# Pro-birth policies, missions and fertility: historical evidence from Congo

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# Pro-birth policies, missions and fertility : historical evidence from Congo

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**Abstract**

Did colonial powers shape fertility patterns in their colonies? We investigate this question in the context of the Belgian Congo. Starting in the late 1920s, several colonial powers in Africa feared depopulation of their colonies and designed pro-birth policies. The Belgian state heavily relied on Catholic nuns to implement these policies in the Congo. Using a demographic survey conducted in the 1970s in seven major cities, we recovered the individual birth calendars of 30,000 women born between 1900 and 1948, under colonial rule. In addition we digitized high-quality territory level information on fertility by cohort in the 1950s. We rely on unique historical and archival material to reconstruct temporal and geographic heterogeneity in exposure to missionary presence and the type of activities performed at the station level. We find a positive effect of Catholic nuns on fertility. In contrast, Catholic male missionaries have no detectable impact on fertility and Protestant missionaries have a clear negative impact. In terms of mechanisms, we argue that progress in general health are unlikely to explain, *alone*, the rise in fertility. Another likely channel was the promotion of an ideal of domesticity where women are confined to their role of mother and wife. Finally, using *Demographic and Health Survey* data, we find some trace of colonial mission's influence on fertility patterns today.

Keywords: Colonial demographic policies, fertility, missions, Congo.

JEL codes: D31, D15, O15, O17, N35.

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# 1 Introduction

Today, fertility levels remain remarkably high in many sub-Saharan African countries, including the Democratic Republic of Congo (DRC) where women give birth to more than six children on average. More worryingly, levels of fertility and of desired fertility are not decreasing as theories of demographic transitions would predict (Bongaarts and Casterline, 2013; Caldwell et al., 1992; Lee, 2003). In fact fertility has even been slightly increasing in the DRC in the recent past, despite sizeable decrease in infant mortality (Shapiro et al., 2017).

While reasons behind African peculiar fertility patterns are still debated, a partial explanation may be that, compared to other regions of the globe, modern family planning programs are lagging behind (De Silva and Tenreyro, 2017, 2020). Yet family policies have a long history in Africa and the question of how to change fertility patterns in the region was the subject of heated debates in the 1920s already. However, the policy makers' main objective then was the exact opposite of modern family planing programs: colonial powers feared depopulation and aimed at increasing fertility in their colonies. Several states carefully designed pro-birth policies and heavily invested in their implementation from the 1930s onward. Surprisingly, these policies - and their potential long-term consequences - have received very little attention in the social science literature. In fact there are few studies in general on the economics of historical changes in fertility (Guinnane, 2011). Historians who have analysed these policies stress that their quantitative impacts on targeted women remain largely unknown (Cornet, 2014; Hunt, 1988; Likaka, 2006). Recently, Canning et al. (2020) and Saxena (2022) have investigated the colonial origins of present-day fertility patterns in sub-Saharan Africa and show that the type of reproductive policies implemented by the colonizers has an important influence on fertility outcomes today.

In this paper, we seek to investigate the impacts of pro-birth policies in colonial Congo during and directly after the colonial period. To implement these policies, the Belgian colonial state heavily relied on Catholic missionaries, and Catholic nuns in particular (Catholic male missionaries were generally not involved in girls' education or women health interventions). In practice, the state subsidized Catholic missions to implement health

and education programs targeted at women with the double objective of raising fertility and decreasing child mortality. Protestant missionaries, who were also very active in the colony, were more independent (financially and ideologically) from the Belgian state. Motivated by work from history arguing, on the one hand that female missionaries had a deep transformative influence on girls "close to the mission", and, on the other hand that Catholic nuns effectively implemented health and education programs designed by the State, we hypothesize that women exposed to Catholic nuns (but not those exposed exclusively to male missionaries) increased their fertility. We are more agnostic about the impact of Protestant missionaries. They also provided education and health care to girls and women, but the content of their programs and the personnel administrating them were sensibly different from those of the Catholics.

To measure fertility behaviors, we recovered individual birth calendar for a sample of about 30000 women surveyed in the 1970s and representative of the population of seven major cities of the newly independent country.[1] The survey is of exceptional quality and provides individual level information for a time period at which reliable demographic information is sorely lacking. In addition, we digitized data from the 1950s on fertility by age categories for 148 territories (this data is representative of 95% of the colony's population).[2] We also built a comprehensive data set on the universe of Catholic and Protestant missionary posts from the 19th century to 1948. For Catholic missions, we know when each post opened, the type of personnel present (in terms of gender and congregation) and the activities missionaries engaged in. This data provides a source of temporal and geographical heterogeneity in pro-birth program intensity: in a given place in a given year, state-subsidized girls education and women health interventions were implemented if Catholic female missionaries were sufficiently close by. We use this heterogeneity in the spirit of a difference-in-difference strategy: we exploit the arrival of new missions of different types (Catholic, Catholic with nuns, Protestants) at different dates in the 148 territories of the country and compare cohorts by their degree of exposures to the missions.

[1] At that time about 20% of the population was urban (de Saint Moulin sJ, 1974). More than 90% of sampled women were born in a rural area and migrated during the last years of the colonial era or after independence.

[2] The territory (*territoire* in French) is the lowest level of administrative division in the Belgian Congo.

We find that Catholic missions stimulated fertility when they hosted Catholic nuns. A decrease of 100 km in the distance to such mission increases the number of children by about 0.2 (for women aged 35). The effect of Catholic nuns is particularly strong when they operated housekeeping schools. In stark contrast, Protestant missions have a negative and robust impact on fertility: women exposed have their first child later, have larger birth intervals and fewer children (a decrease in 100 km in the average distance to a Protestant mission decreases the number of children at 35 by about 0.15). The results are robust to the inclusion of a variety of geographic pre-colonial and individual controls. To verify that mission location (or more precisely the endogenous timing of mission openings) is not driving the results, we check that the parallel trend assumptions hold using the eldest cohort of the 1950s data (and find no significant fertility trends prior to the opening of new missionary posts whether we consider posts of Catholic male missionaries, Catholic female missionaries or Protestant missionaries).[3] Selective urban migration does not seem to drive the results either: when we compare the same birth cohorts (from the same territory) in the representative sample of the 1950s and in the urban sample of migrant in the 1970s, we find similar fertility patterns in the 1950s.[4]

We conclude that, overall, the State was successful in its efforts to stimulate fertility by subsidizing health and education interventions by Catholic nuns. Investigating the mechanisms beyond this overall impact on fertility is complex. Yet the contrasted effects of Protestant and Catholic missions (and the effects of specific missionary works) suggests that improvements in general health alone are unlikely to account for the increase in fertility in the vicinity of nuns. Indeed Protestant missions health care was unlikely to be of lower quality for the period under study. We suggest that Catholic female missionaries were probably successful in changing behaviour and preference related to maternity. Education and evangelizing activities promoted the image of an ideal Christian wife entirely dedicated to the well-being of her children and husband and the embedding of the discourse in religious prescriptions possibly facilitated persuasion (Bassi and Rasul, 2017). Protestant missionaries may have instilled a different view on women's roles. While "Christian

[3]Protestant missions typically hosted both male and female missionaries.

[4]We can reconstruct the fertility in the 1950s of a woman surveyed in the 1970s using their birth calendar.

marriage" was an important institution for them, they also insisted on the importance of formal female education and the promotion of women as local Christian leaders. The contrasted impact of Protestant and Catholic missionaries on female outcomes resonates with the findings of several papers on the distinctive impact of Protestant missions on women education in Prussia (Becker and Woessmann, 2008), India (Calvi et al., 2020) or Africa (Nunn, 2014).

These findings raise the question of the long-lasting influence of these colonial policies on fertility. It is outside the scope of this paper to provide an answer to this question. Yet, as a first step in this direction, we investigate the correlation between Christian missions locations in 1948 and fertility behavior of women in 2007 and 2013-14 (using the two available waves of the Demographic and Health Surveys). We find that women in the vicinity of former Catholic missions do not have more children today. Yet we may find trace of colonial influence in breastfeeding and abstinence behavior that tend to be less prevalent closer to former Catholic missions.[5]

We contribute to several strands of the literature. First, we contribute to a recent literature on the influences of colonial institutions on fertility patterns in sub-Saharan Africa. Canning et al. (2020) compare fertility patterns between the French and the British empires using a regression discontinuity design across the colonial borders that went through homogeneous ancestral ethnic homelands. They show that fertility is significantly higher in the former French colonies where women rely less on modern contraceptives. They argue, with the help of an event study, that the gap in fertility is driven by the earlier introduction of family planning policies in the former British colonies (see also the similar study by Saxena (2022), including countries colonized by Portugal and Belgium). More generally we contribute to a growing literature on the impacts of colonial policies and institutions on individual behaviours and attitudes (Acemoglu et al., 2001; Anderson, 2018; Banerjee and Iyer, 2005; Dell and Olken, 2020; Huillery, 2009; Lowes and Montero, 2020, 2021). Our originality, with respect to this literature, is to measure impacts of exposure

[5] In line with the results on historical data, we find that women living closer to former Protestant missions tend to have fewer children. We find no correlation between Protestant mission location and breastfeeding or abstinence behavior.

to colonial policies on individuals directly exposed to these policies.[6]

Finally, and more directly, we contribute to a growing literature on the impact of missions on development outcomes. This literature insists on long lasting effects (mostly on education and health) of missionary presence during the colonial period (see, for example, Cagé and Rueda, 2016, 2020; Valencia Caicedo, 2019; Calvi et al., 2020; Nunn, 2014 and the extensive reviews by Jedwab et al., 2018 and Becker et al., 2021). Particularly relevant is the recent paper of Okoye and Pongou (2021) who investigate the long-term impacts of missions on fertility (among other outcomes), using a discontinuity design around the border of the Emirates of Northern Nigeria where missionary activities were restricted. They find that, in areas where missions were more active, fertility is lower today. Our specificity with respect to the existing literature on missions lays in our investigation of the early impacts of missions on local populations, which is an important step to understand the long-term effects of missionary presence. Furthermore, by exploiting the *timing of opening* of posts, our identification strategy is less demanding than that of the existing literature: we need not assume that - once geographical and historical controls are introduced - missions settled in "random" places. Because we combine time and geographic variations in exposure, we need to assume that the specific timing of (specific) post openings is uncorrelated with pre-existing fertility trends. We also go a step further in decomposing the influence by type of mission and missionary work (close to the paper of Calvi et al., 2020).

The rest of the paper is organized as follows. Section 2 provides background on pro-birth policies and missions' expansion over the period of interest. Section 3 introduces the data and measures. Section 4 details our empirical strategies and presents the results. Section 5 discusses the mechanisms behind the results at the light of historical evidence. Section 6 analyzes the correlation between former mission location and fertility in the 2000s using DHS data and Section 7 concludes.

## 2 Historical context

[6] In that sense, we are close to the work of Meier zu Selhausen (2014); Meier zu Selhausen and Weisdorf (2016) on the impact of missions on women empowerment

## 2.1 Fear of depopulation, pro-birth policies and the role of Catholic missions

*For the future of the race and the prosperity of our colony, we must count on high childbirths.* P.J. Bourgaux, Union Minière du Haut-Katanga, cited by Likaka (2006)

Between 1885 and 1930, the population of Congo was decreasing. The lack of reliable data makes it hard to estimate the extend of the decline but it was a major preoccupation for colonial authorities (Sanderson, 2000, 2020). The Belgian colony was not an exception and similar trends were observed in neighbouring countries. France and the United Kingdom shared Belgian concern about the demographic situation (Feierman, 1985).[7] Colonial authorities feared labour shortage: a colony would be worth little without workers. The general governor of the Congo summarized the problem in the following terms in 1924: *"The exploitation of the resources we know about - and of those we guess exist - will require numerous hands. It will be delayed if the population does not grow as fast as our resource extraction, and many worry that natality is so low that a gradual decrease, slow but certain, of the population is inevitable."*[8] Low fertility rates became the main topic of the colonial demographic literature and several medical studies and expeditions were devoted to these questions (Hunt, 1988; Sanderson, 2010).

Both European occupation and indigenous practices were blamed for low natality. Colonization was said to have accelerated the spread of diseases and lead to trauma, depression and an apathy that inhibited reproductive functions (Romaniuk, 1967). Indigenous practices held responsible for low birth rates included polygamy, traditional practices of abortion and abstinence during breastfeeding (Hunt, 1988).[9] There was a lot of attention to

[7] Reliable demographic information from the late 1950s confirm that, in some regions in particular, natality rates were very low and infertility rates were very high in the last decades of the 19th and the first decades of the 20th century (Romaniuk, 1967). It is now commonly accepted that sexually transmitted diseases played a major role in this "natality crisis" (Retel-Laurentin, 1974) and that, while the problem predated the Belgium colonization, the movements of population triggered by colonization aggravated the problem. Sterility sharply declined in the next several decades for reasons that remain debated. Anti-veneral diseases campaigns in the late colonial period may have contributed to lessen the problem (Romaniuk, 2011).

[8] This declaration is cited in Congrès Colonial National (1924).

[9] The colonial literature explains abstinence during breastfeeding by superstition and reports that African believed that having sexual relations during this period would harm the child and bring bad luck to the family(Hunt, 1988).

the latter element: as breastfeeding periods were long (two to three years according to the colonial literature), it lead to "excessive" birth-spacing.[10] The historian Hunt (1988) cites the report to the Colonial National Congress of 1924 that makes the explicit link between breastfeeding and low fertility: *"the present situation is certainly irrational. Sometimes women breast feed during three years. In the course of the approximate thirty years during which women are susceptible of becoming mothers, [it is irrational] to place periods of three to four years during which they can have only a single child, while nature would certainly permit them to support more frequent pregnancies without harm"*.

The government started to design policies to reduce infant mortality and promote birth rates in the 1920s. It subsidized health facilities and the development of programs that would teach African women the "art" of child rearing. In addition, the government introduced a tax on polygamy and subsidies for large (monogamous) families.[11] In order to reduce birth spacing, breastfeeding periods were to be reduced and artificial milk and alternative feeding practices were to be promoted (Hunt, 1988). Belgium was not the only country to implement pro-natalist policies in its colony. In the French Empire, laws prohibiting abortion and the use of contraceptives came into effect as early as the 1920s, and continued until after the 1960s. Population policies in the British colonies were also pro-natalist until the 1940s, when policies began to focus on population control, for example by introducing modern contraceptive methods in the 1950s (Canning et al., 2020).

To implement these pro-birth policies the Belgian government seek the support of missionaries: female missionaries were put in charge of the new maternal and infant health programs and would help change sexual practices through moral advice and incentives (Likaka, 2006). An annual subvention was allocated to "national missions" if they respected a strict program and worked under the control of the hygiene services to which they would regularly report (Cornet, 2014, pp 155-6). These programs were ambitious and the regular maternal and infant consultations turned out to be successful at attract-

[10] Even in the absence of sexual abstinence during breastfeeding, breastfeeding depresses fertility through changes in hormonal secretion.

[11] Polygamy was thought to depress birth rates for several reasons. By encouraging young women to marry old men, some young men may be without wives. In addition polygamy was seen as an obstacle to a "higher conception of marriage" that would be centered on reproduction (Congrès Colonial National, 1924).

ing women. It is estimated that at the end of the 1950s about a third of the colony's infant population (aged 0 to 2) attended a consultation program, and half of women giving birth would have attended prenatal consultations. During these consultations mothers (or mothers-to-be) would be instructed about appropriate infant care and in particular feeding practices. As an illustration of the colonial prescriptions regarding infant care, Figure 1 shows a page from an official booklet informing women of all the steps to follow in order to feed their child correctly. It promotes transition to solid food and to bottle feeding and mothers of infant of 10 months are adviced not to breastfeed anymore.[12]

Next to medical programs, girls education programs intended to raise morality standards, promote "Christian marriage" and teach appropriate home-keeping practices. Girls who attended schools were to become Christian wives and mothers, focused on their household. Programs were set by the government and virtually all education took place in missions.[13] When secondary schools opened for girls, they were almost exclusively dedicated to home-keeping. The *écoles ménagères* (housekeeping schools) taught among others infant care, hygiene, sewing and ironing.

### 2.2 Mission expansion, Protestant vs Catholic missionaries and the State

As illustrated by the implementation of pro-birth policies, missions were important intermediaries between the State and the population. In addition to relying on the logistical support of missions for medical assistance, the State saw missionaries as agents of social control that would ensure local peace and educate workers (Markowitz, 1973). It encouraged the expansions of missions, by granting them land concessions and providing subsidies for missionary school and health facilities.[14]

Catholic and Protestant missions had distinct status and relations with the State. Catholic missions were typically "national" while Protestant missions were predominantly from Great-Britain, the United States or Sweden. While claiming to support religious freedom

[12]This booklet, written by a doctor of the colony, was translated into the main local languages and was distributed in the maternal health facilities and housekeeping schools.

[13]The same was true of the British colonies. In the French Empire, education was more often public and teachers were secular state officials.

[14]In the French and British Empires as well, missionary personnel were the main providers of basic health care (Nkwam, 1988; Rouanet, 2015)

and the principles of international law, the State favoured national Catholic congregations over Protestant societies. Protestant missions regularly complained to national authorities that they were receiving smaller land grants than the Catholics, and were excluded from receiving state subsidies. Indeed, until the end of WWII, education and medical subsidies were granted to national missions only. This did not prevent Protestant missions to continue their expansion (see Figure 2, Panel A).

Catholic and Protestant had very different view on their mandate. Catholics were reluctant at first to engage in medical relief work, fearing that healing the body would crowd-out important resources destined to saving the soul (Au, 2017). The development of medical activities in Catholic posts was stimulated by State subsidies and followed the arrival of nuns (despite their lack of formal qualification in this area).[15] In contrast, Protestant missions embraced medical work with great enthusiasm, and relied on highly qualified personnel: they had licensed medical doctors and hospital long before the Catholics (Au, 2017; Markowitz, 1973).[16] Protestant missions welcomed women from the start: the figures available in Irvine (1978) indicate that female missionaries participated to the opening of more than 88% of Protestant posts. In contrast the presence of Catholic nuns only became substantial in the 1930s.

In the area of education, Protestants also got a head start, yet both Catholics and Protestants heavily invested (with the help of State subsidies for the Catholics) in mass education and competed against each other. The primary goals of Catholic missionary schools was mass conversion and the focus was on "socialization" and moral training rather than on "education". Historians report that Protestant education was of higher quality and provided girls with opportunities for literacy before the Catholics partly because they implemented coeducation, instead of aiming for as much gender-specific education as possible (Depaepe and Lembagusala Kikumbi, 2018; Yates, 1982).[17] The development of girls' education in

[15]The government clearly saw the advantage of relying on missionaries. In Congrès Colonial National (1924) one reads: *"Give [missions] the resources needed, they will, at much lower cost than the State or the Red Cross, embark on the medical crusade [...]. If, much alike Protestant foreign missions - who do not lack resources - Belgian religious missions could hire medical doctors, they could considerably increase their social action and bring to the natives from the bush an outstanding medical assistance."* (p. 132, own translation).

[16]Despite important efforts to recruit doctors for Catholic missions in the 1920s, by 1930 there were only 8 Catholic mission doctors, against 30 Protestant mission doctors (Au, 2017).

[17]The report from the 7th congress of Protestant missionaries in the Congo held in 1918 in Luebo, Congo,

Catholic missions followed the arrival of nuns. Overall, investment in girls education has been substantially lower than investment in boys education over the colonial period. Only one in five pupil was a girl upon independence in 1960 (Yates, 1982).[18]

# 3 Data, samples and measures

To measure fertility behaviors and missionary presence in the Belgian Congo during the colonial period, we rely on multiple original sources from historical documents and archival data. The fertility outcomes are derived from two main demographic surveys. The first was conducted in the mid-1950s throughout the whole country and it lead to the publication of data aggregated at the territory (the smallest administrative unit) and the cohort level. For the second survey (conducted in the mid-1970s in seven major cities), we were able to recover individual level records. To assess the extent to which individuals are exposed to the missionary presence, we rely on missionary yearbooks and handbooks, as well as maps indicating the location of different mission stations. These three main data sets are described in greater details in the following sub-sections.

## 3.1 Demographic surveys and fertility measures

### 3.1.1 Demographic survey in urban Zaire in the 1970s: data recorded at the individual level

The micro-data we use to construct our main outcomes are derived from a unique demographic and household budget survey that was carried out between 1975 and 1977, in seven major cities of Zaire: Kinshasa, Matadi, Bandundu, Kikwit, Mbandaka, Kananga

provides an account of what has been accomplished in terms of education and underlines the importance of girls' education - and the difference with the Catholics in this regards: *"Boys and girls have been gathered into village schools in large numbers. At almost every mission station boys have been taught, and on quite a large number girls also. And right where let it be said that it is most necessary to educate the girls of Congo as well as the boys [...] We are glad to record that much has been done in the training of women, and that the majority of our missionaries are awake to this great need. [...] What would have been the result of the Christian churches at home had neglected the education of women? We can have some idea of the result after viewing some of the Latin countries of Southern Europe and of South America dominated by a church that is afraid to educate its people, especially the women."* Congo Missionary Conference, 1918, p.69

[18] Yates (1982) writes that the Belgian Congo "had one of the highest Third Word enrolment rates for males and one of the lowest for females".

and Bukavu.[19] For each of these cities, a census was conducted to count and identify all existing households in each city. From this census, one in eight households was randomly selected so that a total of 270,000 individuals in 46,000 households were interviewed.[20] For each individual belonging to the selected households, enumerators carefully collected demographic information (age, gender, ethnic group, marital status, place of birth), socio-economic characteristics (level of education, employment status and occupation) and position in the household (relationship to the head of the household).

A major advantage of this survey is that each woman over 13 reported the birth schedule of all children she ever had, including the exact month and year of birth, the child's gender and, in case the child was no longer alive, the exact month and year of death. Thanks to this information, we can reconstruct a woman's fertility at a given age (here we measure those levels at 25, 35, 40 and 45) as well as the age at first child, the birth intervals between children, childlessness (whether a women, at a given age, has never given birth) and infant mortality (whether the child died before age 1). For one-sixth of the households surveyed, the weights (but unfortunately not the height) of a woman and a man over the age of 25 living in the household (and randomly selected from the household) were also recorded. We use this variable as a (rough) indicator of health.[21] Finally, for all members of the household, the territory of birth as well as the date of arrival in the city were recorded. More than 90% of sampled women were born in a rural area and migrated during the last years of the colonial era or after independence. We can thus measure each woman's exposure to missionary presence in childhood (as described in Section 3.2).

This database is an essential asset for this project and more generally for the understanding the link between exposure to colonial presence and fertility choices. Indeed, there are very

[19] Zaire was the name of the country from 1971 to 1997. The French designation for these surveys is *Enquêtes démographiques et budgétaires des villes à l'Ouest du Zaïre*. A digital version of these data was stored in the *Belgian Archives for Social Sciences* of this University of Louvain la Neuve. Republique du Zaïre (1978) provides an overview of the survey.

[20] The census and data collection took between one and six months depending on the city and its population size.

[21] Changes in adult weight across cohorts capture changes both in body size and in body shape (fat in the body) (Cole, 2003). The measure of weight thus depends on both nutritional investments in childhood (which influences height) and access to nutrition as an adult (in the weeks preceding the survey) without allowing us to distinguish between the two. In any case, weight is associated to greater access to food (either as a child or an adult) and we are quite confident that weight is positively correlated with health at that time.Overweight was not an issue in the 1970s, quite to the contrary (Abarca-Gómez et al., 2017). The population of Zaire had a very low body mass index and suffered from chronic malnutrition and poverty.

few databases of this quality that have rigorously collected information from individuals who lived under the colonial system with this level of coverage (Sanderson, 2010). Yet, a potential concern is that these surveys were conducted under the Mobutu dictatorship, in a context of hyperinflation and economic hardship, and thus the data may have been strategically manipulated by interviewers or respondents for political or economic purposes. While we found no documents that explicitly address this possible caveat, we are reassured by the following considerations. First, the design of the survey was developed by a team of recognized demographers of Louvain-la-Neuve University in Belgium and at the Congolese Official Institute of Research and Statistics. The implementation of the survey was jointly managed by these teams. The statistical programming, data cleaning, analysis and storage of the information were performed in Louvain-la-Neuve. Documents found in the archives show an impressive level of care taken in data collection and control of the quality levels.Second, these data have been used by prominent demographers specializing in African demography for a significant number of published works (see for instance Shapiro, 1996 and Tabutin, 1982), and they are cited as a reference for measuring infant mortality in the Democratic Republic of Congo during the colonial period (Sanderson, 2010). Finally, this survey uses the same birth calendar methodology to reconstruct measures of fertility and infant mortality as current benchmark surveys, such as the Demographic and Health Surveys. All in all, we believe that the quality of the data meets high social science standards.

#### 3.1.2 Demographic survey of the Congo, 1950s: fertility by age and territory

The results of the survey on Congolese demography conducted in 1955-7 were published in official reports (see Figure 3) and, in particular, current fertility levels are available by 5- or 10-year age categories, at the territory level and for all the territories in the country. Age categories are : 15-19, 20-24, 25-29, 30-34, 35-44, 45-54, +55. Although this data set provides less precise information than that of the 1970s, it has the advantage of being representative of the population of the whole country. About 10% of the population of all territories was surveyed. The sample was stratified to be representative of both urban and rural areas. The published aggregated data accounts for this sampling strategy. Overall,

it is considered to be the first scientific and high quality survey conducted in the Congo (Romaniuk, 1967). To obtain our database, we digitized the published survey results.[22]

## 3.2 Exposure to colonial presence : Missions, missionaries and missionary works

### 3.2.1 Sources for catholic missions

The main sources we have for the Catholic missions come from three official and exhaustive yearbooks published in 1924, 1935 and 1949 (Corman, 1924, 1935; Van Wing, 1949). These three yearbooks contain rich information as they indicate precisely the dates of opening of the missionary posts, the name of congregation managing the post, the current number of missionaries per post, and the presence of female missionaries (their number and their date of arrival). This information is completed by maps allowing to pinpoint the geographical location of each post.

The yearbooks also indicate the type of activities being conducted by missionary personnel at each post at the time of their publication. While these types of activities are diverse, they remain closely related to the two main functions of missionary work: education and health. Table 1 presents four categories of activities dedicated to women and their children that are highlighted in this article: (i) the workrooms, in which women were paid to make handicrafts that the female missionaries then sold in Belgium; (ii) the housekeeping schools and marriage preparation workshops; (iii) the infrastructures and workshops related to maternal and child health: maternity wards, childcare classes, etc.; and finally, (iv) the dispensaries and general health infrastructures.

While some posts are sometimes transferred from one Catholic congregation to another (and this transfer sometimes means that the post is abandoned for a few years), very few posts closed permanently during the period from 1886 to 1949: only 6 posts out of the 389 posts identified with our data were permanently closed.[23] We can thus assume that when a Catholic post is open, it remains so throughout the period, and that the surrounding

[22] One report was never published, so that information is missing for 6 territories.

[23] This, however, does not mean that other posts opened and closed permanently in between yearbook publications or before 1924.

populations are therefore exposed to the missionary presence.

### 3.2.2 Sources for Protestant missions

The sources for the Protestant missions are more scattered than for the Catholic missions, since Protestant societies are less centralized and they came from various countries and regions of the world. To construct our indicators of Protestant missionary presence, we rely on two types of sources: two handbooks compiled in 1961 (Braekman, 1961) and in 1978 (Irvine, 1978) [24]; and six official maps indicating the presence of missionary posts published in 1905, 1921, 1930, 1944, 1953 and 1960.[25] To recover the opening dates of the Protestant posts, we rely on the information contained in both handbooks and in the 1944 map. Only 6 posts out the 286 posts in the final data set do not have an opening date.[26] Theses sources allows us to reconstruct the opening dates of protestants posts for the period 1878-1960. However, as this information is censored for Catholic post from 1948 onward, we focus on the 1886-1948 period. Finally, based on the 1978 handbook, only 17% of the posts closed permanently. As with the Catholic posts, we assume that once opened the posts are active (although the church that manages them may change during the period).

The sources we have for Protestant missions do not contain systematic information on missionary activities within posts. Yet, based on the 1978 handbook, we can easily hypothesize a generalized female presence in Protestant missions: at least one woman participated to the opening of 88% of the posts listed. Also, it allows us to confirm that the Protestant religious personnel was different from that of the Catholic missions: a typical mission was composed of a reverend and his wife, sometimes accompanied by educated unmarried women.

[24] Unlike the Catholic missions, these handbooks are not official, but the authors have scrupulously compiled the information they able to obtain from the various church reports and archives.

[25] We found the maps in the archives of the African Museum in Namur, Belgium.

[26] For these posts we randomly draw a date between the last map on which the post does not appear and the first map on which it is indicated. For example, if a post first appears in 1930, we draw a random date between 1930 and 1921.

### 3.2.3 Dynamics of post openings and measures of colonial exposure

Figure 2 displays the dynamics of new post openings : panel (a) illustrates that the Protestant presence predates that of the Catholics, with the latter catching up – in terms of number of posts – only in the 1930s. Also, this figure shows that the arrival of Catholic female missionaries roughly from the mid-1920s: their presence intensifies up to the beginning of the Second World War. Panel (b) further reveals that the missionary expansion implied a gradual occupation of the whole country: the number of territories with at least one post is increasing throughout the period, which implies that new posts are opening in territories that were not colonized until then. Thus, by the end of 1948, almost all the territories have at least one Catholic post, 80% of the territories have at least one Protestant post, and 66% have at least one Catholic post with Catholic nuns. The gradual occupation of the whole country is also illustrated by the maps presented in Figure 4.

We construct two types of measure of missionary presence at the territory level for any given year between 1886 and 1949. First, we use a binary variable equal to 1 if at least one Catholic (Catholic with nuns or Protestant) missionary post was active on date $t$ in territory $g$. As the nuns are always under the supervision of a male congregation, the date of arrival of Catholic female missionary is always posterior or equal to that of the opening of the post.

Second, we construct continuous measures of proximity that account for the density of missionary posts at the territory level. We follow the methodology proposed by Calvi and Mantovanelli (2018): within each territory we generate 1000 randomly located points; for each of these points we compute the distance to the nearest Catholic post (respectively Protestant or Catholic post with nuns) in any given year (between 1900 and 1948); we compute the average of these distances at the territory level in a given year. The advantage of this methodology is that it accounts for posts that are located in neighboring territories: if a post is build outside but close to a territory boundary, it will influences exposure within the territory considered.[27] Based on these distances we construct two measures of

[27]This measure accurately represents the exposure of a randomly selected inhabitant of the territory if the density of population is homogeneous within the territory. As there is no information available about variation in population density within territories, we can hardly refine our measure. Note however that

proximity: the average proximity and the log average proximity. The first is obtained by multiplying by -1 the distance and the second by applying the logarithm function before multiplying by -1. We apply the same methodology to define exposure to specific Catholic missionary activities.[28] Table 2 reports the average proximity at the territory level in 1910 and 1948 and confirms a sharp decrease in the average distance to the three types of post over the period.

In order to match these measures to the demographic survey data of the 1970s, we use the territory of birth, available for each individual. In the case of the 1950s survey, we use the territory of residence (since the aggregation at the territory level is based on the territory of residence). In order to define exposure measures for a given age category, we compute the arithmetic average of age-specific exposure measures.

To define exposure for a given woman we need to choose an age at which to compute her distance to missions. We choose to compute exposure at birth and at age 6. Using older thresholds would imply large losses of information because of the censuring in the variation in exposure from 1948 onward (the last year at which we observe opening of Catholic missions). Moreover, the historical literature provides arguments for the choice of an early threshold: missionaries targeted young children for education and conversion.[29] Our preferred measure is exposure at birth because it allows us to include more women into the analysis when we use the 1970s data.[30]

# 4 Impact of missions on fertility behavior

In this section we investigate how the presence of missions changed women fertility behavior during and right after the colonial period. We are seeking to evaluate the impacts of

urbanization was very limited before 1950.

[28] Note however that the yearbooks only indicate whether these activities were in place at the time of publication and not the exact date of implementation of these activities. We thus assume that an activity starts the year the yearbook is published and stops the year before the next book is published if it is not mentioned in the next book.

[29] Hunt (1988) writes that the higher conception of marriage and the social duties incumbent on spouses *was not easily inculcated [...] usually requiring Christian education for both spouses, and was most likely about "girls raised among the nuns".* Another historian, Cornet (2014), reports that adult women were *less enthusiastic pupils when exposed to the mental revolutions proposed by occidental missionaries.*

[30] Because we measure missionary presence only up to 1948, when we use the 6-year threshold we need to restrict attention to those born before 1942 (and thus loose observations of women born between 1942 and 1948).

colonial pro-birth policies and we are thus primarily interested in the effects of Catholic nuns (the implementers of these policies) on women fertility. Yet, in order to discuss the plausible channels of influence of Catholic female missionaries on fertility, we contrast the effects of Catholic nuns with Protestant missionaries and male Catholic missionaries. Indeed missions may affect fertility through various mechanisms, some of which suggest different effects of different types of mission.

We see four main channels of influence of missions on fertility, corresponding to different sets of missionaries activities: conversion, health, education and economic opportunities. First, conversion to a religion that promotes the image of women focused on reproduction may, by itself, increase fertility. If this is the case, we would expect male Catholic missionaries to (also) have a stimulating effect on fertility. Second, health interventions may increase the general health of the population and thereby fertility. If this is the main canal of missionary influence, Catholic missions with nuns but also Protestant missions - recognized for the quality of their health expertise during the period of study - should have a stimulating impact on fertility while Catholic missions without nuns should not. Relatedly, if the State-sponsored health programs targeting women's fertility proved successful, the impact of Catholic nuns' may be more pronounced than that of Protestant (not sponsored). Third, education may decrease fertility by increasing women's access to new economic opportunities. Yet, if the teaching incites women to focus on their reproductive role, the overall effect of education is ambiguous. Because Catholic schools (and official programs) promoted more conservative gender roles, we hypothesize that they are less likely to reduce the fertility than Protestant schools. Fourth, missions may directly provide employment possibilities to women, thereby increasing the cost of child rearing and decreasing fertility. It is difficult to evaluate the differences between missions in that regard and we expect this channel to lead to decrease in fertility for all types of missions.

While our analysis will not permit to precisely quantify the relative contribution of these distinct mechanisms, we will be able to rule out some scenarios by comparing the overall impact of Catholic male missionaries, Catholic nuns and Protestant and exploring the separate impact of different activities Catholic nuns engaged in.

We start by introducing our empirical strategies in Section 4.1. We then present estimation results for the impact of missions on total fertility, first birth, birth spacing, child mortality and childlessness in Section 4.2. In Section 4.3, we reproduce the analysis, distinguishing between activities that Catholic nuns engaged in.

## 4.1 Empirical strategies

We seek evaluate the impact of growing up close to missions on women's fertility. To do so, we rely on a generalized difference-in-difference approach and we leverage both the intensity of the missionary exposure and the timing of such exposure.

### 4.1.1 Differences-in-differences using the 1970s individual records

For this data, our baseline specification is as follows :

$$Y_{i,t,g} = \alpha_0 + \alpha_1 \text{ ExpCatholics-All}_{i,t',g} + \alpha_2 \text{ ExpCatholics-Nuns}_{i,t',g} + \alpha_3 \text{ ExpProtestants}_{i,t',g} + \alpha_4\, t + \alpha_5\, t^2 + X_g'\alpha_6 + u_g + \epsilon_{i,t} \quad (1)$$

where $Y_{i,t,g}$ is the fertility outcome for woman $i$, born in *territory* $g$ in year $t$. ExpCatholics-All$_{i,t',g}$, ExpCatholics-Nuns$_{i,t',g}$ and ExpProtestants$_{i,t',g}$ are the exposure measures as described in Section 3.2 : these are either the extensive measure (whether there is at least one missionary post in *territory* $g$ at time $t'$), or the intensive margin variables (based on distances), and are measured either at birth (in which case $t = t'$) or at age 6 ( $t' = t + 6$). The coefficient associated to ExpCatholics-Nuns$_{i,t,g}$ captures the effect of posts in which Catholic nuns are active, conditional on the effects of exposure to Catholic posts in general (ExpCatholics-All, which includes both men and women) and Protestant posts (ExpProtestants). The variables $t$ and $t^2$ allow to account for quadratic year-of-birth time trends. The vector $X_g$ includes controls such as the city of residence, and a dummy variable indicating whether the place of birth within the *territory* is in a rural area or not. Importantly for our identification strategy, we introduce $u_g$ which is a *territory* of birth fixed effect : this last feature of the equation allows to conduct a *within territory* analysis. Thus, our coefficients of interest, $\alpha_1$, $\alpha_2$ and $\alpha_3$ are identified by time variations

of the exposure to the missions, in a given *territory*. Finally, as our exposure measures are constructed at the *territory*-level, the standard errors are clustered at this level.

**Threats to identification** The *within-territory* approach has two implications for our identification strategy. First, the main identifying assumption is that the settlement of missionaries in a given location is not correlated with fertility trends in that same location. As time-invariant unobserved heterogeneity at the territory level is accounted for by the territory fixed-effect, the omitted variable bias can arise from time-variant confounders at the territory level: e.g., missionaries settle in a given location when the territory's fertility rates start worsening because sanitary conditions deteriorate for instance. We test for the the parallel trend assumption in Section 4.4, using fertility trends derived from the 1950s data. Second, this strategy is less demanding than what the typical estimation on the impact of missions requires. We do not need to assume that areas in which missionaries settled are comparable to areas where they did not settle. Indeed with respect to the intensive-margin exposure measure, all *territories* are considered as "treated", only the intensity of this treatment matter; and as for the extensive-margin approach (whether a *territory* has at least one missionary post), we are reassured by Figure 2 which shows that the vast majority of *territories* have been occupied by the end of the period.

Another threat of identification is selective migration. Indeed the 1970s sample is made of urban dwellers, born in a rural area and that migrated in the late 1950s. We need to provide evidence that the propensity to migrate (and the characteristics of these migrants) is not influenced by mission exposure. Ideally, we would need the information from the rural dwellers in 1970s. As this information is not available, we build a 1950s counter-factual population using the 1970s data : we attribute each woman to her *territory* of birth and age-category in the 1950s and construct her fertility at the date of the 1950s survey. We can then compare the results obtained for the impacts of missions on fertility with the representative sample of the 1950s data and with the 1970s counter-factual sample. If the results are similar, the missions impacts can hardly be driven by selective migration. We provide evidence for such test in Section 4.4.

#### 4.1.2 Differences-in-differences using the 1950s territory-level records

This survey records fertility measures at the territory level but only at the time of the survey and for specific age categories $c$: as a result, we have fewer observations per *territory* than in the 1970s data and we need to construct an average exposure measure for each age category. There is another reason why there is less variation in exposure in this data set: women fertile at the time of the survey were born before 1940 (and long before 1940 for many) and, as a result, post openings that occur towards the end of the period are not taken into account. As a result, we use continuous exposure variables only (which entails more variation) and we adapt Equation (1) by (i) using district fixed effects, $u_d$, which is the next highest administrative division after the territory and (ii) using age category fixed-effect $\delta_c$ instead of year-of-birth trends.[31] Equation (2) is then weighted by the number of individuals in each territory $\times$ age-category.

$$Y_{i,c,g} = \alpha_0 + \alpha_1 \text{ ExpCatholics-All}_{i,c,g} + \alpha_2 \text{ ExpCatholic-Nuns}_{i,c,g} + \alpha_3 \text{ ExpProtestants}_{i,c,g} + \alpha_4 \, \delta_c + X_g' \alpha_5 + \, u_d + \epsilon_{i,c} \quad (2)$$

Since we change the level of analysis from territory to district, we limit the omitted-variable bias by introducing in the vector $X_g$, a series of geographic and historical controls measured at the territory level that could be correlated to both the location choices of mission stations and fertility trends. The choice and construction of the controls builds upon Jedwab et al. (2018) who list the following important covariates of mission location: pre-colonial explorer route (data from Nunn and Wantchekon, 2011), latitude, longitude and their product, average elevation and ruggedness (from Jarvis et al., 2008), population density in 1900 and area suitable for agriculture in 1900 (Klein Goldewijk et al., 2010), the Tsetse Suitability Index (data from Alsan, 2015), an historical malaria index from Kiszewski et al., 2004, the exposure to slave trade (data from Nunn and Wantchekon, 2011), the presence a colonial railroad in 1911 (data from Nunn and Wantchekon, 2011), the average distance to Catholic and to Protestant missions in 1886, territory area, and ac-

[31] If we were to use territory fixed effect, we would loose several territories for which there is no variation in exposure across cohorts for the relevant time period.

cess to a navigable river (from the *Referentiel Geographique Commun*, an online repository for GIS maps for DRC).[32]

**Threats to identification** In addition to the assumption of exogeneity of the mission installation timing, in this setting, we need to check that the location of installation within a district (thus between territories) is not endogenous to fertility patterns. As mentioned above, we control for a set of time-invariant controls measured at the territory level, which partially limits the endogeneity bias. In addition, we compare the characteristics of territories that welcome new posts (of different types) by decades of installation (see Section 4.4).

Another potential caveat is migration: we assume it away when we compute exposure using women territory of current residency at the time of the survey in the 1950s. This assumption is particularly worrisome if women with future high levels of fertility are more likely to have migrated to places close to missions. We believe that this is a minor issue in our context because the administration strictly controlled inter-territories migration until the end of the colonial period (a passport and a reason for work or family reunification were required to migrate) and migration was extremely limited (Likaka, 1997).

## 4.2 Empirical results: The contrasted impacts of Catholic and Protestant missionaries on fertility outcomes

In this section we start by investigating the impact of growing up closer to a mission on women fertility. We then turn to the impact of missions on age at first birth, birth spacing, child mortality, childlessness and weight. We distinguish between Catholic missions, Catholic missions with nuns and Protestant missions. Recalling that Catholic missions with nuns always hosted male missionaries, exposure to mission with male missionaries is captured by the variable ExpCatholics-All, while the impact of exposure to Catholic female missionaries is captured by the variable ExpCatholics-Nuns.

Table 3 provides the results of regressions for the total number of birth at different ages

[32] All controls are constructed at the territory level. Pre-colonial explorer routes, colonial railways and access to a navigable river are binary variables that take value one if an explorer route, a railway or a river crosses the territory.

using the 1970s data. While at older ages, fertility is more likely to be complete, the relevant sample size is smaller as it includes only women who have reached the age considered. Exposure is defined at birth (Table A.1 in appendix provides the same estimation when exposure is defined at age six). Panel A, B and C present the results for three different measures of exposure to missions: the presence of missions (of a given type) in the territory of birth (A), the proximity to the closest mission (of a given type) (B) or the log proximity (C).

The results reveal striking differences by type of missions. When women grew up closer to a Catholic mission with nuns they have more children at age 25, 35, 40 and 45: whether we use a binary indicator for exposure (panel A) or continuous measures (panels B and C), the coefficients on Catholic nuns are (almost always) significant. The coefficients reported in panel A suggests that when a first post with nuns opens in a territory, fertility increased by 0.21 at age 35 (and 0.35 at 45). Increasing the average proximity to a Catholic mission with nuns by 100 km translates in women having 0.19 more children at 35 and 0.23 at 45 (panel B). When catholic missions do not host female missionary they appear to have no influence on fertility (most coefficients on ExpCatholics-All are very small and non significantly different from zero). In contrast, when women grew up closer to Protestant missions, they have fewer children. The coefficients are of similar (absolute) size than those on Catholic nuns (yet less often significant): reducing by 100 km the distance to a Protestant post reduces fertility by 0.15 at 35 and 0.22 at 45 (panel B). If we define exposure at age 6 (Table A.1), the results are also very similar (with slightly larger standard errors since the sample sizes are smaller). While the size of the estimated effects may seem rather modest at first sight, we believe that they suggest a substantial effect of missions. First, a new missionary post's influence certainly grows over time, and by exploiting the opening of new posts we are focusing only on their early impact on women. On a related note, the number of individuals directly in contact with mission's schooling or health activities was only a small share of the overall population of a territory during the period under study, so that a small average effect suggests an important influence on those actually exposed to missions' influence. Furthermore, we are averaging influence at the territory level, thereby introducing noise in the measures of women's exposure and

leading to some attenuation in the estimated coefficients.

To further investigate the impact of missions on fertility, we also estimate the impact of exposure on childlessness and on the fertility of women who have at least one child (Tables 4 and 5). Proximity to Catholics nuns appear to decrease childlessness at 25 but not at later ages while proximity to Protestant missions have the opposite effect, with coefficients being significant for some ages when we use extensive margin measure of exposure or log proximity. The Catholic missions without nuns (coefficient on ExpCatholics-All) do not have a significant impact on this dimension. If we use exposure at age 6 none of the coefficients are significantly different from zero (Table A.2). The results on the fertility of women with at least one child are very similar to those introduced above (see Tables 5 and A.3). This suggests that the overall impact of missions is not driven by the overcoming of primary infertility (an issue highlighted in the colonial demographic literature, we come back to this point in the discussion section).

The sharp contrast between the effects of Catholic and Protestant missions on fertility is confirmed when we use the data from the 1950s demographic survey, representative of both urban and rural areas. As detailed in Section 4.1, this data allows to estimate an average impact of missionary presence on women at different stages of their fecund life, but it does not offer the same detailed information as the 1970s data and we cannot reconstruct fertility at different ages. Table 6 reports the results of linear regressions of women fertility, defining exposure at birth (Table A.4 in appendix provides the same estimation when exposure is defined at six). The first two columns use the complete sample of women (all women above 15) while the last two columns restrict attention to women above 35 (who are close to having completed their fertility). Women who grew up closer to Protestant missions have fewer children: an decrease in 100 km in the distance translates in 0.28 fewer children on average for women above 15 (column 1). Catholic missions have an opposite effect on fertility overall: an decrease in 100 km in the distance to any Catholic mission increases fertility by 0.29 (column 1). This effect is captured by the variable ExpCatolics-All and Catholic nuns do not appear to have an effect on fertility overall (contrary to the estimation in the 1970s sample), except if we focus on older age cohorts (significant when we use exposure at 6). While various elements may

explain the contrasted impact of Catholic nuns in the 1970s and 1950s data, we will argue in Section 4.4 that the difference is largely driven by the loss of information implied by the aggregation at the territory × age category level of the 1950s data.

We now turn to the impact of missions on age at first birth and birth intervals. Table 7 reports the results. Women who grew up closer to Catholic nuns are younger by several months when they have their first child and the opposite holds for Protestants (the coefficients are significant only in the the log specification in Panel C). When we include all birth, we find no effect of missions on child spacing, but when we focus on the first two births and thereby avoid giving larger weight to larger families who generate more observation (column 3), we find a positive and significant effect of Protestant missions. Women who grew up closer to a Protestant mission have modestly larger birth intervals: they have their second child about two months later if the distance is reduced by 100km (Panel B).[33]

The impact of missions on infant mortality is reported in Table 8. Infant mortality appears generally lower for children whose mother grew up closer to a Protestant mission or a Catholic mission with nuns and the effect is often large: decreasing distance by 100 km to either type of mission reduces mortality by 21 per thousand for children of mother above 35 (Panel B). The effect of other Catholic missions seem to go in the other direction. These effects are quite different if we use exposure at six instead (Table A.6 in the appendix): the estimated coefficients are then much smaller and never statistically significant. Given this sensibility of the results to the definition of the exposure threshold, we do not want to draw strong conclusions for the impacts of missions on infant mortality.

Finally, we investigate the impact of exposure to mission in childhood on adult weight, an indicator of adult health. Results are reported in Table 9. We find that exposure to Protestant mission is positively correlated with a women's weight, while the coefficients on exposure to Catholic missions are never significantly different from zero. This suggests that women who grew up closer to Protestant missions are in better health in the 1970s.[34]

[33]The results are similar if we use exposure at six, yet slightly less significant (Table A.5)
[34]The effects are similar if we use exposure at six instead, see Table A.7 in the appendix).

### 4.3 Empirical results: Unfolding the effects of Catholic nuns

In this section, we explore whether different types of missionary activities are associated with different fertility patterns. As explained above, this information is available for Catholic missions only. Furthermore the diversity in activities is a characteristic of posts with nuns. Catholic missions with only male missionaries focused on evangelizing and on boys' education. As mentioned above, Catholic orders systematically turned to female missionaries for any health care or girls' education activity.

We construct the following categories of activities (grouping the most common activities): general health, women and child health, housekeeping school and workroom. The results are reported in Table 10. The excluded category is general health because almost all missions with nuns are active in this area. Two activities stand out with robust effects on fertility: hosting a housekeeping school appears to have a positive effect on the fertility of women who grow up close by while workrooms have a negative effect. Similar (and even stronger) results obtain if we use exposure at six (Table A.8), or if we use the 1950s data (Table 11).

### 4.4 Threats to identification: endogeneity of new post installation and selective migration

In this section we provide some evidence in favor of our identifying assumptions. As detailed in Section 4.1, these assumptions are slightly different in the two samples. With the 1970s sample, we face two main threats: the endogenous timing of mission installation within a territory and the selection into urban migration. With the 1950s sample, we need to assume that not only the timing of installation but also the choice of a territory within a district is uncorrelated with fertility trends.

**Endogenous timing of post installation** Historical accounts of the deployment of Catholic and Protestant posts suggest that both religions had similar strategies regarding their occupation of the country (Markowitz, 1973). We found no evidence that would give credit to the idea that Catholic nuns settled precisely in areas where fertility would

increase in near future while Protestant settled precisely where fertility would decrease.[35]

To formally test for the parallel trend assumption, we investigate, with the 1950s data, whether places where (different types of) missions settled were on different fertility trends.[36] More specifically, we verify that the fertility of the two eldest cohorts in the 1950s (aged 45-55 and more than 55) does not correlated with the installation of missions when they were too old to be affected, using the same controls as in Equation (2). In practice, we compute exposure at 38 and add it to our previous estimations to measure the installation of missions when women had (almost) completed their fertility.[37] Results are presented in Table 12. Exposure to missions at 38 is uncorrelated with women fertility, controlling for mission exposure in infancy.

**Endogenous choice of place within districts** We now turn to the question of whether different type of missions settled in areas with specific characteristics. In particular, we worry that the Protestants settled in less favorable areas than the Catholics (which could be correlated with differential fertility trends). To confront this possibility, we compare the characteristics of the locations of new Catholic, Catholic with nuns and Protestant posts by decades, using the historical controls described in Section 4.1.2. While for some decades, some of the characteristics are significantly different across type of missions, we find no systematic differences that would lend support to the idea that Protestant settled in worse environment (See Table 13).

**Selective urban migration** Does selective migration account for the correlation between the fertility of urban women in the 1970s and missionary presence in their place of birth? The results with the 1950s sample are reassuring: we find similar impacts of the Catholic and the Protestant missionaries when we use a sample representative of the

[35] Missions of a given religion first sought to be present in as many regions, districts, territories as possible. Once present in a given area, they organized their expansion with the same hope to cover as extensively the area as possible (Markowitz, 1973). While many congregations and societies were active in the Congo, there was coordination between congregations for the Catholics and between societies for the Protestants and a great deal of competition between religions to avoid leaving large areas under the domination of the other religion.

[36] We have to rely on the 1950s data for this analysis: women old enough to have almost completed their fertility in the last years for which we have variations in exposure (the late 1940s) are (likely) not alive any more in the 1970s.

[37] We use the age 38 because the youngest women in the 45-54 cohort in the 1950s survey were 38 in 1948, the last year at which we measure exposure.

population. Yet the effect of Catholic nuns is a bit less clear and cannot rule out that the measure of fertility (at the time of the survey) hides some subtle patterns. In order to verify that the women surveyed in the 1970s in a city are similar to their rural counterparts, we build a counter-factual population of the territory in the 1950s using the 1970s data. Using the birth date of each women, we attribute each woman to her age-category in the 1950s and compute her fertility at the date of survey of her territory of birth in the 1950s. We reproduce the estimation of Equation (2) on this counter factual sample and compare the results obtained to the estimation on the 1950s data. Because we have not enough observations for all the territories, some are dropped from the analysis. We thus restrict attention to territories represented in the 1970s. The results are featured in Table 14. The coefficient estimates across the two samples are very similar. This suggests that the women surveyed in the 1970s had similar fertility behavior as the general population of their territories in the 1950s, and that selective migration is unlikely to account for the effect of missionaries in the 1970s data.[38]

# 5 Discussion: results interpretation at the light of historians' contributions

In a nutshell, the empirical results reveal that women have more children when they grew up closer to Catholic nuns and fewer children when they grew up closer to Protestants. This effect is not driven by a differential change in childlessness. Protestant missions also affect age at first birth and birth intervals (effects of Catholic nuns on these outcomes are less marked). Finally the impact of Catholic nuns is larger when they opened housekeeping schools and less pronounced when they offered economic opportunities to women in the form of workrooms.

We draw two main conclusions from our analysis. First, Catholic female missionaries appear to have successfully fulfill the State's expectation regarding their role in encouraging higher birth rates. Second, Protestant missionaries, largely independent from the State, have a diametrically opposite effect on fertility. Understanding the mechanisms behind

[38]The similarity between the two estimations also suggests that the aggregations at the cohort × territory level are likely to drive the differences between the results obtained on the sample of individual records from the 1970s and the results obtained on the sample of cohorts aggregates in the 1950s.

these contrasted impacts is complex, yet combining our empirical results with historical evidence suggest partial answers that we develop here below.

A first important remark is that missions' activities directly targeted towards women seem of foremost importance for the observed change in fertility. Indeed Catholic missions who did not organize these activities (those without nuns) have no impact on women's fertility (at least when focusing on the analysis of individual records from the 1970s).[39] This suggests that the conversion channel alone can hardly account for the impact on fertility. Otherwise, we would have expected male missionaries (who focused on conversion and male education) to lead to a decrease in fertility as well.

Now turning to the specific missionary works targeted at women, both health intervention and the promotion of the reproductive role of women by nuns (through education for example) could contribute to the positive impact of nuns on fertility. We discuss the relevance of these channels and then turn to the contrasted impact of Protestant missionaries.

Could general improvements in women health alone explain the positive of Catholic nuns on fertility (and the contrast with Protestants)? Several elements suggest that this is unlikely. First, historical evidence suggests that health interventions of Catholic missions were not of higher quality than those of the Protestants. Protestant missions had more qualified personnel, and started to run dispensaries and hospitals before the Catholics.[40] We cannot rule out however that the activities of the average Catholic mission was of wider scale, given the easier access to State subsidies.[41] Another element against a pure general health channel is the impact of Catholic mission on infant mortality: mothers who grew up closer to Catholic missions with nuns are *not* loosing fewer infants (which might be expected if they are themselves healthier). Furthermore, women who grew up closer to

[39] The dichotomy between missions with and without female missionaries is irrelevant for the Protestants: Protestant missions hosted both male and female missionaries and engaged from the beginning in activities for women (and in fact welcomed girls together with boys in primary schools).

[40] Detailed archival work for several missionary societies and congregations in neighboring Rwanda - a country also under Belgian ruling where health program and missionary implementation followed the same dynamics as in the Congo - reveals that, in the interwar period, 52% of female Protestant missionaries were trained as nurses or medical doctors against 15% of Catholic female missionaries. No Catholic nun held a medical doctor degree (Cornet, 2014).

[41] It is very difficult to find comparable figures for medical actions of Protestant versus Catholic missions. In contrast to aggregate statistics produced episodically for Protestant missions, Catholic yearbooks do not report systematic information on medical consultations, number of treated individuals, the qualification of the personal, the number of hospital beds, etc...

the Catholic nuns do not enjoy larger weights in the 1970s (contrary to those who grew up closer to the Protestants). To the extend that weight at that time is positively correlated with health, it is additional evidence against a pure general health channel. Finally, when we distinguish between the type of activities Catholic nuns engaged in, we do not find any positive correlation between health facilities and fertility.

Could nuns have modified women's demand for children through the promotion of conservative gender roles? Education in Catholic mission schools was not intended to train women to become successful professionals.[42] Education programs established by the state and Catholic religious precepts converged in promoting the image of women entirely dedicated to their children and husband, and submissive to their husband.[43] The embedding of these prescriptions in religion and formal education contributed to increase their legitimacy in the eyes of the targeted population. The historian Likaka (2006) writes in this regard "*Catholic missionaries created schools, which they transformed into vehicles of cultural change to influence sexual behaviors of younger generations. [...] From missions stations, the "pro-natal" discourse extended into local communities. In reality, this treaty had more far-reaching consequences in transforming sexual behavior and the ideologies of reproduction because missionaries' control over schooling than the polygyny-taxation.*" Our empirical results suggest that housekeeping schools have the strongest impact on fertility. In other words, it is where missionaries invested the most in girls' education that fertility increased the most. This finding is consistent with an increase demand for children for women who were in contact with Catholic missionary education activities.

Both health and education interventions may also have modified infant care, in particular breastfeeding practices, thereby, indirectly, influencing fertility. As detailed in Section 2.1, colonial authorities believed that an important factor contributing to low natality was the duration of breastfeeding periods. They were deemed excessive, especially given that it was accompanied by sexual abstinence. Mother and infant consultation programs were

[42] It is not until the very end of the colonial period that some programs were designed to train female school teacher and nurses.

[43] As late as 1952, the State's official text defining school organization in the colony states the necessity 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 homekeeping* (Service de l'enseignement, 1952).

to promote appropriate diversification of infant's diet and a reduced reliance on mother's milk, with a hope to reduce birth spacing. Appropriate infant and child nutrition was also part of the girls' school program. It is difficult to assess how effective these attempts to change infant and child nutrition practices have been. However it seems that birth spacing has not been dramatically reduced: our empirical results show no significant impact of Catholic nuns on birth spacing (and an increase in birth spacing for women who grew up closer to Protestant missions).

Turning to differential impact of Protestants on fertility, the discussion on the expected impacts of missionary works on fertility identifies two channels for an overall decrease in fertility: education (if it increases labour opportunities) and the development of missionary labour opportunities. The possibility also exists that Protestant missionaries promoted a slightly different ideal of a Christian woman. Historical evidence provides some support for all three elements. First girls education may have been less focused on teaching practical women skills if only because primary schools were mixed and welcomed both boys and girls (Yates, 1982). Second, Protestants may have relied more intensively on indigenous labour to perform tasks that required some qualification such as medical care.[44] Also there is some evidence that Protestant missionaries promoted the idea that Christian women should be leader in their communities and contribute to actively spread the faith, thereby giving women roles outside of their households (Richards, 2017). Third, the general description of the ideal "Christian marriage" by Protestant missionaries may have be subtly different than that of the Catholics. Indeed there is much insistence on the marriage been centred on the couple and on love between husbands and wives (Congo Missionary Conference, 1918; Richards, 2017, pp 69-71). Also, Protestant female missionaries were themselves women who considered marriage or were married (and often had children). They were thereby lively examples of well educated women who could choose to get married (or not) and who could successfully combined a career and children. Finally, female missionary views on the roles of women were likely more progressive among the Protestants simply because many Protestant missionaries came from England and Sweden where women's relative status

[44] Cornet (2014) argues that the Anglican Church Missionary Society based a lot of its medical work in Rwanda on African personnel, both male and female, and was the only group to put African employees in charge of dispensaries without being formally supervised by a European missionary.

was in general higher than in Catholic Belgium. In fact in several missionary societies, leadership positions could be occupied by women as well as men. This was unthinkable in Catholic orders where religious women were always formally under the authority of religious men (Cornet, 2014).

# 6 Missions location and fertility today

Finding a strong influence of colonial pro-birth policy on fertility behavior raises the question of the long-term consequences of these policies in light of the delayed demographic transition in the DRC. It is beyond the scope of this paper to provide an answer to this question. It would indeed require a detailed investigation of family planning policies and of their implementation in the ground after the colonial period. Yet our data on missions combined with recent waves of the Demographic and Health Surveys (DHS) allows us to make a modest first step into this direction, by comparing the fertility of women who live today in the vicinity of former missions (of various type) to that of women living further away.

There are important shortcomings to this investigation of the correlation between former missionary presence and present-day outcomes. First, we observe new posts openings until 1948, yet missionary presence has further increased between 1948 and independence (1960). This was the case in particular for Catholic female missionaries who migrated in large numbers from Belgium to the Congo during the last decade of the colonial period. Second the country has gone through multiple conflicts and vast turmoil leading to massive displacements of population, so that it is not clear to what extend the descendants of populations exposed to missions are still living close to former mission posts (especially in eastern provinces). Finally, as the country moved from pro-birth to family planning policies, it is not clear that the influence of colonial policies would be stronger where they were first implemented. Suppose that i) pro-birth programs gradually reached more distant places as missions sought to extend their influence as far away as possible from their post; ii) family planning programs that replaced pro-birth policies after the colonial period, used existing health infrastructures (including former missionary hospitals); and iii) family planning programs were less effective in reaching population distant from these

infrastructures than former missionary activities. In that case, the traces of the influence of colonial policies may be stronger further away from former missions.

With these caveats in mind, we estimate the following equation on the pooled cross-section of the 2007 and 2013-14 waves of the DHS surveys:

$$Y_{i,t,c} = \alpha_0 + \alpha_1 \text{ ExpCatholics-All}_{i,1948,c} + \alpha_3 \text{ ExpProtestants}_{i,1948,c} + \alpha_4\, t + \alpha_5\, t^2 + X_c'\alpha_6 + \epsilon_i \quad (3)$$

where $Y_{i,t,c}$ is the fertility outcome for woman $i$, aged $t$, surveyed in DHS cluster $c$. ExpCatholics-All$_{i,1948,c}$ and ExpProtestants$_{i,1948,c}$ capture the proximity of the DHS cluster GPS coordinates and the nearest missionary post of each type (Catholic or Protestant) in 1948. The vector $X_c$ includes cluster level historical control (the same as those used in the historical analysis), as well as district fixed effects. Errors are clustered at the DHS cluster level.

We do not distinguish between Catholic missions with and without nuns because women missionary continued migrating to the Congo after this date, being increasingly present where male missionaries had settled, and it is not clear whether the distinction in 1948 would matter today.[45] We investigate fertility at different ages (17, 20, 25, 30 and 35) as well as breastfeeding and sexual abstinence (two behaviors specifically targeted by colonial policies). To check whether former missions appear to influence todays' religious practices, we also run similar regressions on respondent's declared religion.

We start by commenting results on religion reported in Table 15. Individuals living today closer to a former mission are more likely to practice the religion of that mission. Thus, an increase in 100 km in the distance to a former Catholic (Protestant) missions is associated with a decrease by 19 (9) percentage points the probability to be Catholic (Protestant). These results suggest that missions have succeeded in changing religious practices among the population under their influence and these effects remain detectable several generations

[45] In addition, for the DHS clusters, there is a strong correlation between distance to missionary post with and without nuns in 1948.

after the initial opening of mission posts.[46]

Tables 16 reports the results of the regressions on fertility at different ages corresponding to Equation 3. It reveals that, in line with the result on the historical data, distance to a former protestant mission is positively (and often significantly) correlated with fertility at all ages. The estimated coefficients suggest that women closer by 100km to a historical Protestant missions have 0.18 fewer children at 25. In contrast, the correlation between distance to a Catholic mission and fertility is smaller and never significant.

In Table 17 we investigate the correlation of the distance to missions to two practices directly targeted by colonial policies: breastfeeding and abstinence (both discouraged by colonial powers). Unfortunately, the only information on breastfeeding available in both survey waves is whether children below 5 are currently (or were ever) breastfed. We construct two binary variables, one for children aged 0 to 12 month and one for those aged 12 to 24 months indicating whether they were breastfed at the time of the survey. For the same children, we construct a variable indicating whether their mother declared being sexually abstinent. We include the same control as in the fertility regressions, adding the age of the child and its square. Results suggest that the presence of former Catholic missions is correlated with lower reliance on breastfeeding and abstinence for mothers of children below 12 months (increasing distance by 100 km is associated with a 6 percentage points lower practice of breastfeeding). The presence of former Protestant missions is uncorrelated with abstinence and possibly slightly negatively correlated with breastfeeding of children between 12 and 24 months (only significant with linear distance). These results provide some weak evidence that breastfeeding (and to a lesser extend abstinence behavior) may be less often practiced in the vicinity of former Catholic missions.[47]

In short, Catholicism and Protestantism today appear correlated with the location of

[46] Catholic and Protestant together account for 58% of religious denominations, another 35% of respondents announce a religion falling in the "other Christian" category.

[47] Until recently health policies in the DRC have not paid much attention to breastfeeding and there has not been a quick post-independence reversal of political orientation in this regard (similar to that towards family planning). The WHO and UNICEF campaigns promoting breastfeeding have only been implemented in the DRC starting the 2000s (Yotebieng et al., 2015). Yotebieng et al. (2013) report results from a survey of health workers in Kinshasa and highlight that the vast majority of healthcare providers have no formal training regarding breastfeeding and nutrition during the first months of life and hold wrong beliefs regarding the need to supplement breastfeeding with other food in early life.

former missions. Overall there is no correlation between distance to Catholic missions and fertility today. Yet there is also weak evidence that breastfeeding is less prevalent in the vicinity of former Catholic missions. Proximity to Protestant missions is (still) associated with lower fertility (and no distinct breastfeeding or abstinence behavior).

# 7 Conclusion

We investigate the effects of pro-birth policies promoted by the Belgian government in the Congo during the colonial period, whereby Catholic nuns were subsidized to implement health and education programs targeted at women. On the health side, maternal and infant programs aimed at decreasing mortality and encouraging natality. As for education, girls' schools intended to train housewives who would focus on their reproductive roles.

We evaluate the impacts of Catholic nuns on the fertility behaviors of women directly exposed to female missionary activities (during the colonial period) in the spirit of a difference-in-difference estimation. We also contrast the impacts of Catholic nuns with that of Catholic male missionaries and Protestant missionaries, and investigate the effects of different concrete activities conducted by the missionaries. To this end we recovered the individual records of high-quality demographic surveys of the 1970s and digitized aggregate records of similar surveys of the 1950s. To measure exposure to missions, we build a comprehensive data set of all missionary posts active in the Congo until 1948, relying on maps and numerous yearbooks.

We find that greater exposition in childhood to Catholic missions with nuns increases women's fertility. In stark contrast, exposure to Protestant mission have a negative impact on fertility. Among nuns' activities, housekeeping schools exhibit the strongest positive correlation with fertility. We show that endogenous mission location or selective urban migration is unlikely to account for our results. In terms of mechanisms, we argue that the impact of missionaries should not be attributed to improvement in general health alone (as these would have led to a similar effect of Catholic nuns and Protestant missionaries, very involved in health care). We contend that the content of education programs and the image of an ideal Christian women promoted by Catholic female missionaries played

an important role in explaining the rise in fertility they triggered. In contrast, Protestant missions may have promoted less conservative gender roles both through education and the examples of female Protestant missionaries. In addition, work opportunities for women may have discouraged high fertility.

These results reveal that missions have been efficient at changing behaviors related to fertility, an aspect of life that this typically regarded as very deeply culturally embedded (Fernandez and Fogli, 2009). The growing field of the economics of religion provides numerous examples of how religion influences attitudes, preferences and behaviors (Iyer, 2016). A stark example is provided by Schulz (2020) who show that the influence of the Catholic church was decisive for the ban of kin marriages in medieval Europe (in line with the arguments developed by Goody and Goody, 1983). Appealing to supernatural forces remains a powerful vector of change for family related behavior in today's world: Bassi and Rasul (2017) highlight the remarkable power of persuasion of the Catholic pope whose discourses against birth control during his visit in Brazil in 1991 translated into higher fertility in the country.

Our analysis raises the question of the legacies of colonial pro-birth policies on demographic dynamics after the colonial period. We took only a (very) modest step in this direction when we investigate the correlation between former mission location and fertility in the 2000s. We do not find that women have higher fertility in the vicinity of former Catholic missions with nuns.[48] Further research is needed to understand both the origins of the 20th century population growth in the country and why the demographic transition is extremely slow in the DRC and slower than in neighbouring countries (Shapiro et al., 2017).

On a final note and from a broader perspective, our paper contributes to the debate on the onset of population growth in sub-Saharan Africa. While classic theories of demographic transition suggest that population started to grow because mortality decreased in environments characterized by high natural birth rates (Caldwell, 2016; Iliffe, 2017), several contributions by demographers underline the possible role of increases in fertility under

[48] Yet the former presence of these missions appears negatively correlated with the breastfeeding of infants.

the influence of various colonial policies (see e.g. Dawson 1987, Koponen 1986 and the review of the debate by Walters 2021). In parallel, a recent literature puts into question the premise of the absence of birth control before the advance of modern family planning. For example, Drixler (2013) argues that several societies in the past exhibited "low reproductivity" regimes.[49] There exists very limited quantitative evaluation of the impact of colonial policies aimed at modifying fertility (one important exception is Canning et al., 2020 who compare present day fertility regimes by colonial origin). Our paper thus makes an important contribution in showing that, in the Congo, colonial powers have been remarkably successful at stimulating fertility among women directly exposed to pro-birth policies.

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[49] Particularly relevant to our study, his analysis of 19th century eastern Japan describes a "reverse fertility transition" among a population that practised birth control (through withdrawal and infanticide) and raised so few children that it did not replace itself. Governments were instrumental in changing the regime: they both offered to pay their subjects to have more children and aimed at changing preferences regarding birth. Drixler argues that parents who practised infanticides saw themselves as responsible parents towards their living children and that governments tried to modify this perception by calling infanticide "murder".

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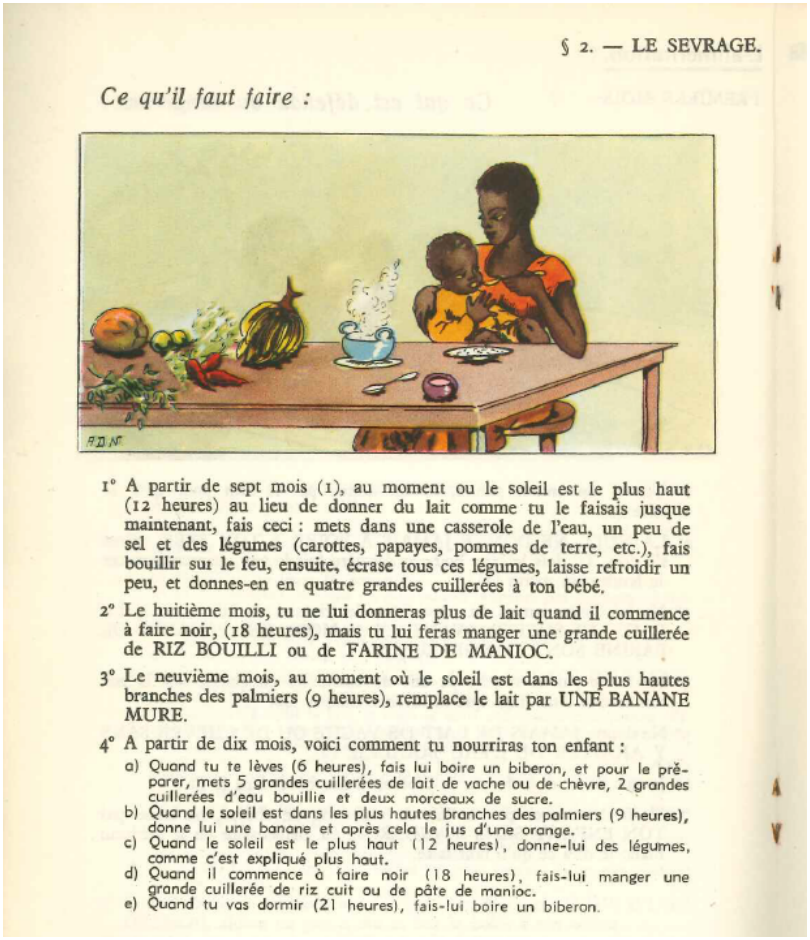
# 8 Figures

**Figure 1:** Official booklet giving advice to mothers on how to properly raise their children



§ 2. — LE SEVRAGE.

*Ce qu'il faut faire :*

1° A partir de sept mois (1), au moment ou le soleil est le plus haut (12 heures) au lieu de donner du lait comme tu le faisais jusque maintenant, fais ceci : mets dans une casserole de l'eau, un peu de sel et des légumes (carottes, papayes, pommes de terre, etc.), fais bouillir sur le feu, ensuite, écrase tous ces légumes, laisse refroidir un peu, et donnes-en en quatre grandes cuillerées à ton bébé.

2° Le huitième mois, tu ne lui donneras plus de lait quand il commence à faire noir, (18 heures), mais tu lui feras manger une grande cuillerée de RIZ BOUILLI ou de FARINE DE MANIOC.

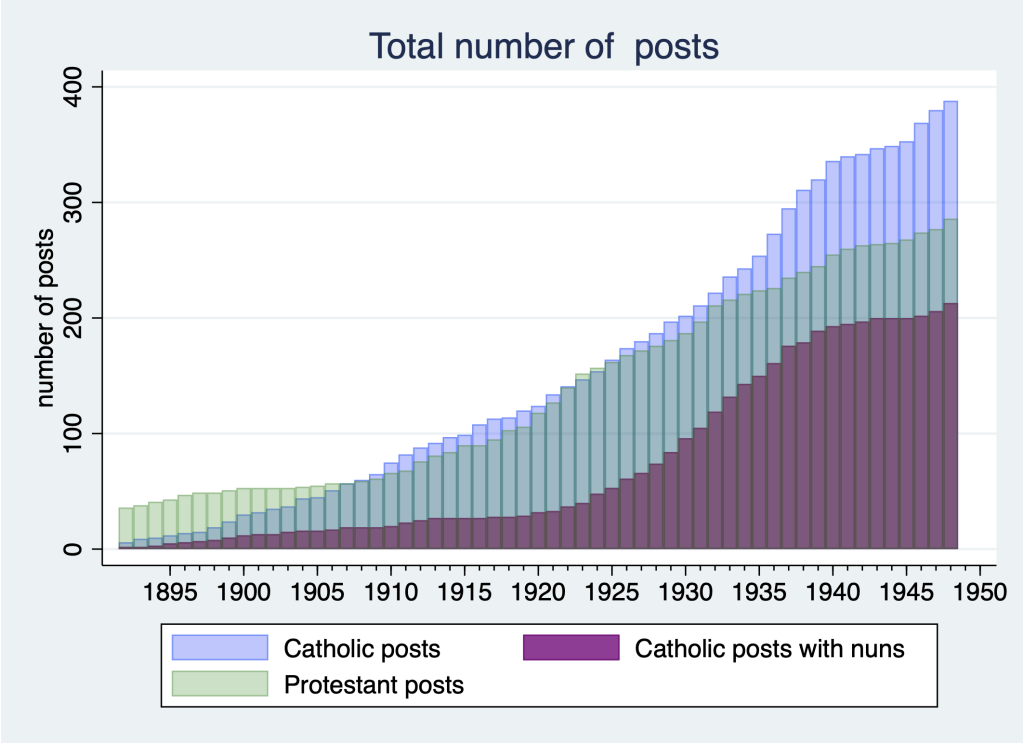
3° Le neuvième mois, au moment où le soleil est dans les plus hautes branches des palmiers (9 heures), remplace le lait par UNE BANANE MURE.

4° A partir de dix mois, voici comment tu nourriras ton enfant :

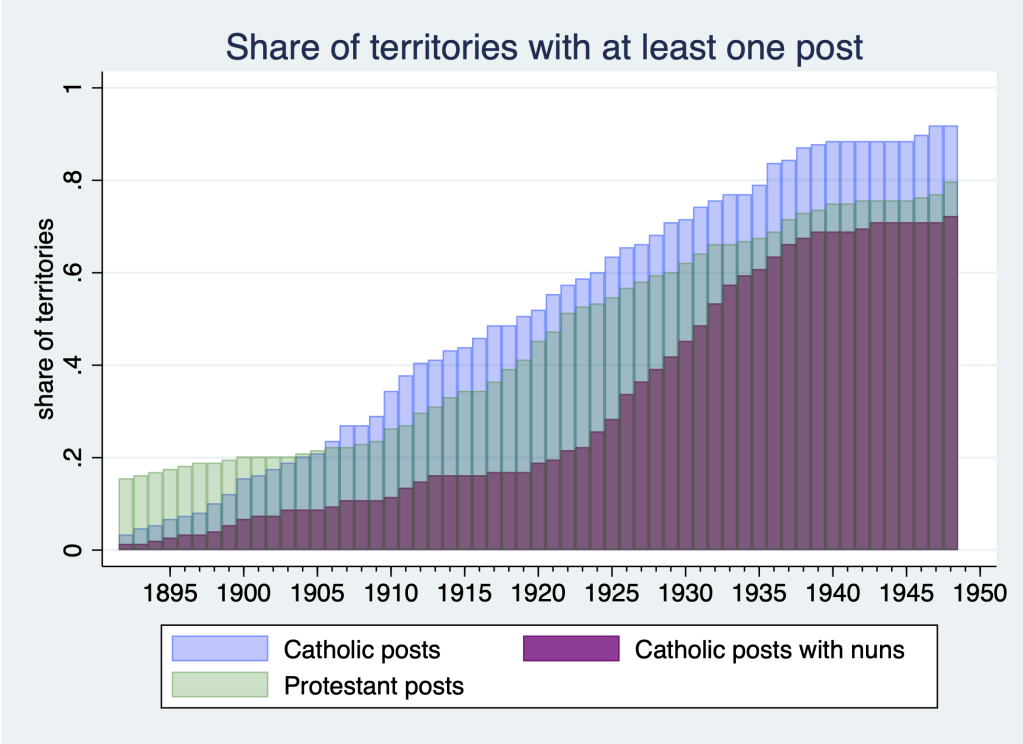
a) Quand tu te lèves (6 heures), fais lui boire un biberon, et pour le préparer, mets 5 grandes cuillerées de lait de vache ou de chèvre, 2 grandes cuillerées d'eau bouillie et deux morceaux de sucre.
b) Quand le soleil est dans les plus hautes branches des palmiers (9 heures), donne lui une banane et après cela le jus d'une orange.
c) Quand le soleil est le plus haut (12 heures), donne-lui des légumes, comme c'est expliqué plus haut.
d) Quand il commence à faire noir (18 heures), fais-lui manger une grande cuillerée de riz cuit ou de pâte de manioc.
e) Quand tu vas dormir (21 heures), fais-lui boire un biberon.

Source : Donny (1950).
This page illustrates the very detailed guidelines that mothers must follow in order to wean their child (in French).

**Figure 2:** Opening of missionary posts, by religious affiliation




**(a)** Number of posts by year




**(b)** Share of territories with at least one post

Data : Multiple historical and archival sources described in Section 3.2.

**Figure 3:** Picture of one report of population survey carried in the mid-1950s.

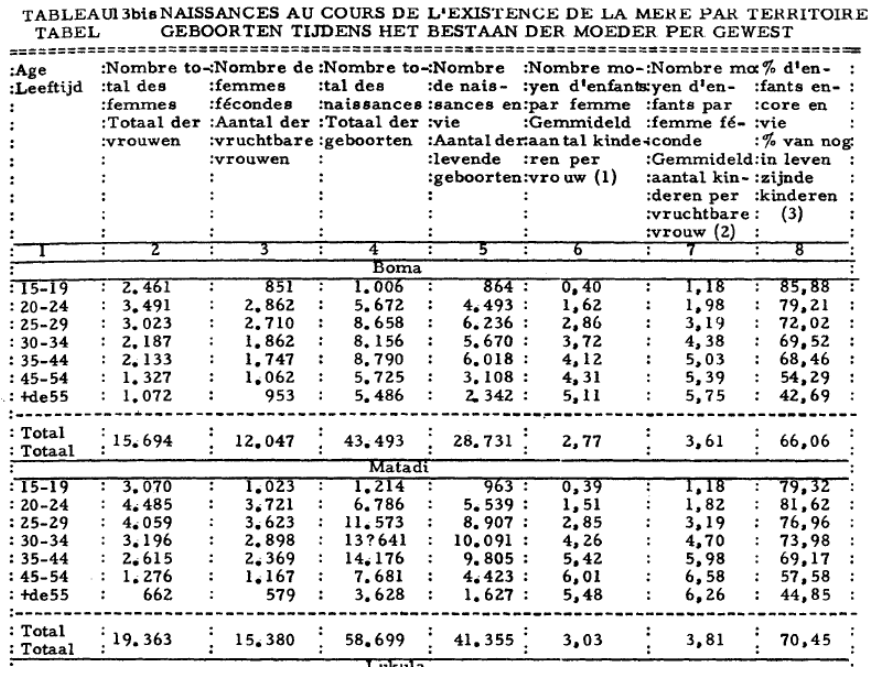
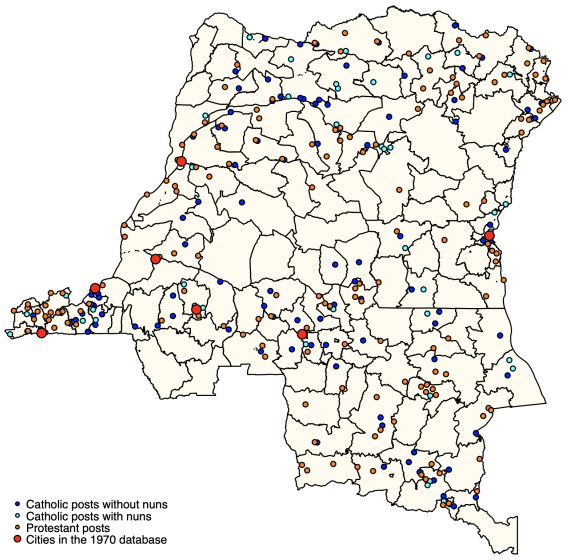


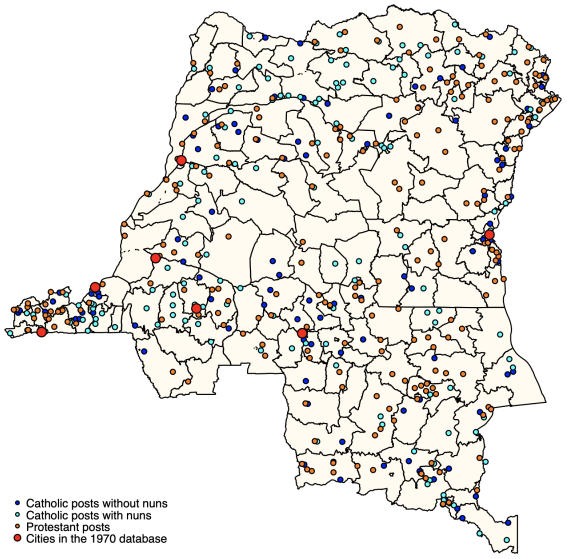
TABLEAU 13bis NAISSANCES AU COURS DE L'EXISTENCE DE LA MERE PAR TERRITOIRE
TABEL GEBOORTEN TIJDENS HET BESTAAN DER MOEDER PER GEWEST

| Age / Leeftijd | Nombre total des femmes / Totaal der vrouwen | Nombre de femmes fécondes / Aantal der vruchtbare vrouwen | Nombre total des naissances / Totaal der geboorten | Nombre de naissances en vie / Aantal der levende geboorten | Nombre moyen d'enfants par femme / Gemmideld aantal kinderen per vrouw (1) | Nombre moyen d'enfants par femme féconde / Gemmideld aantal kinderen per vruchtbare vrouw (2) | % d'enfants encore en vie / % van nog in leven zijnde kinderen (3) |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| **Boma** | | | | | | | |
| 15-19 | 2.461 | 851 | 1.006 | 864 | 0,40 | 1,18 | 85,88 |
| 20-24 | 3.491 | 2.862 | 5.672 | 4.493 | 1,62 | 1,98 | 79,21 |
| 25-29 | 3.023 | 2.710 | 8.658 | 6.236 | 2,86 | 3,19 | 72,02 |
| 30-34 | 2.187 | 1.862 | 8.156 | 5.670 | 3,72 | 4,38 | 69,52 |
| 35-44 | 2.133 | 1.747 | 8.790 | 6.018 | 4,12 | 5,03 | 68,46 |
| 45-54 | 1.327 | 1.062 | 5.725 | 3.108 | 4,31 | 5,39 | 54,29 |
| +de55 | 1.072 | 953 | 5.486 | 2.342 | 5,11 | 5,75 | 42,69 |
| Total / Totaal | 15.694 | 12.047 | 43.493 | 28.731 | 2,77 | 3,61 | 66,06 |
| **Matadi** | | | | | | | |
| 15-19 | 3.070 | 1.023 | 1.214 | 963 | 0,39 | 1,18 | 79,32 |
| 20-24 | 4.485 | 3.721 | 6.786 | 5.539 | 1,51 | 1,82 | 81,62 |
| 25-29 | 4.059 | 3.623 | 11.573 | 8.907 | 2,85 | 3,19 | 76,96 |
| 30-34 | 3.196 | 2.898 | 13?641 | 10.091 | 4,26 | 4,70 | 73,98 |
| 35-44 | 2.615 | 2.369 | 14.176 | 9.805 | 5,42 | 5,98 | 69,17 |
| 45-54 | 1.276 | 1.167 | 7.681 | 4.423 | 6,01 | 6,58 | 57,58 |
| +de55 | 662 | 579 | 3.628 | 1.627 | 5,48 | 6,26 | 44,85 |
| Total / Totaal | 19.363 | 15.380 | 58.699 | 41.355 | 3,03 | 3,81 | 70,45 |
| **Vukula** | | | | | | | |

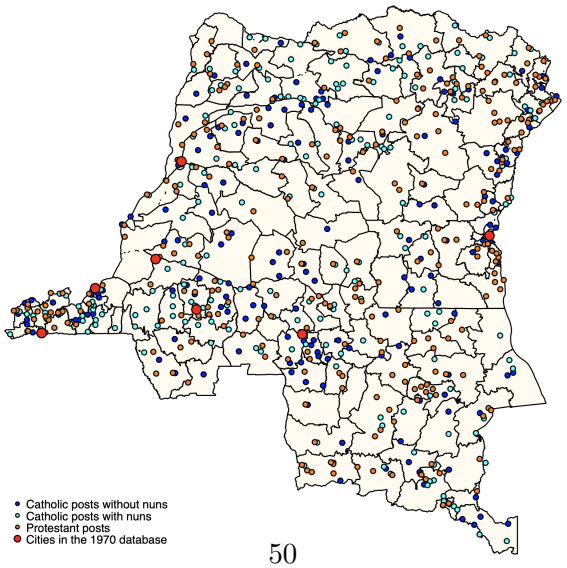
**Figure 4:** Spatial distribution of missionary posts




**(a)** Missionary posts in 1924




**(b)** Missionary posts in 1935




**(c)** Missionary posts in 1949

Data : Multiple historical and archival sources described in Section 3.2.

# 9 Tables

**Table 1:** Type of activities targeting women and their children in Catholic posts with nuns (proportion of total posts), by Catholic missions yearbooks:

| | 1924 | 1935 | 1949 |
|---|---|---|---|
| Workrooms | 0.21 | 0.19 | 0.34 |
| Housewife schools | 0.29 | 0.26 | 0.46 |
| General health | 0.62 | 0.84 | 0.94 |
| Women and children health | 0.19 | 0.67 | 0.91 |
| N | 48 | 150 | 217 |

Data from the Catholic Missions yearbooks (*Annuaires des Missions Catholiques au Congo Belge*) published in 1924, 1935 and 1949. For more detail information, see Section 3.2.1. The last row indicates the number of Catholic posts with female missionaries.

**Table 2:** Change in territory average proximity to different type of posts between 1910 and 1948:

| | (1) | | | |
|---|---|---|---|---|
| | mean | sd | min | max |
| prox_all_1910 | -1.10 | 0.75 | -3.45 | -0.15 |
| prox_all_1948 | -0.37 | 0.18 | -1.01 | -0.03 |
| prox_mcf_1910 | -1.87 | 1.09 | -4.71 | -0.15 |
| prox_mcf_1948 | -0.55 | 0.31 | -1.59 | -0.03 |
| prox_mp_1910 | -1.33 | 0.92 | -3.61 | -0.15 |
| prox_mp_1948 | -0.43 | 0.18 | -1.15 | -0.13 |

The measures of exposure are average linear proximity (measured as minus the distance) to the closest post of either type, using 1000 random location in the territory.The unit is 100 km.

**Table 3:** Total number of births at different ages
Missionary exposure measured at birth

| | Age 25 *(1)* | Age 35 *(2)* | Age 40 *(3)* | Age 45 *(4)* |
|---|---|---|---|---|
| **Panel A: Any post in district (0/1)** | | | | |
| ExpCatholics - All (C) | −0.074 | −0.012 | 0.076 | 0.086 |
| | (0.085) | (0.158) | (0.162) | (0.174) |
| ExpCatholics - Nuns (CN) | 0.179*** | 0.214** | 0.145 | 0.350** |
| | (0.065) | (0.108) | (0.133) | (0.155) |
| ExpProtestants (P) | −0.129 | −0.260** | −0.290** | −0.251 |
| | (0.086) | (0.131) | (0.138) | (0.159) |
| Adjusted R2 | 0.09 | 0.13 | 0.13 | 0.12 |
| pvalue(C = CN) | 0.023 | 0.290 | 0.772 | 0.279 |
| pvalue(C = P) | 0.697 | 0.309 | 0.137 | 0.207 |
| pvalue(CN = P) | 0.002 | 0.002 | 0.010 | 0.007 |
| **Panel B: Proximity to post - Linear measure** | | | | |
| ExpCatholics - All (C) | 0.077 | −0.119 | −0.003 | 0.014 |
| | (0.117) | (0.177) | (0.208) | (0.209) |
| ExpCatholics - Nuns (CN) | 0.031 | 0.190* | 0.194** | 0.231*** |
| | (0.079) | (0.112) | (0.086) | (0.085) |
| ExpProtestants (P) | −0.126 | −0.152 | −0.165 | −0.217* |
| | (0.079) | (0.111) | (0.106) | (0.128) |
| Adjusted R2 | 0.09 | 0.13 | 0.13 | 0.12 |
| pvalue(C = CN) | 0.773 | 0.199 | 0.433 | 0.406 |
| pvalue(C = P) | 0.227 | 0.892 | 0.544 | 0.421 |
| pvalue(CN = P) | 0.166 | 0.042 | 0.010 | 0.003 |
| **Panel C: Proximity to post - Log measure** | | | | |
| ExpCatholics - All (C) | 0.176* | −0.059 | −0.039 | 0.072 |
| | (0.094) | (0.129) | (0.159) | (0.169) |
| ExpCatholics - Nuns (CN) | 0.159* | 0.234* | 0.217** | 0.373*** |
| | (0.087) | (0.121) | (0.104) | (0.106) |
| ExpProtestants (P) | −0.233*** | −0.224** | −0.138 | −0.249* |
| | (0.066) | (0.105) | (0.117) | (0.140) |
| Adjusted R2 | 0.09 | 0.13 | 0.13 | 0.12 |
| pvalue(C = CN) | 0.896 | 0.120 | 0.222 | 0.196 |
| pvalue(C = P) | 0.003 | 0.376 | 0.669 | 0.187 |
| pvalue(CN = P) | 0.000 | 0.005 | 0.024 | 0.001 |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 2.82 | 5.40 | 5.96 | 5.98 |
| N | 27660 | 15753 | 9942 | 6355 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: women aged 25 or older (column 1), 35 or older (column 2), 40 or older (column 3) and 45 or older (column 4). OLS regression. Dep variables : number of births a women had before age 25 (column 1), 35 (column 2), 40 (column 3) and 45 (column 4). ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at birth. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects.
Standard errors, in (), are clustered at the territory level.
* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

**Table 4:** Childlessness
Exposure measured at birth

| | Age 25 | Age 35 | Age 40 | Age 45 |
|---|---|---|---|---|
| | *(1)* | *(2)* | *(3)* | *(4)* |
| **Panel A: Any post in district (0/1)** | | | | |
| ExpCatholics - All (C) | −0.027 | −0.019 | −0.014 | −0.011 |
| | (0.026) | (0.024) | (0.024) | (0.023) |
| ExpCatholics - Nuns (CN) | −0.045*** | −0.009 | −0.003 | −0.012 |
| | (0.014) | (0.012) | (0.013) | (0.014) |
| ExpProtestants (P) | 0.034* | 0.029 | 0.035 | 0.034* |
| | (0.019) | (0.021) | (0.022) | (0.019) |
| Adjusted R2 | 0.08 | 0.07 | 0.06 | 0.07 |
| pvalue(C = CN) | 0.513 | 0.711 | 0.705 | 0.952 |
| pvalue(C = P) | 0.067 | 0.133 | 0.163 | 0.168 |
| pvalue(CN = P) | 0.000 | 0.066 | 0.111 | 0.046 |
| **Panel B: Proximity to post - Linear measure** | | | | |
| ExpCatholics - All (C) | 0.009 | 0.013 | 0.005 | −0.007 |
| | (0.030) | (0.025) | (0.023) | (0.019) |
| ExpCatholics - Nuns (CN) | −0.036* | −0.010 | −0.006 | 0.004 |
| | (0.021) | (0.018) | (0.014) | (0.010) |
| ExpProtestants (P) | 0.026 | 0.016 | 0.022 | 0.018 |
| | (0.017) | (0.016) | (0.015) | (0.013) |
| Adjusted R2 | 0.08 | 0.07 | 0.06 | 0.07 |
| pvalue(C = CN) | 0.280 | 0.556 | 0.730 | 0.663 |
| pvalue(C = P) | 0.665 | 0.912 | 0.581 | 0.279 |
| pvalue(CN = P) | 0.024 | 0.304 | 0.177 | 0.456 |
| **Panel C: Proximity to post - Log measure** | | | | |
| ExpCatholics - All (C) | −0.026 | 0.013 | 0.022 | 0.006 |
| | (0.024) | (0.023) | (0.024) | (0.022) |
| ExpCatholics - Nuns (CN) | −0.058*** | −0.007 | −0.008 | −0.002 |
| | (0.017) | (0.014) | (0.013) | (0.012) |
| ExpProtestants (P) | 0.047*** | 0.027 | 0.030* | 0.030** |
| | (0.015) | (0.016) | (0.016) | (0.013) |
| Adjusted R2 | 0.09 | 0.07 | 0.07 | 0.07 |
| pvalue(C = CN) | 0.220 | 0.487 | 0.349 | 0.778 |
| pvalue(C = P) | 0.024 | 0.679 | 0.789 | 0.358 |
| pvalue(CN = P) | 0.000 | 0.136 | 0.092 | 0.131 |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 0.14 | 0.07 | 0.07 | 0.08 |
| N | 28956 | 16573 | 10605 | 6905 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: women aged 25 or older (column 1), 35 or older (column 2), 40 or older (column 3) and 45 or older (column 4). OLS regression. Dep variables : Dummy equal to 1 if the woman never gave birth before age 25 (column 1), 35 (column 2), 40 (column 3) and 45 (column 4). ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory* $g$. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at birth. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects.

Standard errors, in (), are clustered at the territory level.

* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

**Table 5:** Total number of births at different ages for women with at least one birth
Missionary exposure measured at birth

| | Age 25 | Age 35 | Age 40 | Age 45 |
|---|---|---|---|---|
| | *(1)* | *(2)* | *(3)* | *(4)* |
| **Panel A: Any post in district (0/1)** | | | | |
| ExpCatholics - All (C) | $-0.124^{*}$ | $-0.015$ | 0.072 | 0.098 |
| | (0.068) | (0.142) | (0.147) | (0.171) |
| ExpCatholics - Nuns (CN) | $0.101^{*}$ | $0.181^{*}$ | 0.153 | $0.339^{**}$ |
| | (0.053) | (0.104) | (0.134) | (0.154) |
| ExpProtestants (P) | $-0.082$ | $-0.260^{**}$ | $-0.267^{**}$ | $-0.255$ |
| | (0.060) | (0.119) | (0.125) | (0.162) |
| Adjusted R2 | 0.04 | 0.11 | 0.12 | 0.11 |
| pvalue(C = CN) | 0.018 | 0.336 | 0.727 | 0.322 |
| pvalue(C = P) | 0.689 | 0.277 | 0.134 | 0.183 |
| pvalue(CN = P) | 0.017 | 0.004 | 0.010 | 0.008 |
| **Panel B: Proximity to post - Linear measure** | | | | |
| ExpCatholics - All (C) | 0.144 | $-0.067$ | 0.035 | 0.012 |
| | (0.100) | (0.149) | (0.206) | (0.203) |
| ExpCatholics - Nuns (CN) | $-0.068$ | $0.171^{*}$ | $0.160^{*}$ | $0.216^{**}$ |
| | (0.058) | (0.093) | (0.083) | (0.084) |
| ExpProtestants (P) | $-0.137^{**}$ | $-0.186^{*}$ | $-0.134$ | $-0.197$ |
| | (0.060) | (0.102) | (0.108) | (0.126) |
| Adjusted R2 | 0.04 | 0.11 | 0.12 | 0.11 |
| pvalue(C = CN) | 0.128 | 0.227 | 0.617 | 0.419 |
| pvalue(C = P) | 0.046 | 0.562 | 0.535 | 0.457 |
| pvalue(CN = P) | 0.410 | 0.018 | 0.031 | 0.005 |
| **Panel C: Proximity to post - Log measure** | | | | |
| ExpCatholics - All (C) | 0.130 | $-0.028$ | 0.001 | 0.069 |
| | (0.081) | (0.111) | (0.151) | (0.163) |
| ExpCatholics - Nuns (CN) | 0.017 | $0.217^{**}$ | $0.176^{*}$ | $0.352^{***}$ |
| | (0.070) | (0.107) | (0.102) | (0.105) |
| ExpProtestants (P) | $-0.180^{***}$ | $-0.240^{***}$ | $-0.103$ | $-0.225$ |
| | (0.053) | (0.087) | (0.115) | (0.140) |
| Adjusted R2 | 0.04 | 0.11 | 0.12 | 0.11 |
| pvalue(C = CN) | 0.371 | 0.147 | 0.387 | 0.211 |
| pvalue(C = P) | 0.011 | 0.171 | 0.647 | 0.219 |
| pvalue(CN = P) | 0.010 | 0.001 | 0.068 | 0.002 |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 2.82 | 5.40 | 5.96 | 5.98 |
| N | 24855 | 15426 | 9855 | 6332 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: women aged 25 or older (column 1), 35 or older (column 2), 40 or older (column 3) and 45 or older (column 4). OLS regression. Dep variables : number of births a women had before age 25 (column 1), 35 (column 2), 40 (column 3) and 45 (column 4). ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at birth. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects.
Standard errors, in (), are clustered at the territory level.
$^{*}$ $p \leq 0.1$, $^{**}$ $p \leq 0.05$, $^{***}$ $p \leq 0.01$.

**Table 6:** Mission exposure and cohort fertility in the representative sample of the 1950s
Exposure measured at birth

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | All (linear distance) | All (log distance) | >35 (linear distance) | >35 (log distance) |
| ExpCatholics_All | 0.293** | 0.253* | 0.193 | 0.207 |
| | (0.114) | (0.140) | (0.118) | (0.177) |
| ExpCatholics_Nuns | 0.050 | -0.039 | 0.071 | 0.205 |
| | (0.092) | (0.125) | (0.095) | (0.162) |
| ExpProtestants | -0.282** | -0.193* | -0.219 | -0.306* |
| | (0.108) | (0.110) | (0.155) | (0.156) |
| _cons | -15.462** | -14.149* | -14.765 | -14.046 |
| | (7.294) | (7.389) | (11.160) | (11.082) |
| $N$ | 742 | 742 | 318 | 318 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

One observation is one age category in a given territory. Age categories are: 15-19, 20-24, 25-29, 30-34, 35-44, 45-54, +55. When exposure is measured by linear distance, we divide the distance by 100 to ease the reading of coefficients. Observations are weighted by the number of women they represent. Standard errors are clustered at the territory level. Controls include district and cohort fixed effects and the following control at the territory level: distance to Catholic and Protestant missions in 1886, latitude, longitude and their product, area, area suited for agriculture, mean elevation, standard deviation in elevation, population density in 18xx, tse-tse index, malaria index, the presence of railroad, navigable river and the intensity of the Atlantic slave trade.

**Table 7:** Age at first birth and birth intervals
Exposure measured at birth

| | Age at first birth | Birth intervals | |
|---|---|---|---|
| | | All births | Btw. 1st and 2nd births |
| | *(1)* | *(2)* | *(3)* |
| **Panel A: Any post in district (0/1)** | | | |
| ExpCatholics - All | 0.102 | −0.165 | −0.481 |
| | (0.384) | (0.516) | (1.342) |
| ExpCatholics - Nuns | −0.693*** | −0.273 | −0.685 |
| | (0.207) | (0.365) | (0.880) |
| ExpProtestants | 0.201 | 0.540 | 1.040 |
| | (0.330) | (0.420) | (0.910) |
| Adjusted R2 | 0.09 | 0.02 | 0.02 |
| pvalue(C = CN) | 0.058 | 0.406 | 0.390 |
| pvalue(C = P) | 0.847 | 0.350 | 0.403 |
| pvalue(CN = P) | 0.011 | 0.223 | 0.257 |
| **Panel B: Proximity to post - Linear measure** | | | |
| ExpCatholics - All | 0.075 | −0.380 | −1.936 |
| | (0.489) | (0.613) | (1.772) |
| ExpCatholics - Nuns | −0.372 | 0.215 | 0.723 |
| | (0.300) | (0.396) | (0.870) |
| ExpProtestants | 0.115 | 0.378 | 1.947** |
| | (0.281) | (0.376) | (0.956) |
| Adjusted R2 | 0.09 | 0.02 | 0.02 |
| pvalue(C = CN) | 0.495 | 0.752 | 0.405 |
| pvalue(C = P) | 0.950 | 0.475 | 0.125 |
| pvalue(CN = P) | 0.228 | 0.339 | 0.084 |
| **Panel C: Proximity to post - Log measure** | | | |
| ExpCatholics - All | −0.340 | 0.103 | −1.493 |
| | (0.366) | (0.491) | (1.313) |
| ExpCatholics - Nuns | −0.644** | 0.040 | −0.445 |
| | (0.268) | (0.448) | (1.024) |
| ExpProtestants | 0.493** | 0.221 | 1.766** |
| | (0.246) | (0.406) | (0.800) |
| Adjusted R2 | 0.09 | 0.02 | 0.02 |
| pvalue(C = CN) | 0.499 | 0.782 | 0.114 |
| pvalue(C = P) | 0.101 | 0.920 | 0.035 |
| pvalue(CN = P) | 0.002 | 0.869 | 0.069 |
| Controls | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 19.36 | 30.81 | 32.09 |
| N | 27701 | 125524 | 25760 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: women aged 25 or older. (column 1) and women aged 25 or older who gave birth at least twice (columns 2 and 3). OLS regression. Dep variables : age at first child (column 1), birth intervals in months for all births the woman ever had (column 2), and restricted to the first and second births only (column 3). ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at birth. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. In Column 2, we also include birth-order dummy variables. All regressions include territory fixed-effects.
Standard errors, in (), are clustered at the territory level.
* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

**Table 8:** Infant mortality
Exposure measured at birth

| | Age 25 | Age 35 | Age 40 | Age 45 |
|---|---|---|---|---|
| | *(1)* | *(2)* | *(3)* | *(4)* |
| **Panel : Any post in district (0/1)** | | | | |
| ExpCatholics - All (C) | 4.320 | 5.148 | 6.995 | 3.968 |
| | (13.068) | (11.459) | (10.683) | (10.590) |
| ExpCatholics - Nuns (CN) | −4.602 | −3.159 | −3.428 | −2.603 |
| | (9.064) | (7.269) | (8.250) | (10.626) |
| ExpProtestants (P) | −19.273* | −21.918** | −33.293*** | −29.300** |
| | (9.869) | (10.137) | (11.536) | (11.422) |
| Adjusted R2 | 0.02 | 0.02 | 0.02 | 0.02 |
| pvalue(C = CN) | 0.573 | 0.551 | 0.500 | 0.709 |
| pvalue(C = P) | 0.245 | 0.097 | 0.018 | 0.054 |
| pvalue(CN = P) | 0.321 | 0.177 | 0.059 | 0.121 |
| **Panel B: Proximity to post - Linear measure** | | | | |
| ExpCatholics - All (C) | 44.534** | 47.849*** | 32.221* | 27.537 |
| | (20.859) | (17.285) | (18.800) | (18.980) |
| ExpCatholics - Nuns (CN) | −12.265 | −21.307*** | −19.769*** | −17.742** |
| | (8.043) | (7.937) | (7.546) | (7.666) |
| ExpProtestants (P) | −26.323* | −21.078*** | −21.528*** | −16.333** |
| | (13.417) | (7.516) | (6.883) | (7.605) |
| Adjusted R2 | 0.02 | 0.02 | 0.02 | 0.02 |
| pvalue(C = CN) | 0.068 | 0.006 | 0.029 | 0.065 |
| pvalue(C = P) | 0.024 | 0.001 | 0.010 | 0.037 |
| pvalue(CN = P) | 0.373 | 0.984 | 0.881 | 0.911 |
| **Panel C: Proximity to post - Log measure** | | | | |
| ExpCatholics - All (C) | 1.659 | 21.941* | 16.297 | 18.298 |
| | (12.219) | (11.896) | (12.686) | (14.314) |
| ExpCatholics - Nuns (CN) | −8.426 | −14.907 | −13.580 | −13.299 |
| | (10.137) | (10.327) | (10.149) | (10.605) |
| ExpProtestants (P) | −14.002* | −24.809*** | −33.414*** | −29.233*** |
| | (7.140) | (9.063) | (9.789) | (9.662) |
| Adjusted R2 | 0.02 | 0.02 | 0.02 | 0.02 |
| pvalue(C = CN) | 0.621 | 0.056 | 0.141 | 0.145 |
| pvalue(C = P) | 0.288 | 0.006 | 0.007 | 0.019 |
| pvalue(CN = P) | 0.646 | 0.492 | 0.184 | 0.295 |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 91.98 | 93.69 | 102.57 | 112.09 |
| N | 76567 | 84101 | 58440 | 37344 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: all births for women aged 25 or older (column 1), 35 or older (column 2), 40 or older (column 3) and 45 or older (column 4). OLS regression. Dep variable : Dummy equal to 1 if the child died before age 1. This variable is multiplied by 1000 to ease the reading of the coefficients. ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory* $g$. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at birth. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects.
Standard errors, in (), are clustered at the territory level.
* $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$.

**Table 9:** Women's weight
Exposure measured at birth

| | All households | Households with one adult woman only |
|---|---|---|
| | *(1)* | *(2)* |
| **Panel A: Any post in district (0/1)** | | |
| ExpCatholics - All (C) | 0.284 | 0.866 |
| | (1.840) | (1.956) |
| ExpCatholics - Nuns (CN) | −0.026 | −0.463 |
| | (1.113) | (1.300) |
| ExpProtestants (P) | 3.268* | 3.177* |
| | (1.727) | (1.716) |
| Adjusted R2 | 0.13 | 0.15 |
| pvalue(C = CN) | 0.887 | 0.591 |
| pvalue(C = P) | 0.321 | 0.446 |
| pvalue(CN = P) | 0.132 | 0.089 |
| **Panel B: Proximity to post - Linear measure** | | |
| ExpCatholics - All (C) | −3.381 | −1.373 |
| | (2.132) | (2.411) |
| ExpCatholics - Nuns (CN) | 0.217 | 0.352 |
| | (0.706) | (0.750) |
| ExpProtestants (P) | 3.422*** | 3.587*** |
| | (0.770) | (1.069) |
| Adjusted R2 | 0.13 | 0.15 |
| pvalue(C = CN) | 0.141 | 0.530 |
| pvalue(C = P) | 0.003 | 0.073 |
| pvalue(CN = P) | 0.009 | 0.027 |
| **Panel C: Proximity to post - Log measure** | | |
| ExpCatholics - All (C) | −0.651 | −0.340 |
| | (1.737) | (2.081) |
| ExpCatholics - Nuns (CN) | 0.137 | 0.208 |
| | (0.825) | (0.785) |
| ExpProtestants (P) | 2.187** | 2.445** |
| | (1.102) | (1.229) |
| Adjusted R2 | 0.13 | 0.15 |
| pvalue(C = CN) | 0.685 | 0.800 |
| pvalue(C = P) | 0.158 | 0.273 |
| pvalue(CN = P) | 0.205 | 0.166 |
| Controls | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* |
| Mean of dep. variable | 57.48 | 57.48 |
| N | 2155 | 1651 |

Data: Budgetary survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: all households where at least one woman over 25 resides (column 1), households where at only one woman over 25 resides (column 2). OLS regression. Dep variable: : woman's weight in kg. ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at birth. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects.

Standard errors, in (), are clustered at the territory level.

* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

**Table 10:** Fertility levels at different ages and missionary activities targeting women and their children
Exposure measured at birth

| | Age 25 *(1)* | Age 35 *(2)* | Age 40 *(3)* | Age 45 *(4)* |
|---|---|---|---|---|
| **Panel A: Proximity to post - Linear measure** | | | | |
| ExpCatholics - All | 0.068 | −0.080 | 0.021 | 0.008 |
| | (0.109) | (0.173) | (0.207) | (0.209) |
| ExpCatholics - Nuns | −0.037 | 0.063 | 0.034 | 0.092 |
| | (0.077) | (0.110) | (0.091) | (0.100) |
| ExpCatholics - Nuns - Workrooms | 0.008 | −0.071** | −0.083** | −0.012 |
| | (0.022) | (0.028) | (0.039) | (0.039) |
| ExpCatholics - Nuns - Housekeeping school and workshops | 0.063*** | 0.144*** | 0.168*** | 0.141*** |
| | (0.022) | (0.035) | (0.042) | (0.046) |
| ExpCatholics - Nuns - Women health activities | −0.008 | 0.044** | 0.020 | −0.013 |
| | (0.017) | (0.021) | (0.025) | (0.028) |
| ExpProtestants | −0.088 | −0.232** | −0.189 | −0.163 |
| | (0.074) | (0.112) | (0.130) | (0.153) |
| Adjusted R2 | 0.09 | 0.13 | 0.13 | 0.12 |
| **Panel B: Proximity to post - Log measure** | | | | |
| ExpCatholics - All | 0.160* | −0.035 | −0.035 | 0.050 |
| | (0.096) | (0.130) | (0.157) | (0.176) |
| ExpCatholics - Nuns | 0.047 | 0.101 | 0.047 | 0.203 |
| | (0.094) | (0.135) | (0.121) | (0.137) |
| ExpCatholics - Nuns - Workrooms | 0.035 | −0.077* | −0.114 | 0.096 |
| | (0.035) | (0.045) | (0.079) | (0.071) |
| ExpCatholics - Nuns - Housekeeping school and workshops | 0.107** | 0.129** | 0.218*** | 0.233** |
| | (0.046) | (0.060) | (0.081) | (0.092) |
| ExpCatholics - Nuns - Women health activities | 0.059 | 0.138** | 0.022 | −0.078 |
| | (0.049) | (0.059) | (0.053) | (0.064) |
| ExpProtestants | −0.244*** | −0.298** | −0.139 | −0.195 |
| | (0.078) | (0.124) | (0.129) | (0.160) |
| Adjusted R2 | 0.09 | 0.13 | 0.13 | 0.12 |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 2.82 | 5.40 | 5.96 | 5.98 |
| N | 27660 | 15753 | 9942 | 6355 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: women aged 25 or older (column 1), 35 or older (column 2), 40 or older (column 3) and 45 or older (column 4). OLS regression. Dep variables : number of births a women had before age 25 (column 1), 35 (column 2), 40 (column 3) and 45 (column 4). ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory* $g$. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at birth. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects.

Standard errors, in (), are clustered at the territory level.

* $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$.

**Table 11:** Mission exposure and cohort fertility in the representative sample of the 1950s - by missionary activities targeting women and their children
Exposure measured at birth

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | All (linear distance) | All (log distance) | Above 35 (linear distance) | Above 35 (log distance) |
| ExpCatholics_All | 0.188* | 0.162 | 0.181* | 0.147 |
| | (0.101) | (0.126) | (0.108) | (0.167) |
| ExpCatholics_Nuns | -0.020 | -0.438*** | -0.205*** | -0.445*** |
| | (0.083) | (0.129) | (0.077) | (0.159) |
| ExpCatholics_Nuns_Workrooms | -0.048 | -0.001 | -0.297*** | 0.105 |
| | (0.035) | (0.098) | (0.104) | (0.315) |
| ExpCatho_Nuns_HousekeepSchool | 0.078* | 0.494*** | 0.521*** | 0.942*** |
| | (0.047) | (0.100) | (0.106) | (0.267) |
| ExpCatholics_Nuns_Woman_Health | 0.090*** | 0.206 | 0.224** | -0.019 |
| | (0.021) | (0.139) | (0.091) | (0.379) |
| ExpProtestants | -0.246** | -0.157 | -0.253* | -0.200 |
| | (0.104) | (0.099) | (0.150) | (0.146) |
| _cons | -16.336** | -14.927** | -25.860** | -18.135* |
| | (7.328) | (7.192) | (11.411) | (10.240) |
| *N* | 742 | 742 | 318 | 318 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

One observation is one age category in a given territory. Age categories are: 15-19, 20-24, 25-29, 30-34, 35-44, 45-54, +55. Observations are weighted by the number of women they represent. Standard errors are clustered at the territory level. Controls include district and cohort fixed effects and the following control at the territory level: distance to Catholic and Protestant missions in 1886, latitude, longitude and their product, area, area suited for agriculture, mean elevation, standard deviation in elevation, population density in 18xx, tse-tse index, malaria index, the presence of railroad, navigable river and the intensity of the Atlantic slave trade.

**Table 12:** Fertility of women aged 45+ and missions installation when they had (almost) completed their fertility:

| | (1) | (2) | (3) |
|---|---|---|---|
| | y | y | y |
| ExpCathoAll_Old | -0.267 | -0.232 | |
| | (0.700) | (0.656) | |
| ExpCathoNuns_Old | 0.599 | 0.589 | |
| | (0.403) | (0.397) | |
| ExpProtestant_Old | 0.141 | | 0.097 |
| | (0.510) | | (0.491) |
| ExpCathoAll | 0.333** | 0.339** | 0.327** |
| | (0.138) | (0.135) | (0.137) |
| ExpCathoNuns | 0.168 | 0.161 | 0.199 |
| | (0.126) | (0.121) | (0.123) |
| ExpProtestants | -0.585*** | -0.569*** | -0.582** |
| | (0.219) | (0.203) | (0.227) |
| _cons | -18.546 | -18.451 | -16.589 |
| | (11.213) | (11.217) | (12.043) |
| *N* | 212 | 212 | 212 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Only the two oldest cohorts (45-54 and 55+) are included in the analysis. The dependent variable is the cohort average fertility (col 1-3) or the increase in fertility across the two cohorts (col 4-6). ExpX_Old corresponds to the cohort average exposure (distance) at 38 to post of type X.
Distances are in 100 km. Observations are weighted by the number of women they represent. Standard errors are clustered at the territory level. Controls include district and cohort fixed effects and the following control at the territory level:" "distance to Catholic and Protestant, missions in 1886, latitude, longitude and their product, area, area suited for agriculture, mean elevation, standard deviation in elevation, population density in 18xx, tse-tse index, malaria index, the presence of railroad, navigable river and the intensity of the Atlantic slave trade.

**Table 13:** 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 4.1.2

**Table 14:** Comparison of results on the representative sample of 1950s and on the counter-factual sample of migrants observed in the 1970s:

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 50s (at 0) | 70s (at 0) | 50s (at 0) - log | 70s (at 0) - log |
| ExpCatholics_All | 0.378** | 0.295 | 0.143 | 0.018 |
| | (0.155) | (0.277) | (0.169) | (0.209) |
| ExpCatholics_Nuns | 0.002 | 0.034 | -0.064 | -0.089 |
| | (0.107) | (0.153) | (0.142) | (0.140) |
| ExpProtestants | -0.280** | -0.314* | -0.206 | -0.178 |
| | (0.122) | (0.170) | (0.129) | (0.152) |
| _cons | -21.768*** | -7.839* | -19.860*** | -7.635* |
| | (6.765) | (4.217) | (6.853) | (4.293) |
| $N$ | 565 | 565 | 565 | 565 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Columns 1, 3, 5 and 7 use the 1950s data, for cohorts/territories represented in the 1970s data. Columns 2, 4, 6 and 8 use the reconstructed 1950s fertility of women surveyed in the 1970s. One observation is one age category in a given territory. Age categories are: 15-19, 20-24, 25-29, 30-34, 35-44, 45-54, +55. Observations are weighted by the number of women they represent. Standard errors are clustered at the territory level. Controls include district fixed effects and the following control at the territory level: distance to Catholic and Protestant missions in 1886, latitude, longitude and their product, area, area suited for agriculture, mean elevation, standard deviation in elevation, population density in 18xx, tse-tse index, malaria index, the presence of railroad, navigable river and the intensity of the Atlantic slave trade.

**Table 15:** Religion in the 2000s and missionary presence in 1948

| | *(1)* Catholic | *(2)* Protestant |
|---|---|---|
| **Panel A: Linear distance** | | |
| ExpCatholics-All (C) | 0.192*** | −0.135*** |
| | (0.043) | (0.050) |
| ExpProtestants (P) | −0.046 | 0.091** |
| | (0.040) | (0.039) |
| Adjusted R2 | 0.09 | 0.09 |
| pvalue(C = P) | 0.000 | 0.001 |
| **Panel B: Log distance** | | |
| ExpCatholics-All (C) | 0.041*** | −0.030*** |
| | (0.010) | (0.010) |
| ExpCatholics-Nuns (CN) | | |
| ExpProtestants (P) | −0.009 | 0.030*** |
| | (0.011) | (0.011) |
| Controls | *Yes* | *Yes* |
| Region FE | *Yes* | *Yes* |
| N | 24539 | 24539 |
| Adjusted R2 | 0.09 | 0.09 |
| Mean of dep. var. | 0.29 | 0.29 |
| pvalue(C = P) | | |
| pv1 | | |
| pv2 | 0.002 | 0.000 |

Standard errors, in (), are clustered at the DHS cluster level.
* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

Data: Pooled 2007 and 2013-14 waves of the demographic and health surveys in the DRC. Sample: all women aged 15 to 49. OLS regression.

Dep variables : Binary for Catholic (column 1) or Protestant (column 2).

DistCatholics and DistProtestants are the distance measures computed for the DHS cluster to missions post in 1948. Controls included: age and age square and a binary for the DHS wave.

Standard errors, in (), are clustered at the territory level.
* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

**Table 16:** Fertility in the 2000s and missionary presence in 1948 (comparing Catholic and Protestant missions)

| | *(1)* Age 17 | *(2)* Age 20 | *(3)* Age 25 | *(4)* Age 30 | *(5)* Age 35 | *(6)* Age 40 |
|---|---|---|---|---|---|---|
| **Panel A: Linear distance** | | | | | | |
| ExpCatholics-All (C) | −0.024 | −0.074 | −0.124 | −0.039 | −0.172 | 0.066 |
| | (0.039) | (0.067) | (0.109) | (0.154) | (0.225) | (0.333) |
| ExpProtestants (P) | −0.058* | −0.099* | −0.177* | −0.166 | −0.196 | −0.069 |
| | (0.032) | (0.055) | (0.092) | (0.128) | (0.183) | (0.255) |
| Adjusted R2 | 0.03 | 0.05 | 0.08 | 0.08 | 0.09 | 0.09 |
| pvalue(C = P) | 0.558 | 0.787 | 0.730 | 0.534 | 0.938 | 0.762 |
| **Panel B: Log distance** | | | | | | |
| ExpCatholics-All (C) | −0.010 | −0.022 | −0.035 | −0.008 | −0.024 | 0.018 |
| | (0.008) | (0.014) | (0.023) | (0.032) | (0.043) | (0.065) |
| ExpProtestants (P) | −0.010 | −0.023 | −0.042* | −0.069* | −0.082 | −0.036 |
| | (0.008) | (0.014) | (0.025) | (0.037) | (0.053) | (0.073) |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* |
| Region FE | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* |
| N | 21301 | 19161 | 14170 | 9800 | 6455 | 3735 |
| Adjusted R2 | 0.03 | 0.05 | 0.08 | 0.08 | 0.09 | 0.09 |
| Mean of dep. var. | 0.37 | 1.02 | 2.45 | 3.87 | 5.17 | 6.15 |
| pvalue(C = P) | 0.954 | 0.955 | 0.849 | 0.234 | 0.429 | 0.595 |

Standard errors, in (), are clustered at the DHS cluster level.
* $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$.
Data: Pooled 2007 and 2013-14 waves of the demographic and health surveys in the DRC. Sample: Women who reached at the time of the survey the aged considered. OLS regression.
Dep variables : Fertility at the age indicated in the column title.
DistCatholics and DistProtestants are the distance measures computed for the DHS cluster to missions post in 1948. Controls included: age and age square and a binary for the DHS wave.
Standard errors, in (), are clustered at the territory level.
* $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$.

**Table 17:** Breastfeeding and abstinence in the 2000s and missionary presence in 1948 (comparing Catholic and Protestant missions)

| | *(1)* Breastfed <12 | *(2)* Abstain <12 | *(3)* Breastfed 12-24 | *(4)* Abstain 12-24 |
|---|---|---|---|---|
| **Panel A: Linear distance** | | | | |
| ExpCatholics-All (C) | −0.054** | −0.035 | 0.030 | −0.004 |
| | (0.022) | (0.043) | (0.040) | (0.043) |
| ExpProtestants (P) | −0.026 | −0.003 | −0.063* | −0.010 |
| | (0.018) | (0.037) | (0.035) | (0.034) |
| Adjusted R2 | 0.01 | 0.23 | 0.16 | 0.04 |
| pvalue(C = P) | 0.356 | 0.612 | 0.118 | 0.918 |
| **Panel B: Log distance** | | | | |
| ExpCatholics-All (C) | −0.011** | −0.016* | −0.005 | −0.009 |
| | (0.005) | (0.008) | (0.008) | (0.008) |
| ExpProtestants (P) | −0.008 | 0.012 | −0.016 | 0.000 |
| | (0.005) | (0.010) | (0.010) | (0.009) |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Region FE | *Yes* | *Yes* | *Yes* | *Yes* |
| N | 5416 | 5416 | 4601 | 4601 |
| Adjusted R2 | 0.01 | 0.23 | 0.16 | 0.04 |
| Mean of dep. var. | 0.91 | 0.43 | 0.64 | 0.19 |
| pvalue(C = P) | 0.783 | 0.044 | 0.443 | 0.512 |

Standard errors, in (), are clustered at the DHS cluster level.
* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

Data: Pooled 2007 and 2013-14 waves of the demographic and health surveys in the DRC. Sample: Children below 12 months (columns 1 and 2) or between 12 and 24 months (columns 3 & 4). OLS regression.

Dep variables : Binary variable indicating whether the child is breastfed at the time of the survey (columns 1 & 3) or whether the mother is sexually abstinent (columns 2 and 4).

DistCatholics and DistProtestants are the distance measures computed for the DHS cluster to missions post in 1948. Controls included: the mother's age and its square, the child age (in months) and its square and a binary for the DHS wave.

Standard errors, in (), are clustered at the territory level.
* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

# 10 Appendix

**Table A.1:** Total number of births at different ages
Missionary exposure measured at 6 years

| | Age 25 | Age 35 | Age 40 | Age 45 |
|---|---|---|---|---|
| | *(1)* | *(2)* | *(3)* | *(4)* |
| **Panel A: Any post in district (0/1)** | | | | |
| ExpCatholics - All (C) | 0.054 | −0.124 | −0.015 | 0.024 |
| | (0.155) | (0.242) | (0.248) | (0.283) |
| ExpCatholics - Nuns (CN) | −0.042 | 0.253** | 0.208 | 0.484*** |
| | (0.092) | (0.114) | (0.135) | (0.164) |
| ExpProtestants (P) | −0.078 | −0.098 | −0.243 | −0.404 |
| | (0.150) | (0.237) | (0.262) | (0.256) |
| Adjusted R2 | 0.10 | 0.13 | 0.13 | 0.12 |
| pvalue(C = CN) | 0.536 | 0.119 | 0.406 | 0.185 |
| pvalue(C = P) | 0.605 | 0.949 | 0.608 | 0.365 |
| pvalue(CN = P) | 0.847 | 0.203 | 0.125 | 0.001 |
| **Panel B: Proximity to post - Linear measure** | | | | |
| ExpCatholics - All (C) | 0.214 | 0.136 | 0.173 | 0.369 |
| | (0.154) | (0.240) | (0.282) | (0.265) |
| ExpCatholics - Nuns (CN) | −0.030 | 0.241 | 0.272** | 0.250** |
| | (0.095) | (0.157) | (0.126) | (0.118) |
| ExpProtestants (P) | 0.062 | −0.250 | −0.250 | −0.267 |
| | (0.087) | (0.177) | (0.181) | (0.204) |
| Adjusted R2 | 0.10 | 0.13 | 0.13 | 0.12 |
| pvalue(C = CN) | 0.224 | 0.741 | 0.756 | 0.684 |
| pvalue(C = P) | 0.447 | 0.250 | 0.246 | 0.081 |
| pvalue(CN = P) | 0.527 | 0.074 | 0.037 | 0.056 |
| **Panel C: Proximity to post - Log measure** | | | | |
| ExpCatholics - All (C) | 0.063 | 0.078 | −0.065 | 0.155 |
| | (0.132) | (0.226) | (0.226) | (0.278) |
| ExpCatholics - Nuns (CN) | −0.001 | 0.296* | 0.288** | 0.386*** |
| | (0.114) | (0.154) | (0.136) | (0.146) |
| ExpProtestants (P) | −0.022 | −0.232 | −0.175 | −0.286 |
| | (0.096) | (0.178) | (0.192) | (0.185) |
| Adjusted R2 | 0.10 | 0.13 | 0.13 | 0.12 |
| pvalue(C = CN) | 0.726 | 0.431 | 0.183 | 0.495 |
| pvalue(C = P) | 0.650 | 0.381 | 0.762 | 0.246 |
| pvalue(CN = P) | 0.903 | 0.043 | 0.070 | 0.013 |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 2.82 | 5.40 | 5.96 | 5.98 |
| N | 17368 | 15750 | 9942 | 6355 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: women aged 25 or older (column 1), 35 or older (column 2), 40 or older (column 3) and 45 or older (column 4). OLS regression. Dep variables : number of births a women had before age 25 (column 1), 35 (column 2), 40 (column 3) and 45 (column 4). ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at age 6. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects. Standard errors, in (), are clustered at the territory level.
* $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$.

**Table A.2:** Childlessness
Exposure measured at age 6

| | Age 25 | Age 35 | Age 40 | Age 45 |
|---|---|---|---|---|
| | *(1)* | *(2)* | *(3)* | *(4)* |
| **Panel A: Any post in district (0/1)** | | | | |
| ExpCatholics - All (C) | −0.053 | −0.036 | −0.023 | −0.020 |
| | (0.035) | (0.030) | (0.028) | (0.031) |
| ExpCatholics - Nuns (CN) | −0.002 | −0.015 | −0.002 | 0.003 |
| | (0.023) | (0.018) | (0.018) | (0.018) |
| ExpProtestants (P) | 0.036 | 0.019 | 0.013 | 0.030 |
| | (0.037) | (0.027) | (0.028) | (0.033) |
| Adjusted R2 | 0.09 | 0.07 | 0.06 | 0.07 |
| pvalue(C = CN) | 0.154 | 0.500 | 0.517 | 0.506 |
| pvalue(C = P) | 0.138 | 0.209 | 0.445 | 0.351 |
| pvalue(CN = P) | 0.406 | 0.289 | 0.643 | 0.488 |
| **Panel B: Proximity to post - Linear measure** | | | | |
| ExpCatholics - All (C) | −0.027 | 0.002 | −0.006 | −0.032 |
| | (0.046) | (0.050) | (0.045) | (0.045) |
| ExpCatholics - Nuns (CN) | −0.014 | −0.035 | −0.027 | −0.006 |
| | (0.028) | (0.026) | (0.021) | (0.016) |
| ExpProtestants (P) | −0.005 | 0.020 | 0.019 | 0.018 |
| | (0.024) | (0.021) | (0.021) | (0.020) |
| Adjusted R2 | 0.09 | 0.07 | 0.07 | 0.07 |
| pvalue(C = CN) | 0.835 | 0.590 | 0.726 | 0.634 |
| pvalue(C = P) | 0.691 | 0.724 | 0.588 | 0.272 |
| pvalue(CN = P) | 0.838 | 0.181 | 0.199 | 0.440 |
| **Panel C: Proximity to post - Log measure** | | | | |
| ExpCatholics - All (C) | −0.027 | −0.012 | 0.005 | −0.018 |
| | (0.033) | (0.032) | (0.031) | (0.034) |
| ExpCatholics - Nuns (CN) | −0.017 | −0.019 | −0.014 | 0.002 |
| | (0.030) | (0.023) | (0.021) | (0.020) |
| ExpProtestants (P) | 0.018 | 0.027 | 0.022 | 0.033 |
| | (0.027) | (0.020) | (0.020) | (0.023) |
| Adjusted R2 | 0.09 | 0.07 | 0.06 | 0.07 |
| pvalue(C = CN) | 0.814 | 0.873 | 0.647 | 0.622 |
| pvalue(C = P) | 0.399 | 0.384 | 0.671 | 0.236 |
| pvalue(CN = P) | 0.462 | 0.208 | 0.291 | 0.398 |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 0.14 | 0.07 | 0.07 | 0.08 |
| N | 18226 | 16570 | 10605 | 6905 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: women aged 25 or older (column 1), 35 or older (column 2), 40 or older (column 3) and 45 or older (column 4). OLS regression. Dep variables : Dummy equal to 1 if the woman never gave birth before age 25 (column 1), 35 (column 2), 40 (column 3) and 45 (column 4). ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at age 6. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects.

Standard errors, in (), are clustered at the territory level.

* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

**Table A.3:** Total number of births at different ages for women with at least one birth
Missionary exposure measured at age 6

| | Age 25 | Age 35 | Age 40 | Age 45 |
|---|---|---|---|---|
| | *(1)* | *(2)* | *(3)* | *(4)* |
| **Panel A: Any post in district (0/1)** | | | | |
| ExpCatholics - All (C) | −0.014 | −0.137 | 0.024 | 0.044 |
| | (0.134) | (0.232) | (0.246) | (0.279) |
| ExpCatholics - Nuns (CN) | −0.053 | 0.184* | 0.190 | 0.475*** |
| | (0.075) | (0.099) | (0.129) | (0.168) |
| ExpProtestants (P) | −0.026 | −0.117 | −0.301 | −0.415* |
| | (0.082) | (0.202) | (0.244) | (0.247) |
| Adjusted R2 | 0.06 | 0.11 | 0.12 | 0.11 |
| pvalue(C = CN) | 0.805 | 0.187 | 0.545 | 0.219 |
| pvalue(C = P) | 0.947 | 0.959 | 0.444 | 0.321 |
| pvalue(CN = P) | 0.809 | 0.200 | 0.073 | 0.001 |
| **Panel B: Proximity to post - Linear measure** | | | | |
| ExpCatholics - All (C) | 0.346** | 0.281 | 0.303 | 0.389 |
| | (0.133) | (0.192) | (0.271) | (0.265) |
| ExpCatholics - Nuns (CN) | −0.079 | 0.138 | 0.175 | 0.226** |
| | (0.073) | (0.123) | (0.111) | (0.114) |
| ExpProtestants (P) | −0.009 | −0.296** | −0.251 | −0.259 |
| | (0.074) | (0.149) | (0.193) | (0.207) |
| Adjusted R2 | 0.06 | 0.11 | 0.12 | 0.11 |
| pvalue(C = CN) | 0.017 | 0.553 | 0.666 | 0.575 |
| pvalue(C = P) | 0.016 | 0.037 | 0.133 | 0.078 |
| pvalue(CN = P) | 0.566 | 0.048 | 0.093 | 0.071 |
| **Panel C: Proximity to post - Log measure** | | | | |
| ExpCatholics - All (C) | 0.076 | 0.129 | 0.032 | 0.169 |
| | (0.120) | (0.192) | (0.220) | (0.281) |
| ExpCatholics - Nuns (CN) | −0.072 | 0.216 | 0.201 | 0.353** |
| | (0.085) | (0.131) | (0.125) | (0.145) |
| ExpProtestants (P) | −0.052 | −0.256 | −0.202 | −0.271 |
| | (0.058) | (0.163) | (0.190) | (0.185) |
| Adjusted R2 | 0.06 | 0.11 | 0.12 | 0.11 |
| pvalue(C = CN) | 0.401 | 0.717 | 0.514 | 0.592 |
| pvalue(C = P) | 0.334 | 0.194 | 0.511 | 0.249 |
| pvalue(CN = P) | 0.867 | 0.040 | 0.105 | 0.021 |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 2.82 | 5.40 | 5.96 | 5.98 |
| N | 14922 | 15423 | 9855 | 6332 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: women aged 25 or older (column 1), 35 or older (column 2), 40 or older (column 3) and 45 or older (column 4). OLS regression. Dep variables : number of births a women had before age 25 (column 1), 35 (column 2), 40 (column 3) and 45 (column 4). ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at age 6. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects. Standard errors, in (), are clustered at the territory level.
* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

**Table A.4:** Mission exposure and cohort fertility in the representative sample of the 1950s
Exposure measured at 6

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | All (linear distance) | All (log distance) | >35 (linear distance) | >35 (log distance) |
| ExpCatholics_All | 0.462*** | 0.294** | 0.198 | 0.071 |
| | (0.144) | (0.147) | (0.125) | (0.149) |
| ExpCatholics_Nuns | 0.047 | -0.064 | 0.260** | 0.411** |
| | (0.113) | (0.123) | (0.121) | (0.203) |
| ExpProtestants | -0.275* | -0.214* | -0.160 | -0.257 |
| | (0.162) | (0.117) | (0.241) | (0.210) |
| _cons | -15.645** | -14.365* | -14.399 | -12.961 |
| | (7.312) | (7.475) | (10.973) | (10.864) |
| *N* | 742 | 742 | 318 | 318 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

One observation is one age category in a given territory. Age categories are: 15-19, 20-24, 25-29, 30-34, 35-44, 45-54, +55. When exposure is measured by linear distance, we divide the distance by 100 to ease the reading of coefficients. Observations are weighted by the number of women they represent. Standard errors are clustered at the territory level. Controls include district and cohort fixed effects and the following control at the territory level: distance to Catholic and Protestant missions in 1886, latitude, longitude and their product, area, area suited for agriculture, mean elevation, standard deviation in elevation, population density in 18xx, tse-tse index, malaria index, the presence of railroad, navigable river and the intensity of the Atlantic slave trade."

**Table A.5:** Age at first birth and birth intervals
Exposure measured at age 6

| | Age at first birth | Birth intervals | |
|---|---|---|---|
| | | All births | Btw. 1st and 2nd births |
| | *(1)* | *(2)* | *(3)* |
| **Panel A: Any post in district (0/1)** | | | |
| ExpCatholics - All | 0.191 | −0.628 | −2.382 |
| | (0.537) | (0.830) | (1.921) |
| ExpCatholics - Nuns | −0.325 | −0.288 | −0.473 |
| | (0.336) | (0.483) | (1.273) |
| ExpProtestants | −0.274 | 0.404 | 2.431** |
| | (0.521) | (0.431) | (0.951) |
| Adjusted R2 | 0.08 | 0.01 | 0.02 |
| pvalue(C = CN) | 0.341 | 0.286 | 0.171 |
| pvalue(C = P) | 0.599 | 0.320 | 0.053 |
| pvalue(CN = P) | 0.936 | 0.218 | 0.046 |
| **Panel B: Proximity to post - Linear measure** | | | |
| ExpCatholics - All | 0.765 | −1.305 | −2.921 |
| | (0.750) | (1.210) | (2.882) |
| ExpCatholics - Nuns | −0.544 | −0.058 | 0.032 |
| | (0.465) | (0.485) | (0.736) |
| ExpProtestants | −0.729* | 0.718 | 2.524** |
| | (0.370) | (0.501) | (1.156) |
| Adjusted R2 | 0.08 | 0.01 | 0.02 |
| pvalue(C = CN) | 0.220 | 0.192 | 0.296 |
| pvalue(C = P) | 0.084 | 0.099 | 0.101 |
| pvalue(CN = P) | 0.772 | 0.138 | 0.106 |
| **Panel C: Proximity to post - Log measure** | | | |
| ExpCatholics - All | 0.398 | −0.192 | −1.765 |
| | (0.525) | (0.856) | (1.993) |
| ExpCatholics - Nuns | −0.453 | −0.001 | −0.204 |
| | (0.412) | (0.549) | (1.037) |
| ExpProtestants | −0.417 | 0.518 | 2.461** |
| | (0.381) | (0.516) | (0.957) |
| Adjusted R2 | 0.08 | 0.01 | 0.02 |
| pvalue(C = CN) | 0.215 | 0.809 | 0.356 |
| pvalue(C = P) | 0.316 | 0.525 | 0.119 |
| pvalue(CN = P) | 0.949 | 0.538 | 0.109 |
| Controls | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 19.36 | 30.81 | 32.09 |
| N | 17403 | 91271 | 16252 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: women aged 25 or older. (column 1) and women aged 25 or older who gave birth at least twice (columns 2 and 3). OLS regression. Dep variables : age at first child (column 1), birth intervals in months for all births the woman ever had (column 2), and restricted to the first and second births only (column 3). ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at age 6. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. In Column 2, we also include birth-order dummy variables. All regressions include territory fixed-effects.
Standard errors, in (), are clustered at the territory level.
* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

**Table A.6:** Infant mortality
Exposure measured at age 6

| | Age 25 | Age 35 | Age 40 | Age 45 |
|---|---|---|---|---|
| | *(1)* | *(2)* | *(3)* | *(4)* |
| **Panel : Any post in district (0/1)** | | | | |
| ExpCatholics - All (C) | 18.737 | 2.356 | −5.165 | 9.771 |
| | (19.339) | (16.048) | (16.235) | (18.930) |
| ExpCatholics - Nuns (CN) | 5.546 | 0.579 | 1.629 | −5.593 |
| | (13.804) | (9.191) | (9.237) | (9.773) |
| ExpProtestants (P) | −13.998 | −5.503 | −4.550 | −14.097 |
| | (14.636) | (9.876) | (14.664) | (18.429) |
| Adjusted R2 | 0.02 | 0.02 | 0.02 | 0.02 |
| pvalue(C = CN) | 0.628 | 0.925 | 0.729 | 0.514 |
| pvalue(C = P) | 0.268 | 0.725 | 0.982 | 0.472 |
| pvalue(CN = P) | 0.314 | 0.582 | 0.689 | 0.646 |
| **Panel B: Proximity to post - Linear measure** | | | | |
| ExpCatholics - All (C) | −9.217 | 5.675 | −8.630 | −2.419 |
| | (34.557) | (24.085) | (23.835) | (23.415) |
| ExpCatholics - Nuns (CN) | 0.250 | −7.043 | −5.200 | −4.013 |
| | (13.470) | (12.141) | (10.480) | (10.615) |
| ExpProtestants (P) | −1.760 | −3.613 | −10.418 | −7.874 |
| | (20.340) | (18.104) | (19.666) | (20.017) |
| Adjusted R2 | 0.02 | 0.02 | 0.02 | 0.02 |
| pvalue(C = CN) | 0.955 | 0.845 | 0.761 | 0.894 |
| pvalue(C = P) | 0.862 | 0.793 | 0.961 | 0.880 |
| pvalue(CN = P) | 0.937 | 0.873 | 0.815 | 0.865 |
| **Panel C: Proximity to post - Log measure** | | | | |
| ExpCatholics - All (C) | −14.706 | −8.815 | −11.754 | 5.395 |
| | (22.546) | (16.828) | (16.804) | (15.789) |
| ExpCatholics - Nuns (CN) | −4.340 | −6.300 | −4.162 | −6.671 |
| | (13.218) | (10.284) | (9.234) | (10.103) |
| ExpProtestants (P) | −4.841 | −4.029 | −13.106 | −15.414 |
| | (10.945) | (10.148) | (14.522) | (17.560) |
| Adjusted R2 | 0.02 | 0.02 | 0.02 | 0.02 |
| pvalue(C = CN) | 0.744 | 0.906 | 0.707 | 0.527 |
| pvalue(C = P) | 0.736 | 0.834 | 0.958 | 0.368 |
| pvalue(CN = P) | 0.976 | 0.867 | 0.589 | 0.666 |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 91.98 | 93.69 | 102.57 | 112.09 |
| N | 44326 | 84101 | 58440 | 37344 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: all births for women aged 25 or older (column 1), 35 or older (column 2), 40 or older (column 3) and 45 or older (column 4). OLS regression. Dep variable : Dummy equal to 1 if the child died before age 1. This variable is multiplied by 1000 to ease the reading of the coefficients. ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at age 6. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects.

Standard errors, in (), are clustered at the territory level.

* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

**Table A.7:** Women's weight
Exposure measured at age 6

| | All households | Households with one adult woman only |
|---|---|---|
| | *(1)* | *(2)* |
| **Panel A: Any post in district (0/1)** | | |
| ExpCatholics - All (C) | 0.881 | 3.729 |
| | (2.455) | (3.150) |
| ExpCatholics - Nuns (CN) | −0.146 | −1.189 |
| | (1.292) | (1.651) |
| ExpProtestants (P) | 2.563 | 3.184 |
| | (2.303) | (2.149) |
| Adjusted R2 | 0.12 | 0.14 |
| pvalue(C = CN) | 0.721 | 0.218 |
| pvalue(C = P) | 0.683 | 0.905 |
| pvalue(CN = P) | 0.323 | 0.107 |
| **Panel B: Proximity to post - Linear measure** | | |
| ExpCatholics - All (C) | 3.564 | 4.403 |
| | (3.892) | (8.379) |
| ExpCatholics - Nuns (CN) | −1.494 | −1.531 |
| | (1.060) | (4.463) |
| ExpProtestants (P) | 3.436*** | 3.191** |
| | (0.965) | (1.267) |
| Adjusted R2 | 0.12 | 0.14 |
| pvalue(C = CN) | 0.268 | 0.638 |
| pvalue(C = P) | 0.976 | 0.888 |
| pvalue(CN = P) | 0.001 | 0.323 |
| **Panel C: Proximity to post - Log measure** | | |
| ExpCatholics - All (C) | 4.895** | 5.100 |
| | (2.421) | (3.399) |
| ExpCatholics - Nuns (CN) | −1.474 | −0.958 |
| | (1.262) | (2.466) |
| ExpProtestants (P) | 1.293 | 2.417** |
| | (1.272) | (1.214) |
| Adjusted R2 | 0.12 | 0.14 |
| pvalue(C = CN) | 0.045 | 0.262 |
| pvalue(C = P) | 0.233 | 0.483 |
| pvalue(CN = P) | 0.118 | 0.211 |
| Controls | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* |
| Mean of dep. variable | 57.48 | 57.48 |
| N | 1371 | 1029 |

Data: Budgetary survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: all households where at least one woman over 25 resides (column 1), households where at only one woman over 25 resides (column 2). OLS regression. Dep variable: : woman's weight in kg. ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at age 6. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects.

Standard errors, in (), are clustered at the territory level.

* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.

**Table A.8:** Fertility levels at different ages and missionary activities targeting women and their children
Exposure measured at age 6

| | Age 25 | Age 35 | Age 40 | Age 45 |
|---|---|---|---|---|
| | *(1)* | *(2)* | *(3)* | *(4)* |
| **Panel A: Proximity to post - Linear measure** | | | | |
| ExpCatholics - All | 0.189 | 0.085 | 0.124 | 0.304 |
| | (0.163) | (0.238) | (0.311) | (0.288) |
| ExpCatholics - Nuns | −0.104 | 0.083 | 0.091 | 0.040 |
| | (0.092) | (0.149) | (0.116) | (0.113) |
| ExpCatholics - Nuns - Workrooms | −0.080*** | −0.067** | −0.060* | −0.030 |
| | (0.019) | (0.030) | (0.035) | (0.041) |
| ExpCatholics - Nuns - Housekeeping school and workshops | 0.123*** | 0.201*** | 0.207*** | 0.214*** |
| | (0.028) | (0.042) | (0.043) | (0.047) |
| ExpCatholics - Nuns - Women health activities | −0.016 | −0.042 | −0.043 | −0.071** |
| | (0.018) | (0.031) | (0.033) | (0.035) |
| ExpProtestants | 0.107 | −0.124 | −0.110 | −0.037 |
| | (0.085) | (0.178) | (0.193) | (0.219) |
| Adjusted R2 | 0.10 | 0.13 | 0.13 | 0.12 |
| **Panel B: Proximity to post - Log measure** | | | | |
| ExpCatholics - All | 0.071 | 0.070 | −0.074 | 0.139 |
| | (0.132) | (0.227) | (0.228) | (0.268) |
| ExpCatholics - Nuns | −0.027 | 0.199 | 0.167 | 0.177 |
| | (0.122) | (0.168) | (0.146) | (0.166) |
| ExpCatholics - Nuns - Workrooms | −0.083** | −0.074 | −0.092 | −0.049 |
| | (0.033) | (0.049) | (0.065) | (0.074) |
| ExpCatholics - Nuns - Housekeeping school and workshops | 0.116** | 0.200*** | 0.249*** | 0.348*** |
| | (0.047) | (0.074) | (0.078) | (0.097) |
| ExpCatholics - Nuns - Women health activities | −0.028 | 0.001 | −0.048 | −0.066 |
| | (0.044) | (0.085) | (0.082) | (0.083) |
| ExpProtestants | 0.016 | −0.190 | −0.115 | −0.203 |
| | (0.084) | (0.183) | (0.186) | (0.165) |
| Adjusted R2 | 0.10 | 0.13 | 0.13 | 0.12 |
| Controls | *Yes* | *Yes* | *Yes* | *Yes* |
| Territory FE | *Yes* | *Yes* | *Yes* | *Yes* |
| Mean of dep. variable | 2.82 | 5.40 | 5.96 | 5.98 |
| N | 17368 | 15750 | 9942 | 6355 |

Data: Demographic survey collected in the 1970s in seven major cities in Zaire (see Section 3.1.1). Sample: women aged 25 or older (column 1), 35 or older (column 2), 40 or older (column 3) and 45 or older (column 4). OLS regression. Dep variables : number of births a women had before age 25 (column 1), 35 (column 2), 40 (column 3) and 45 (column 4). ExpCatholics-All, ExpCatholics-Nuns and ExpProtestants are extensively described in Section 3.2. Panel A : whether there is at least one missionary post in *territory g*. Panel B and C : measures of *territory*-level proximity to posts (measured as minus the average distance to missionary posts. The unit is 100 km). Panel C includes the log transformation of this measure. All exposure variables are measured at age 6. Controls included: city of residence, a dummy variable indicating whether the place of birth of the mother is in a rural area and a quadratic year-of-birth trend. All regressions include territory fixed-effects.
Standard errors, in (), are clustered at the territory level.
* p ≤ 0.1, ** p ≤ 0.05, *** p ≤ 0.01.