Colonial Origins and Fertility: Can the Market Overcome History?*

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Abstract

To what extent can market incentives and contemporary social policies modify the long-term impact of historical institutions? We address this question by focusing on the role of colonial reproductive policies in shaping fertility behavior in Africa. Exploiting the arbitrary division of ancestral ethnic homelands and the resulting discontinuity in institutions across British-French colonial borders, we find that women in former British areas have lower realized fertility today. To examine channels of persistence, we collect historical data on laws governing access to contraception and show that the British-French gap in fertility is driven by the legacy of stricter contraceptive laws in former French colonies, which affect contraceptive uptake today. We find no evidence that the effect of British colonization on fertility operates through a human capital or income effect. Analyzing heterogeneity by market access, we show that contemporary factors can modify the long-term impact of colonial history on fertility. First, we find that the fertility effect of British colonization is only present in areas with low market access. Second, we find that the convergence of contraceptive laws in former British and French colonies reduces the fertility gap between Anglophone and Francophone women more in areas with low market access. By shedding light on the fact that market access and liberal contraceptive laws act more as substitutes than complements to affect fertility, these findings can inform strategies to target birth control policies and address the long-term impact of institutions shaped by colonial history.

Keywords: Fertility, Colonial Origins, Colonial Population Laws and Policies, Market Access, Contemporary Policies, Africa.

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1 Introduction

Over the past two centuries, the world experienced a gradual breakout from a long-standing Malthusian trap, in which income growth was offset by population growth. Economic growth theory explaining this remarkable escape has emphasized the essential role of human capital in lowering fertility and inducing a transition from stagnation to sustained economic growth (Galor (2011)). At the global level, fertility has declined significantly since the 1960s, from five children per woman to less than half this number by 2016 (The World Bank (2016)). By contrast, the demographic transition in sub-Saharan Africa is still in its early stages. Despite an impressive increase in female education and a significant decline in child mortality, fertility rates in this region remain high, with an average of 4.8 children per woman in 2016, roughly double the world average of 2.4 children per woman (The World Bank (2016)). Africa's population pressure varies widely across and within countries, from 7.1 children per woman in Niger to 3.2 and 2.5 children per woman in Lesotho and South Africa, respectively (The World Bank (2016)). Although regional variation in fertility transition is commonly linked to differences in historical institutions (Galor (2011)), little research has sought to provide causal evidence of the long-lasting impacts of past institutions on fertility in Africa. What is more, we know very little about whether contemporary factors known to affect fertility behavior such as market incentives and birth control policies can mitigate the long-term impact of history. In this paper, we address this knowledge gap by examining the causal effects of colonial origins on fertility behavior in sub-Saharan Africa, focusing on British-French divergence on colonial population policies, and how these effects are modified by present-day market access and family planning policies.

After World War I, Britain and France considered that Africa was underpopulated. In response, both adopted pronatalist policies to bolster fertility in their respective colonies. The French colonial government extended the 1920 French law forbidding abortion and the promotion of contraception in all its colonies, while British officials implemented public health interventions and policies to encourage African population growth (Latham (2002), Garenne (2018), Ittman (2022)). However, in the late 1930s, the British and the French began to diverge in their colonial population policies. Rising concerns about rapid population growth, risk of political unrest, and economic difficulties in the British colonial empire led to the passage of the Colonial Development and Welfare Act in 1940 and the adoption of population policies that incorporated migration, food supplies, medical services, and family planning as a method of promoting economic development in the colonies (Ittman (1999, 2013)). At the time of independence, family planning policies allowing the promotion and sales of contraceptives were already present in former British colonies. By contrast, even after their independence, former French colonies continued to enforce the 1920 pronatalist French law, which outlawed information and awareness campaigns on family planning and contraception. It was not until the early 1980s, following the adoption of the resolutions of the Third World Population Conference that took place in Bucharest in 1974, that former

French colonies repealed the 1920 law and that reforms authorizing the sales and promotion of contraceptives were gradually introduced into national health programs.

The diverging colonial population policies and their incidence on contemporary legislation on contraception provide an opportunity to study whether and how these policies continue to affect fertility in sub-Saharan Africa today. To this end, we address three questions. First we ask whether British versus French colonization has a differential impact on fertility. Second, we ask whether the colonial origins of fertility differences are driven by British-French historical differences in family planning laws. Third, we examine whether present-day market incentives can attenuate the long-term effects of colonial population policies, and document how these incentives interact with more recent birth control policies.

To address these questions, we collect new data on colonial population policies and exploit the natural experiment that led to the arbitrary division of historical ethnic homelands across colonial borders during the "Scramble for Africa". Combining individual-level data from Demographic and Health Surveys (DHS) with data on historical ethnic homelands from Murdock's Ethnographic Map of Africa, we implement a spatial Regression Discontinuity Design (RDD) with ethnic homeland fixed effects to estimate the causal effect of British (versus French) colonization on reproductive behavior. This identification strategy accounts for culture and other unobserved ethnicity-related factors that may affect fertility and that could potentially bias our estimates. Reassuringly, specification checks show that ancestral cultural characteristics and geographic factors known to correlate with fertility vary smoothly at the British-French borders. Robustness analysis also show that selective migration and random displacement of DHS clusters are unlikely to bias our results.

We present five set of results. First, we show that British colonization has a negative impact on contemporary fertility. On average, women in former British colonies have significantly fewer children than their counterparts in former French colonies. Our baseline estimates show that anglophone women have 0.15 to 0.22 fewer children than francophone women. This difference represents a fertility decline of about 3% to 5% relative to a mean total fertility rate of 4.8 throughout the sub-Saharan African region. In terms of magnitude, this is a large effect considering that it took close to 60 years to reduce fertility by only 28% in sub-Saharan Africa. We also find that women in former British colonies are more likely to initiate sexual activity at older ages and to delay childbearing, and they are less likely to engage in child marriage (that is, being married before 18 years old). Our results are robust to a variety of analyses, including alternatives RD specifications and parameters, dropping Cameroon and Togo who had more than one colonizer, exposure to historical missionary activities, different religious affiliation, and alternative clustering methods accounting for unknown spatial autocorrelation.

Second, we show that the long-term impact of British versus French colonization on fertility is driven by women exposed to differential family planning laws in former British and French colonies. Motivated by the history of colonial population policies and laws on contraception, we use archives and other official sources to collect new data on the timing of liberalization of sales and promotion of contraceptives in both former British and French colonies. While former British colonies had already adopted liberal policies allowing the promotion and sales of contraception as early as their independence, former French colonies adopted these policies only starting in 1980. We exploit this year as a cut-off in our RD strategy and examine whether the impacts of British versus French colonization on fertility vary before and after the legalization of contraceptives in francophone countries. We find that the negative effects of British colonization on fertility is large for cohorts of francophone and anglophone women exposed to divergent contraceptive laws. The fertility effects of British colonization decrease significantly following the adoption of liberal contraceptive laws in former French colonies.

Third, analyzing the mechanism underlying our results, we show that the British-French difference in fertility is explained by differences in contraceptive use. Using an indicator of lifetime contraceptive use, we find that before the legalization of contraceptives in former French colonies, anglophone women are more likely to use modern contraception compared to francophone women. But this effect decreases substantially after the adoption of more liberal contraceptive laws in former French colonies. This result is consistent with the idea that the long-term impacts of colonization on fertility is driven by the lasting impacts of colonial population policies on contemporary contraceptive laws and their subsequent impact on access to, and use of, contraception.

Fourth, although we find evidence showing that our results are primarily driven by differences in colonial population policies and their impact on contraceptive use, we test whether colonial differences in other institutional dimensions are driving the effects on fertility. The literature on colonial origins in Africa has documented British-French differences in features such as administrative rules, education policies, legal institutions, and marital property laws that may exert influence on economic development and other distal determinants of fertility outcomes. Building on the theoretical literature on the short-term drivers of fertility and demographic transition (Becker (1960), Mincer (1963), Becker and Lewis (1973), Galor and Weil (1996), Strulik (2017), Doepke and Tertilt (2018)), we consider the following distal determinants of fertility: (a) female education; (b) female economic empowerment (income and labor participation) and bargaining power; and (c) child mortality. We examine the effect of British versus French colonization on each of these channels and test whether variation in this effect after the legalization of contraceptives in former French colonies is consistent with variation in the fertility effect of British colonization. Our results show that these factors either vary smoothly at the British-French border or the effects of British colonization on these factors are inconsistent with the effects of British colonization on fertility.[1] We conclude that these factors do not mediate the effect of colonial origins on fertility. We also show that maternal mortality does not drive our results either.

Fifth, we establish whether contemporary factors can modify the long-term fertility im-

[1]For example, while education is higher among Anglophone women prior to the legalization of contraceptives in former French colonies, the gap expands after the legalization, contrary to the fertility gap.

pact of colonial history by examining how colonial origins and population policies interact with market access to shape fertility behavior today. As a preliminary, we show that women in areas with greater market access have higher labor participation today, implying a greater opportunity cost of childbearing. Next, we find that the average effect of British colonization masks important heterogeneity that depends on market access. For robustness, we construct several measures of access to international markets and domestic markets.[2] We find that British colonization has little effect on fertility in areas with greater market access. The fertility effect of British colonization is only present in the hinterland and other areas with low market access. These findings imply that the effect of colonial origins on fertility does not persist when the opportunity cost of having a child is sufficiently high. Moreover, we find that the relatively recent introduction of more liberal family planning in former French colonies reduces the fertility gap between Anglophone and Francophone women more in areas with low market access. From a policy perspective, our analysis suggests that market access and birth control policies act more as substitutes than complements to reduce the fertility gap caused by divergent colonial population policies. This also shows the extent to which the long-term effects of historical population institutions can be modified through actions that generate economic opportunities for women or that facilitate access to birth control.

Contributions to the literature. To our knowledge, this paper is among the first to link variation in fertility behavior in present-day Africa to differences in colonial population policies, and document how the effects of these historical policies may be modified by market access and relatively recent family planning policies. We make three main contributions.

First, by focusing on colonial reproductive laws and policies, we consider a feature of colonial institutions that has received little attention in the literature. Colonialism as a determinant of present-day social and economic outcomes has commonly been analyzed as a bundle (Robinson (2019)), which leaves open the important question of the long-term impacts of different aspects of this historical episode. We show that differences in colonial population policies and their lasting impact on contraceptives legislation are the root of comparative fertility behavior in Africa. Moreover, to the extent that fertility affects economic development (Galor and Weil (2000), Bloom et al. (2009)), our paper can be viewed as documenting a novel mechanism through which colonial origins have had a lasting impact on local economic development in African societies. We do not find that the fertility effect of colonial origins is driven by economic development, female education, or child mortality. Instead, we show that colonial origins affect fertility through differences in colonial population policies and their lasting impact on the use of modern methods of birth control. In

[2] We make use of five different measures: (a) proximity to the sea coast (our main measure); (b) minimum travel time to international ports; (c) a network-based measure of access to port cities; (d) a network-based measure of access to major cities (the last two measures follow an approach proposed by Donaldson and Hornbeck (2016) and are computed using data on African transportation networks); and (e) minimum travel time to cities of at least 50,000 inhabitants. The first three measures therefore mainly reflect access to export (and international) markets, whereas the last two measures reflect access to domestic markets.

this sense, our study enriches the broad literature on the historical origins of comparative economic development (Acemoglu et al. (2001), La Porta et al. (2008), Nunn (2008), Alesina et al. (2011), Nunn and Wantchekon (2011), Okoye and Pongou (2014, 2017), Wantchekon et al. (2015), Michalopoulos and Papaioannou (2013), Alesina, Giuliano, and Nunn (2013), Acemoglu et al. (2014), Cogneau and Moradi (2014), Fenske and Kala (2017), Dupraz (2017), Anderson (2018), Archibong and Obikili (2020), Okoye (2021); see also Michalopoulos and Papaioannou (2020) and Nunn (2020) for a comprehensive literature review). Moreover, it is surprising that the link between colonial population policies and comparative economic development had not been documented so far, as economic development was the most important reason for Britain introducing family planning programs in its colonies (Ittman (1999, 2013)).

Second, our study contributes to the current debate on variation in the pace of demographic transition in Africa (see Shapiro and Tambashe (2003) and Ezeh et al. (2009) and the references therein). While the extant literature explains this phenomenon by focusing on cross-country differences in the short-term determinants of fertility (such as female labor participation, female education, and child mortality), we contribute to this debate by showing that deep-rooted political institutional factors matter. Our analysis also complements recent efforts to understand fertility patterns in Africa. Using data from Senegal, Rossi (2019) shows that polygamy raises fertility by encouraging competition between wives. Exploiting a quasi-natural experiment based on the restriction of Christian missionary activities in some Emirates of Northern Nigeria by the British colonial power, Okoye and Pongou (2022) document a negative long-term effect of Christian missions on fertility. Guirkinger and Villar (2022) find a positive effect of exposure to Catholic nuns on fertility in Belgian Congo. Our findings are robust to controlling for both colonial-era missionary activities and contemporary religious affiliation. Zipfel (2022) compares the fertility of sub-Saharan African countries to that of other low-and-middle income countries, and suggests that the nature of occupational change in the former region explains why its fertility transition is different.

Finally, our paper contributes to the nascent literature that investigates heterogeneity in the long-term effects of history. Using data from Nigeria, Okoye et al. (2019) show that colonial railroads have short-term and long-term impacts on several measures of local economic development. They find that the effects of colonial railways are only present in northern Nigeria. In the same vein, in a study that investigates the role of national institutions for subnational development, Michalopoulos and Papaioannou (2014) show that the explanatory power of national institutions on regional economic development was only visible in areas close to capital cities. Our paper differs from the aforementioned studies in its scope, analysis, and policy implications. Our analysis highlights the heterogeneous nature of the colonial origins of comparative fertility behavior in Africa, and shows that market access and birth control policies act more as substitutes to reduce the fertility effect of colonial population policies.

The rest of this paper unfolds as follows. In Section 2, we present the history of colonial population policies and contraceptive laws in former British and French colonies in Africa. Section 3 discusses the data. Section 4 presents our empirical strategy. Section 5 examines the long-term effect of colonial origins on fertility and tests the robustness of the findings. Section 6 highlights the role of colonial population policies and more recent contraceptive laws. Section 7 distinguishes between channels of causality. Section 8 presents the analysis of the heterogeneous effect of colonial origins on fertility by market access. Section 9 concludes.

2 History of Colonial Population Policies and Contraceptive Laws in Africa

The British and French colonial administration differed along various dimensions. This section provides a summary of the main characteristics of their population policies, with a particular focus on how British-French differences in this sphere shaped post-colonial government laws on access to contraceptives.

2.1 British and French colonial population policies

The legislative history of France has played a significant role in the development of the law of many francophone countries in the world. On July 31, 1920, France adopted a pronatalist population policy in order to raise fertility rates and thwart the important demographic deficit caused by World War I (Latham (2002), Garenne (2018)). The French pronatalist law known as "Loi de 1920" (see Appendix Figure A1) was designed to repress abortion and prohibit the sale of contraceptives and anti-conception propagandas.[3] In July 30, 1939 this pronatalist law was reinforced by a law called the *"Code de la Famille"* which gave more entitlements to adults with children, including cash incentives to mothers who stayed at home to care for children, subsidized holidays, better maternity leaves, and a lump sum transfer to parents with a third child. The restrictive French law was extended and enforced in all French colonies. After the independence, abortion and contraception continued to be legally banned in former French colonies, even as restrictions were lifted in France itself.[4] It was not until the early 1980s, following the adoption of the resolutions of the Third World Population Conference that took place in Bucharest in 1974, that former French colonies changed the 1920 law and that reforms legalizing awareness campaigns on contraceptives and their sales were gradually introduced into national health programs (Stepan and Kellogg (1974), Garenne (2018), Ittman (2022)).

British colonial population policies went through several phases (Ittman (1999, 2013)).

[3] Law of July 31, 1920 prohibiting abortion and anti-conception propagandas, art 7, Official Journal of August 1, 1920, supra n.13.

[4] On December 28, 1967, the 1920 French law was repealed and replaced by the *"Loi Neuwirth"* which lifted the ban on birth control methods in France.

In the 1920s, these policies were pronatalist as in French colonies, due to high death rates and a desire for a large native work force. Drawing from unreliable data collected in the 1920s, British officials and demographers argue that low population was a major impediment to development. The influence of Malthusianism and the British officials' belief in an underpopulated Africa justified public health interventions and policies focusing on encouraging African population growth (Ittman (2022)).

In the late 1920s and the 1930s the British Eugenics movement lobbied for population control in the colonies. Historian Karl Ittmann writes:

> In 1929 the Eugenics Society set up the Birth Control Investigation Committee (BCIC) to gather more information about birth control and to encourage private efforts in family planning. Its International Subcommittee corresponded with groups in Europe, Asia, and Africa to facilitate this work. As in its other campaigns for voluntary sterilization and middle-class tax subsidies in the inter-war period, the Society brought in other groups to broaden the base of the movement. It provided financial support for the National Birth Control Association (NBCA), which in 1938 became the Family Planning Association, the forerunner of the International Planned Parenthood Federation. The Eugenics Society also funded research into birth control, seeking simple and cheap contraceptive methods that would be suitable for both poor whites in Britain and the peoples of the empire, who were thought to present similar problems of ignorance and improvidence. (Ittman, 1999, p. 59)

The British Eugenics Society had a significant influence on British officials, who began to change their position toward colonial demographic problems. To that point, Karl Ittmann writes:

> As early as the mid-1930s, British colonial officials discussed the problems associated with population growth in potentially overcrowded regions of the empire. These discussions led to a population policy that embraced migration, food supplies, medical services, and family planning. (Ittman, 1999, p. 55)

However, only small scale family planning initiatives took place in British colonies in the 1930s, and these initiatives were mainly concentrated in Asia and the Caribbean. A major shift occurred with World War II. Colonial policy, which historically allowed a great deal of autonomy to local administrators, was centralized in the Colonial Office in London, to aid the war effort. In response to the population pressure, the British colonial power adopted population policies that incorporated migration, food supplies, medical services, and family planning as a method of promoting economic development in the British colonial empire (Ittman (1999, 2013)). The decision to promote economic development in the colonies was formalized by the passage of the Colonial Development and Welfare Act in

1940 (see Appendix Figure A1).[5] Ittman (1999) provides more detailed information on the internal dynamics that led to the radical change in the attitude of the Colonial Office toward demographic issues in the British empire. He writes:

> In 1941, Dr Archibald Smart, a medical adviser to the Colonial Office, expressed the mounting concern among some officials over the pace of population growth in the British empire [...] Dr Smart's comment marked a fundamental shift in the position of the British government toward colonial demographic issues, as the Colonial Office increasingly viewed population growth as a threat to its efforts to strengthen the British empire. (Ittman, 1999, p. 55)

Prior to the implementation of these policies in African colonies, several European demographers used new quantitative techniques to explore population dynamics in Africa (Ittman (2022)). The results of these works warned against rapid population growth as mortality was decreasing while social norms were encouraging high fertility. These results aligned with the predictions of British officials and independent researchers in the 1940s. One meaningful recapitulation of these projections is from Ittman (2022). He writes:

> In 1943, Julian Huxley argued that expanded health services and greater prosperity would bring population growth. In 1945 Andrew Cohen, one of the architects of postwar African policy, noted predictions that the introduction of DDT would lower death rates from malaria, leading to population increase. (...) In 1948, T. H. Davey, a medical advisor to the Colonial Office, claimed that parts of Nigeria and Kenya were already experiencing high rates of growth and that other regions of the continent would follow if existing trends continued. Postwar censuses in East Africa in 1948 and in northern Nigeria in 1952 seemed to confirm these impressionistic reports. (Ittman (2022))

In the postwar era, British colonial interventions to contain rapid expansion of Africa population focused on resettlement programs and increased agricultural output. Family planning programs allowing the creation of birth control clinics only appeared in the British empire in Africa at the end of the colonial period and continued after the independence (Ittman (2022)).

2.2 Contemporary Contraceptives Legislation

The history of colonial population policies in Africa described above shows that during most of the colonial era, French colonies pursue a pronatalist agenda characterized by stricter contraceptive laws than former British colonies. The latter had more liberal contraceptive

[5] This report was written in 1938-1939 and was to be published in 1940 but was delayed due to the war since it criticized the British administration. However, the conclusion and recommendations were published in 1940.

laws. Kenya was a pioneer in adopting family planning policies. Modern contraception was introduced in this country in 1957, and the first clinics offering modern methods of birth control appeared in 1960 (Garenne (2018)). The adoption of family planning policies in other former British colonies accelerated after their independence. For instance, Ghana launched a demographic program in 1959 (May (2017)), and the "Family Advice Center", which consisted of specialized centers providing resources for family planning, was created in 1961 (Oliver (1995), Caldwell and Sai (2007), Garenne (2018)).

By contrast, at independence, family planning activities and contraceptives were not permitted in all former French colonies because of the existing 1920 French law forbidding both abortion and the promotion of contraception. However, the situation changed over time. Today, former French colonies have either repealed the restrictive French law of 1920 or no longer enforce it. Among the francophone countries in this study, Cameroon was the first country to repealed the French pronatalist law. Until 1980, the sales of contraceptives to the public and contraceptive advertising were prohibited by Law No. 29/69 of May 29, 1969, regulating the profession of pharmacists in Cameroon. In addition, Law no. 80/10 of July 14, 1980 authorizes the sales of contraceptives and provides that only pharmacists can sell prescription drugs and contraceptives.[6]. Among the francophone countries to follow suit were Côte d'Ivoire in 1981, Burkina Faso in 1986, Chad in 1993, Benin in 2003, Niger in 2006, Togo in 2007, and Guinea in 1992 (Appendix Table A1 provides details on the legal source). All these countries abrogated laws that had made contraceptives illegal and enacted new laws authorizing the sales of contraceptives.

Figure 1 summarizes the timeline of population policies in former British and French African colonies. We see that former British colonies introduced family planning policies and legalize contraceptives much earlier than former French colonies.[7] The year 1980 marks the beginning of population policy convergence across these countries and will be used in the analysis below to assess the impact of colonial population policies on fertility. This policy convergence does not necessarily imply that British-French differences in reproductive laws or in individual attitudes towards family planning totally disappeared, especially given the possibility of cultural transmission and persistence of values across generations. In fact, exploiting an index of changes in reproductive health laws in sub-Saharan Africa, Finlay et al. (2012)) and Finlay and Erin (2017) show that the effect of liberalization of reproductive health laws on contraceptive use among women was much larger in former British colonies than in former French colonies.

[6]This law was also enforced in former British Cameroon

[7]This is consistent with studies that have found that former French colonies have had more restrictive reproductive health laws in terms of access to family planning and abortion than former British colonies since the 1960s (Finlay and Erin (2017), Finlay et al. (2012)).

3 Data and Descriptive Statistics

3.1 Contemporary Data

To examine the effects of British versus French colonization on fertility outcomes, we combine Demographic and Health Surveys (DHS) with maps of the British-French boundaries in Africa (see Figure 2). DHS are nationally representative surveys conducted at regular intervals (in general every five years) since 1986. Each survey uses a two-stage probabilistic sampling approach, selecting clusters (or census enumeration zones) in the first stage and households in the second stage. Each survey provides detailed information on demographic, social, economic, and health characteristics of eligible women, men, and children in each household.[8] For the purpose of our analysis, we restrict our sample to DHS surveys containing both individual-level information and GPS data for each cluster. Figure 2-a shows a map of colonial borders and ancestral ethnic homelands in Africa. Among countries with available DHS data[9], 8 former French colonies and 3 former British colonies are sharing common boundaries. Former French colonies are: Benin, Burkina Faso, Cameroon, Chad, Ivory Coast, Guinea, Niger, and Togo. Former British colonies are: Ghana, Nigeria, and Sierra Leone. Using data on the 11 eligible countries, Figure 2-b provides a map with British-French borders and the DHS clusters that are within $70Km$ of the nearest British-French borders. Appendix Table A2 provides summary statistics for the main outcomes of interest as well as other individual-level controls included in the estimations.

3.2 Historical Data

To identify the causal impact of British versus French colonization on fertility outcomes, we include ethnic homeland fixed effects in our empirical strategy. Ethnic homeland fixed effects ensure that our estimated effect is not biased by differences in ethnic-specific characteristics such as culture or norms surrounding gender and fertility, and they also control for pre-colonial factors such as exposure to slave trades. To this end, we gather historical data on the location of ancestral ethnic homelands from the George Peter Murdock's Ethnographic Map of Africa. Murdock's map portrays the spatial distribution of 826 ethnic areas across Africa at the time of colonization. Following a similar approach as in Michalopoulos and Papaioannou (2013, 2014, 2016), we overlay contemporary national boundaries of Africa and DHS clusters on Murdock's map (Figure 2) to associate each DHS cluster (and thus individuals in this DHS cluster) to the corresponding ancestral ethnic-country area. For identification checks, we also exploit the Ethnographic Atlas (EA) coded by George Peter Murdock (Murdock (1967)) and updated by Nunn and Wantchekon (2011). The EA provides cultural practices for $1,291$ pre-colonial societies around the world. For our analysis, the

[8] Information collected through DHS is generally recorded at different levels. The analysis in this paper relies mainly on the Individual Recode files (Women-level data) and the Birth Recode files (child-level data).

[9] See Appendix Table A1 for the list of available DHS by country.

EA provides an opportunity to examine whether areas around the British-French border are similar along several pre-colonial characteristics including prevalence of polygamy and population density which are two factors relevant for fertility outcomes. In the analysis below, we also prove that differential exposure to missionary activities before colonization do not affect our results. To this end, we add to our main specification controls for the proximity to historical Catholic and Protestant mission stations. We draw information on historical foreign mission stations in Africa from the Roome (1924) map of Catholic and Protestant mission stations.[10]

3.3 Geographic Data

To account for geographic variation across the British-French border, we augment our data with geographic information measured at a very fine level. We divide Africa into pixel units of $12\text{km} \times 12\text{km}$. For each pixel, we rely on various sources (see Appendix Section B3) to collect information on the following measures of geographic and natural endowments: elevation, soil suitability for agriculture, and precipitation. In Section 4, we show that these geographic variables do not vary across the British-French border, which is reassuring as it implies that areas that were colonized by the British are comparable to areas that were colonized by the French with respect to measures of local economic development in the pre-colonial era.[11]

3.4 Roads and Urban Population Data

To construct four of the five measures of access to international and domestic markets used in the analysis below, we use geo-referenced panel data on roads in Africa provided by the World Bank. This dataset shows the evolution of the road network in Africa and the quality of these roads (the nature of the road includes highway, paved, improved, or earthen road) for the period 1960 - 2010. Following the literature (e.g., Jedwab and Storeygard (2020); Berg et al. (2018)), we assume different speeds for different quality of roads and compute the travel time between two localities using ESRI's network analyst. Specifically, we assume 80, 60, 40, 12, and 6 km/h on highways, paved roads, improved roads, earthen roads, and areas with no roads, respectively. The construction of the market access variables also makes use of a panel database of cities' locations and urban populations in sub-Saharan Africa that we obtained from the Africapolis database.[12] With data on travel time and urban population, we compute our network-based measures of accessibility as described in Section 8.

[10] We use the dataset available at https://scholar.harvard.edu/nunn/pages/data-0.

[11] Controlling for geographic variables in addition to ethnic homeland fixed effects largely accounts for pre-colonial events such as the transatlantic slave trade, given that the number of slaves exported from each area was primarily a function of the distance to the coastline and some of the aforementioned geographic variables (Nunn (2008)).

[12] *Available at* https://africapolis.org/data.

4 Empirical Strategy

4.1 Estimation

We exploit the arbitrary drawing of African borders and the resulting British-French discontinuities to estimate the causal effect of British versus French colonization on contemporary levels of fertility. Specifically, we compare women located close to the British side of the boundary to their counterparts on the French side in a spatial regression discontinuity framework. We estimate the following RD specification:

$$Y_{iaet} = \alpha + \beta \mathsf{British}_a + f(\mathsf{distance}_a) + X_i'\mu + Z_a'\lambda + \delta_e + \sigma_{b(a)} + \theta_t + \varepsilon_{iaet} \quad (1)$$

where Y_{iaet} is the outcome of interest for individual i residing in enumeration area (village/town/city) a which falls in the ancestral ethnic homeland e in survey year t. $\mathsf{British}_a$ is an indicator equal to 1 if enumeration area a is inside a former British colony and 0 if a is inside a former French colony. $f(\mathsf{distance}_a)$ is the RD polynomial, which controls for smooth functions of the distance between enumeration area a and the British-French border of interest. Following Calonico et al. (2014), Gelman and Imbens (2019), and Cattaneo et al. (2019), our baseline specification is a local linear polynomial in distance to the British-French border estimated separately on each side of the border. We show robustness for polynomials of higher orders in the appendix. X_i' is a vector of individual-level covariates including age and age squared. Z_a' is a vector of covariates of enumeration area containing an indicator for whether enumeration area a is located in an urban area. δ_e is a vector of ethnic homeland fixed effects which ensures that we are comparing women from the same cultural background but who are residing on different sides of the British-French border. $\sigma_{b(a)}$ is a vector of border segment fixed effects, obtained by splitting each boundary into segments of equal length.[13] This rules out the possibility that anglophone women located in the extreme south of the border are compared to francophone women located in the extreme north of the border. Lastly, θ_t includes survey year fixed effects. For inference purposes, we cluster standard errors at the enumeration area level. Yet, to account for undefined spatial dependence, we also present results using Conley standard errors with a cut-off window of 10km (Conley (1999)).

We estimate Equation (1) for a restricted sample of individuals located close to the British-French borders.[14] In the main analysis, we present results for various pre-determined fixed bandwidths (70km; 100km; and 150km) and for the data-driven optimal bandwidth

[13] The number of segments is not the same for all borders. The rule of thumb was to split the border into equal segments of less than 100km.

[14] A similar RD approach has been used to examine the effects of historical events in various developing countries. See, for instance, Dell (2010), Michalopoulos and Papaioannou (2014), and Lowes and Montero (2021).

calculated using the default procedure proposed by Cattaneo et al. (2019).[15] Reassuringly, our main results are robust to alternative non-default RD parameters. In addition, the baseline analysis estimates Equation (1) with a "donut hole" of $5km$, that is, we exclude individuals within $5km$ of the British-French border. This restriction is important to account for the random displacement of DHS clusters and the potential incorrect assignment of respondents around the boundary.[16]

4.2 Specification checks

Our coefficient of interest in Equation (1) is β, which measures the local average effect of British colonization on the outcome of interest. The causal interpretation of this coefficient rests on two identifying assumptions. The first assumption is the continuity assumption which requires that all factors besides the treatment evolve smoothly at the cut-off. In our setting that compares reproductive behavior across individuals living in adjacent countries with different colonial origins, the intuition behind this assumption is that there is no discontinuity in all relevant pre-colonial factors at the British-French boundaries. In other words, our estimates would be biased if Britain and France chose to colonize very different areas based on specific pre-existing characteristics relevant to our outcomes of interest. For example, colonial borders in Africa might have been influenced by salient geographical features such as rivers, lakes, and soil quality.

Existing accounts provide ample evidence of the randomness of African borders.[17] It is argued that colonial borders in Africa were unilaterally drawn by Europeans at a time when they had limited knowledge of the local conditions; suggesting that the drawing of colonial borders arbitrarily allocated areas or locations (villages/towns/cities) between British and French colonies. Thus, these areas should have similar geographic and pre-colonial characteristics allowing us to identify the effect of British colonization on contemporary outcomes. To assess the plausibility of this assumption, we examine the relationship between colonial origins and a set of observable pre-existing factors that may independently affect reproductive behavior. Table 1 presents summary statistics and RD estimates using specification (1) for important geographic, ecologic, and pre-colonial characteristics. This analysis is at the individual level with standard errors clustered at the pixel level. Consistent with the continuity assumption, we find balance in most characteristics. Geographic and ecologic characteristics include elevation, soil suitability, precipitation, distance to the capital city,

[15] The default options are: triangular kernel function, mean squared error optimal bandwidth selection, the same bandwidth on each side of the border, and local linear specification for the distance to the British-French border.

[16] To maintain the confidentiality of respondents in DHS, the GPS coordinates are randomly displaced by up to $2km$ for all urban clusters, and rural clusters are displaced by up to $5km$ for 99% of rural clusters and up to $10km$ for 1% of rural clusters. This random displacement of clusters induces a classical measurement error which would bias our estimates toward zero if we incorrectly assigned clusters to British or French areas.

[17] See, for instance, Michalopoulos and Papaioannou (2015, 2013) for a review of historical arguments supporting the arbitrary drawing of African borders.

distance to pre-colonial missions, distance to the coast, and the malaria suitability index. Table 1 suggests that areas colonized by the British were similar to those colonized by the French in terms of most geographic and pre-colonial features, with the exception of distance to the capital city.[18] In the analysis below, we show that our main results are robust to controlling for these geographic and location characteristics. Exploiting data from the Ethnographic Atlas (Murdock (1967)), we also show balance on pre-colonial ethnic characteristics including population density and polygamy. While we only show balance on selected pre-colonial ethnic characteristics, our main specification in Equation (1) accounts for potential unobservable ethnic-related differences by controlling for ethnic homeland fixed effects as described in Section 4.1.

The second identifying assumption is that there is no selective sorting around the treatment threshold. A major threat to this assumption is related to selective migration resulting from strategic internal and cross-border movements of people following colonial border formation. First, if areas close to the border attract individuals from other regions of the country and from different cultural backgrounds, including those individuals in the analysis could bias our baseline estimates as they do not properly control for culture. Second, due to the porous nature of borders and the very frequent interactions across borders, it is likely that norms around fertility converge across border communities. As such, our estimates are likely downward biased. To test the sensitivity of our results to selective migration, we restrict the analysis in the specification (1) to the subsample of natives.[19] Although focusing on natives may not fully account for selective migration, the analysis below (Section 5) shows that our RD estimates are slightly stronger, suggesting that selective migration is unlikely to fully explain our results.

5 RD Effects of Colonial Origins on Fertility

5.1 Baseline Results

This section examines the long-run effects of British versus French colonization on contemporary fertility, which is measured by the number of children ever born. Before turning to the RD estimates, we first provide a graphical illustration of the fertility discontinuity at the British-French border.

Figure 3 presents standard two-dimensional RD plots for our main outcome of interest, with distance to the British-French border as the running variable and a local linear trend to each side of the discontinuity. The vertical line on this graph marks the British-French border. Across each side of the border, we draw a separate scatterplot showing the average

[18]Given that proximity to the capital city is negatively associated with fertility, the fact that former British areas are farther from the capital city than former French areas implies that our estimated effect of British versus French colonization on fertility is biased toward zero.

[19]Natives are individuals who never lived elsewhere than their place of birth, and by definition have only been exposed to the cultural influence of the ethnic homeland in which they were born.

number of children ever born within equal-sized bins. Overlaid on the scatterplots is a local linear trend and its 95% confidence interval, fitted separately on each side of the British-French border. We observe there is a clear discontinuity at the British-French border. Figure 3 shows that at the border, women in former British colonies have fewer children than their counterparts in former French colonies.

The RD estimates in Table 2 are consistent with the discontinuity observed in the RD plot. Table 2 reports estimates of Equation (1) for different bandwidth choices. Column (1) shows results for women within the optimal bandwidth calculated using the procedure suggested by Cattaneo et al. (2019). Columns (2), (3), and (4) show results for women within a window of 70Km, 100Km, and 150Km of the British-French border, respectively. Across all specifications in Table 2, we find that women in former British colonies have 0.15 to 0.22 fewer children than their counterparts in former French colonies. This effect represents a fertility decline of about 3% to 5% relative to the total fertility rate of 4.8 children per woman throughout the sub-Saharan African region. This effect is large in magnitude considering that it took 60 years to reduce fertility by just 28% in sub-Saharan Africa.[20]

In Appendix Table A3, we report the analysis of the effect of British versus French colonization on other reproductive outcomes. As before, each column of Appendix Table A3 shows estimates of Equation (1) for different bandwidth choices. In *Panel A*, the dependent variable is a dummy indicating whether a woman gave birth to her first child before reaching 18 years old. In *Panel B*, the dependent variable is a woman's age at first sexual intercourse. In *Panel C*, the dependent variable is a dummy indicating whether a woman get married before reaching 18 years old. Overall, we find that women in former British colonies are significantly less likely to have their first child before age 18; they are more likely to delay initiation of sexual activity; and they are less likely to marry before the age of 18 compared to their counterparts in former French colonies.

5.2 Robustness Checks

We conduct several robustness checks. First, we investigate whether the results are robust to alternative RD parameters. In Appendix Table A4, we show that the results are robust to alternative optimal bandwidth selection procedures and to alternative Kernel functions used to construct the local-polynomial estimators. For ease of comparison, we report our baseline estimate in the first column of *Panel A*. Across all specifications, coefficients are significant and higher in magnitude compared to those from our baseline specification. In Appendix Table A5, we show that the results are robust to using local quadratic polynomial and various combinations of bandwidth selection procedures and Kernel functions. In Appendix Table A6, we also show that our results are robust to estimating a non-parametric specification using the Stata package rdrobust developed by Calonico et al. (2014).

[20]The World Bank estimates that total fertility rate in sub-Saharan Africa has decreased from an average of 6.6 children per woman in 1960 to 4.7 children per woman in 2020 (World Development Indicators).

Second, although we have shown that regions on the two sides of the border display balanced geographic and location baseline characteristics (see Table 1), we nevertheless control for these characteristics in alternative specifications. Appendix Table A7 shows that controlling for elevation, precipitation, soil suitability for agriculture (*Panel A*), and distance to the capital city (*Panel B*) increases the magnitude of our estimates and these results hold for different bandwidth choices, which confirms our expectations. The negative effect of British colonization on fertility remains globally intact even after controlling for all the aforementioned factors in the same specification (*Panel C*). We reach the same conclusion by adding controls for religion (*Panel D* and *Panel E*). Estimates in *Panel D* and *Panel E* of Appendix Table A7 suggest that our results are not driven by differential exposure to colonial missionary activities or by differences in contemporary religious affiliation.

Third, in Appendix Table A8, we show that our results are robust to a specification that excludes Cameroon and Togo whose first colonizer was Germany. To the extent that German colonization has affected fertility outcomes, this specification check is important to rule out the possibility that our results are driven by different population policies inherited from German colonization.

Fourth, as mentioned in Section 4.1, random displacement of DHS clusters is likely to induce classical measurement error which would bias our estimates towards zero. The baseline results account for this issue by excluding enumeration areas within 5km of the British-French border. Appendix Table A9 shows that increasing or decreasing the size of the donut hole does not affect our results. The negative impact of British colonization on fertility remains large and highly significant.

The fact that our finding that women in former British colonies have significantly fewer children than their counterparts in former French colonies is strengthened when restricting the analysis to respondents living at least 5km or 10km away from the border also suggests that selective migration is unlikely to bias our estimates. Reassuringly, we reach the same conclusion by restricting the analysis to the subsample of natives. Natives are individuals who never lived elsewhere than their place of birth since they were born. The estimates using the sample of natives are displayed in Appendix Table A10. The fertility effect of British colonization remains negative and statistically significant across all specifications.

Lastly, we also show robustness to unknown spatial autocorrelation using Conley standard errors in Appendix Table A11.

6 Role of Colonial Population Policies

In this section, we examine channels of persistence. Our primary mechanism hypothesizes that the long-term impact of colonial origins on fertility can be traced back to colonial reproductive laws and their lasting impacts on family planning activities and contraceptives. We formally test this hypothesis by examining the British-French gap in fertility and lifetime use of modern contraception before and after former French colonies repealed the 1920 pronatalist law inherited from their colonial past.

6.1 Family Planning Policies and Fertility

As discussed in Section B1, the 1920 French law prohibited both abortion and the promotion of contraception. This law was repealed or was no longer enforced in francophone countries starting in 1980, following the adoption of the resolutions of the Third World Population Conference that took place in Bucharest in 1974. For this reason, the year 1980 is viewed as the cut-off marking the transition from pro-natalist population laws to family planning policies promoting contraceptives in francophone countries. Put differently, 1980 is the turning point at which British and French contraceptive legislation began to converge.

Following a conservative approach that considers that 12 years old as the minimum age at menarche (Garenne (2020), Leone and Brown (2020)), the analysis below assumes that, similar to anglophone women, francophone women aged 12 or younger in 1980 (women born in 1968 or after) are fully exposed to family planning policies promoting contraceptives. On the other hand, compared to anglophone women, francophone women born before 1968 had limited access[21] to family planning programs and contraceptives because of the existing restrictive 1920 French pronatalist law. Contrasting Women born before and after 1968, we present three sets of empirical evidence showing that the British-french fertility gap is closing for the cohorts born after 1968, which represents women exposed to more liberal contraceptive laws in both former British and French colonies.[22]

First, using available data from all sub-Saharan African countries, Figure 4 provides a graphical illustration of how the British-French difference in fertility levels has evolved before and after francophone countries revoked the French law and adopted more liberal contraceptive laws. The orange line on this figure represents the average British-French fertility gap for cohort of women born between 1945 and 2000. We see that the British-French fertility difference is largely negative for women born before 1968. It suggests that prior to the convergence of contraceptive laws in former British and French countries, anglophone women had fewer children compared to francophone women. However, Figure 4 also shows that the British-French fertility gap is gradually decreasing for younger cohorts and it stabilizes around zero for cohorts of women born after 1968. This pattern aligns with the hypothesis that compared to anglophone women, francophone women born before 1968 were constrained by the restrictive French law which encouraged higher fertility by forbidding the promotion and sales of contraception

Second, we implement an event-study cohort analysis to provide further empirical evidence of how the repeal of the 1920 French law and its subsequent replacement by more

[21]Some of these women may have been partially exposed to the post-1980 contraceptive laws during their reproductive lifespan. As a result, the cohort analysis below is more likely to capture the lower bound effects of colonial origins on fertility outcomes.

[22]Appendix Table A12 provides summary statistics for the main outcomes of interest by cohort.

liberal contraceptive laws in francophone countries reduces the fertility gap between these countries and Anglophone countries. Specifically, we use an event study regression model to examine how the British-French fertility gap evolved during the period leading up to and following the liberalization of contraceptives in former French colonies. We estimate the following specification:

$$Y_{icaet} = \lambda_0 + \lambda_1 \text{British}_a + \sum_{c=-23}^{31} \lambda_{2c} \text{Cohort}_c + \sum_{c=-23}^{31} \lambda_{3c} \text{Cohort}_c \times \text{British}_a + \varepsilon_{icaet} \tag{2}$$

Where Cohort_c is an indicator for cohort of women born c years before (for negative values) of after (for positive values) 1968. As mentioned above, the year 1968 marks the birth year of the first cohort of francophone women fully exposed to family planning policies allowing the sales and promotion of contraceptives. The cohort of women born in 1967 serves as the reference cohort. For example, the estimated coefficients on the $\text{Cohort}_{(3)}$ dummy interacted with the British dummy is interpreted as the change in the British-French fertility gap for women born 3 years after 1968 as compared to women born in 1967. Results from estimating Equation (2) are summarized in Figure 5. On the x-axis we plot the number of years around 1968. For ease of interpretation, we plot on the y-axis the marginal effects of British vs. French colonization on fertility for a given period relative to the reference year 1967. Consistent with Figure 4, Figure 5 shows that in the years prior to the repeal of the pronatalist law in francophone countries, the British-French difference in fertility is negative and relatively stable. Strikingly, in the years following the repeal of the pronatalist French law, the British-French difference in fertility is gradually closing. Figures 4 and 5 are consistent with the fact that contraceptive legislation in former British and French colonies converged only after 1980. While anglophone women had access to family planning services since their independence, their counterparts in francophone countries had only access to these services in the 1980s.

Lastly, we supplement the evidence above with results from a regression-based analysis where we decompose the regression discontinuity in Equation (1) by cohort born before and after 1968. A graphical illustration of this decomposition is displayed in Figure 6. Figure 6 is a standard two-dimensional RD plots similar to Figure 3 but implemented separately for the subsample of women born before and after 1968. We see that anglophone women have fewer children relative to francophone women only for cohorts born before 1968 (*Panel A*, Figure 6). The negative British-French difference in fertility disappears and, if anything, it becomes positive for cohorts born after 1968. These results are confirmed in the RD analysis consisting on the following regression model:

$$Y_{iaet} = \alpha + \alpha_1 \text{British}_a + \alpha_2 \text{Post}_i + \alpha_4 \text{British}_a \times \text{Post}_i + f(\text{distance}_a) + X_i'\mu + Z_a'\lambda + \delta_e + \sigma_{b(a)} + \theta_t + \varepsilon_{iaet} \quad (3)$$

where all variables are defined as in Equation (1). The additional variable Post_i is an indicator equal to 1 if respondent i is born after 1968 and 0 if i is born before 1968.The coefficient α_1 estimates the British-French fertility gap for women born before 1968. α_3 estimates the additional change in the British-French fertility gap for women born after 1968. In other words, α_3 indicates how the British-French fertility gap changes following the adoption of more liberal contraceptive laws in former French colonies. Results from estimating Equation (3) are reported in Table 3. As above, we show results for the optimal bandwidth (column (1)) and for selected bandwidths (columns (2) - (4)). Overall, we find that the negative effect of British colonization on fertility mainly applies to women born before 1968 (compared to women born in 1968 or after). This effect is significantly much smaller for women born in 1968 or after, as illustrated by the positive and significant coefficient on the interaction term. These results are consistent with the hypothesis that the fertility difference between anglophone and francophone women was driven by the existence of the French pronatalist law inherited from colonization. Once these countries repealed the 1920 law and adopted family planning policies allowing contraceptives, the British-French fertility gap decreased considerably. Estimates in column (1) of Table 3 suggest that the British-French difference in fertility has decreased by more than three fourth for women born after 1968. Interestingly, these findings suggest that contemporary family planning policies are able to attenuate the long-term impact of colonial population policies on fertility.

6.2 Family Planning Policies and Contraceptive use

The results shown so far demonstrate that anglophone women have significantly fewer children compared to francophone women and that this effect mainly pertains to those women whose reproductive lifespan started before francophone countries adopted family planning policies promoting contraceptives. We conjecture that this happens because by prohibiting family planning policies and the promotion of contraceptives, the 1920 French pronatalist law severely limited francophone women's access to contraceptives. We now turn to a direct investigation of this channel by examining the empirical relationship between colonial origins, family planning policies, and contraceptive use.

The DHS surveys ask women whether they have ever use modern, traditional, or folkloric method of contraception. We focus on whether or not a woman ever use a modern method of birth control. Modern methods of contraception include: pill, IUD, injections, diaphragm, condom, female sterilization, male sterilization, lactational amenorrhea, implants/norplant, female condom, and foam/jelly. We define our outcome of interest as a binary indicator equal to 1 if the respondent has ever use a modern method of contraception, and 0 if the respondent never used contraception or if he only used a traditional or folkloric method.

Figure 7 shows the RD plots for our measure of contraceptive use, separately for women born before and after 1968. We see a discontinuity in the proxy of lifetime contraceptive use at the British-French border. Anglophone women are more likely to have ever used modern contraception compared to francophone women. However, the size of this difference is smaller for cohorts born after 1968. To confirm this result, we estimate Equation (3) where the dependent variable is whether or not the woman has ever used a modern method of contraception. Results are displayed in Table 4. Results using the optimal bandwidth are shown in column (1). Consistent with the RD plots, we see that anglophone women are more likely to use contraception but this effect is only significant for women born before 1968. The effect is decreasing for cohorts born after 1968 as illustrated by the negative coefficient on the interaction term.[23] The coefficient on the interaction term suggests that the British-French gap in the use of modern contraceptives decrease by more than 46% for women born after 1968 (see column (1), Table 4). These results line up with our central hypothesis that the long-term effects of British versus French colonization on fertility is driven by the lasting impact of restrictive colonial population policies on the use of contraception.

7 Ruling out Alternative Explanations

Our analysis so far has documented lasting negative effects of British versus French colonization on fertility rates. We demonstrated that these effects can be linked to differences in colonial population policies and their impact on contraceptive use. Though our regression discontinuity approach with ethnic homeland fixed effects control for potentially confounding factors, it is still possible that channels other than the one we have tested so far may be operating. The literature on colonial origins in Africa has documented British-French differences in other institutional dimensions including administrative rules, education policies, legal institutions, and marital property laws that exert influence on female education, economic development, and intra-household bargaining power, all of which are known to affect fertility outcomes (see our conceptual framework in Appendix Section B1.2). In this section, we rule out these alternative channels; they do not drive the effect of colonial origins and population policies on fertility.

[23]Interestingly, Anderson (2018) finds that women in the British common law system are less likely to use methods of "protective" contraception that reduce their likelihood of contracting HIV than their counterparts in the French civil law system. It is important to note that our findings do not contradict the findings from this latter study, as in reality, our results are not directly comparable. *Protective* methods of contraception overlap but do not coincide with modern methods of birth control. For example, IUD, injections, diaphragm, female sterilization, male sterilization, implants/norplant, and foam/jelly are modern methods of birth control but they do not protect against sexually transmitted diseases. Anderson (2018) acknowledges that women in the British common law system are more likely to use some of these methods than their counterparts in the civil law system.

7.1 Female Education

An alternative channel through which the negative effect of colonial origins and population policies on fertility may be operating is women's education. As described in Appendix Section B1.2, the literature on colonial origins emphasizes the British advantage in educational outcomes, especially for women. British colonizers provided all women with access to education, while France focused on educating an exclusive group of administrators (Dupraz (2017), ? (?)). Educated women tend to be more knowledgeable about modern methods of birth control and are more likely to use them, which in turn lowers their fertility (Rosenzweig and Schultz (1985), Rosenzweig and Schultz (1989), Ainsworth et al. (1996)).

If the distinct legacies of the British and French colonial education systems were the main channel driving the results found here, we would expect to see a decreasing British-French difference in education for women born after 1968, consistent with the closing British-French gap in fertility observed for these women. We find that this is not the case. Table 5 shows the impact of British versus French colonization on educational outcomes for cohorts born before and after 1968. *Panel A* reports results from estimating Equation (3) for women's years of education. *Panel B* reports results from estimating Equation (3) for women's literacy, which is an indicator variable equal to 0 if the respondent cannot read at all. As evidenced in the literature on colonial origins, British colonization has a positive, significant impact on the two indicators of women's education. Women living in former British colonies have much more schooling years and are more likely to be literate than women from former French colonies. Interestingly, the interaction term shows that these effects are stronger for cohorts born after 1968 which is inconsistent with the fact that the fertility gap is closing for these cohorts.

7.2 Economic Development

Another possible explanation for the negative effect of British versus French colonization on fertility could be that colonial origins affect legal institutions and economic property rights, which in turn affect economic development outcomes and fertility. The literature on colonial origins has emphasized the positive impacts of British colonization on economic development and growth (see details in Appendix Section B1.2), which is known to influence the determinants of fertility such as household income, labor market outcomes, and health.[24] We test each of these channels in turn.

Female labor participation and income We analyze the effect of British versus French colonization on female labor participation and examine if this effect is consistent with the effect of colonial origins on fertility across cohorts. Results are reported in Table 6. We

[24] In reality, there is a two-way relationship between economic development and fertility. Lower fertility positively affects development through several channels, including the participation of women to the labor market and investment in child quality (Ashraf et al. (2013)).

measure female labor participation using a woman's access to paid employment, a proxy for financial resources. In the DHS, employed women are asked whether they work for cash, or whether they are paid in kind, or not paid at all. We define access to paid employment as an indicator equal to 1 if the respondent is working and if she is being paid in kind, in cash or both, and 0 if she is working without pay. We see that anglophone women born before 1968 enjoy higher access to paid employment compared to their counterparts in francophone countries. While the interaction term shows that this difference is weaker for women born after 1968, the latter effect is close to zero and not statistically significant. These results suggest that differences in female labor participation are unlikely to explain our results.

Our conclusion that female employment or income does not explain the negative effect of British colonization on fertility is reinforced by the graphical evidence shown in Appendix Figure A2). This figure depicts trends in the British-French differences in fertility rates and per capita income between 1960 and 2016. We see that the fertility gap between former British and French colonies opened much earlier than the per capita income gap. While in the aftermath of the independence, a decreasing British-French difference in fertility was already perceptible, former British and French colonies had comparable levels. A sharp and consistent income gap between these former colonies only in the mid 80s. These observations imply that the income gap cannot explain the fertility gap. On the contrary, they suggest that higher income in former British colonies is partly a result of their lower fertility, which is consistent with economic growth theory (Galor (2011)).

Child mortality. The positive impact of British colonization on female education and income may result in better health outcomes for children and women (as illustrated in Appendix Section B1.2), which could explain the lower fertility of anglophone women. In fact, it has been argued that improvement in child health and survival will result in parents desiring fewer children, because when child mortality is high, parents choose to have many children because they would like to maximize the number of surviving ones (Doepke (2005)).

Table 7 examines the effects of British versus French colonization and population policies on mortality outcomes. *Panel A* reports results for child mortality, measured by a binary indicator for whether a child died before reaching five years old.[25] The results show that the effect of British colonization on child mortality is negative for both cohorts born before and after 1968. But, this differential effect on child mortality is weak and not significant across all specifications, suggesting that there is no discontinuity in child mortality at the British-French border. Also, the fact that the survival advantage of children born to anglophone women increases for cohorts born after 1968 is inconsistent with the closing fertility gap, as lower mortality reduces fertility. We conclude that child mortality does not explain the negative effect of British versus French colonization and population policies on fertility.

[25]This variable has been used to measure both child quality and household welfare in a number of studies (Millimet and Wang (2011), Liu (2014), Bhattacharjee and Dasgupta (2016)).

Maternal mortality. Lastly, using available data in the DHS, we also check whether lower fertility in former British colonies is driven by differences in maternal mortality. A selection bias resulting from a British-French difference in maternal death is likely to exist if there are systematic fertility differences between mothers who died for causes related to pregnancy and mothers whose birth history is observed in our sample. To exclude this possibility, we assess the impact of colonial origins on maternal mortality using information on siblings survival history incorporated into DHS surveys.[26] In the DHS Siblings Survival Module, the respondent is asked about the age and sex of each sibling born by the same mother, and whether each sibling is still alive. If a sibling has died, information is collected on the age at death and the year of death of this sibling. For all sisters of reproductive age, the DHS also asks questions about the time of death relative to pregnancy in order to identify pregnancy-related deaths. Following the World Health Organization, we define maternal mortality for each respondent as the total number of sisters who died from any cause while pregnant, during childbirth, within six weeks after the delivery, or within 2 months after the delivery. This measure is equal to 0 if the respondent reported that his sister's death is not related to pregnancy. We estimate Equation 3 using our measure of maternal mortality. Results are displayed in Table 7, *Panel B*. There is no significant differences in maternal mortality across women living in former British colonies and those in former French colonies and this result holds both for cohorts born before and after 1968. We conclude that selection bias resulting from maternal mortality is unlikely to drive the fertility effect of British colonization found in our analysis.

7.3 Female Bargaining Power

Female bargaining power within the household has also been linked to fertility (see for instance Mason (1986) and Upadhyay et al. (2014)). Women with higher bargaining power are more likely to negotiate and impose their ideal number of children. To the extent that this ideal number of children is lower than the partner's ideal number of children, higher female bargaining power could negatively influence fertility. The literature on colonial origins has demonstrated that British common law countries are associated with weaker female marital property rights (Anderson (2018)), which in turn decreases women's bargaining power. Motivated by this literature, we assess whether differences in female bargaining power varies by colonial origin and whether this effect is consistent with the effect on fertility for different cohorts. Results from estimating Equation 3 using different proxies for women's bargaining power within the household are displayed in Table 8. *Panel A* reports coefficients for participation in decision making, which is a score generated using the principal components of women's participation in household decisions over health, large purchases, and visits to relatives. *Panel B* reports coefficients for experience of domestic violence, which is a score

[26] Siblings history data have been shown to be a reliable source of information on maternal mortality (see, for instance, Merdad et al. (2013) and Weitzman (2017)).

generated using the principal components of women's experience of any form of physical and sexual violence. *Panel C* reports coefficients for justification of domestic violence, which is a score generated using the principal components of women's acceptance of domestic violence. The effects of colonial origins and population policies on each of these measures of bargaining power are inconsistent with the effects on fertility. While anglophone women enjoy a higher level of participation in decision making for cohorts born before 1968, their advantage is even stronger for cohorts born after 1968, which is inconsistent with the closing fertility gap. For each of the two other outcomes, we find no discontinuity at the British-French border and for different cohorts as most coefficients are not statistically significant. These findings imply that women's bargaining power do not explain the fertility effects of British versus French colonization and population policies.

8 Heterogeneous Effects by Market Access

The findings uncovered so far demonstrate that British colonial population policies led to lower fertility level among Anglophone women compared to their Francophone counterparts, and that this fertility gap partially closed after former French colonies repealed the 1920 pronatalist law and adopted family planning programs. The extent to which such historical policies interact with contemporary economic forces has not been widely studied. In this section, we address this knowledge gap by studying how the fertility effects of British colonization and the subsequent introduction of family planning policies in Francophone countries vary with market access. By generating income-earning opportunities outside of the household, market access is likely to increase the opportunity cost of having a child (Becker and Lewis (1973), Galor and Weil (1996)). If the prevalence of such opportunities is sufficiently high, it might either amplify or attenuate the effect of historical population policies. In addition to testing this hypothesis, we also investigate how market access interact with more recent birth control policies to reduce the fertility gap between former British and French colonies. This latter analysis may produce policy-relevant findings in that it will suggest whether or not policies to reduce fertility should be supplied in conjunction with market incentives or whether such policies should be supplied in priority in areas with low market access. In addition, analyzing the interaction between historical policies and contemporary factors might inspire ways in which the long-term impacts of history could be addressed.

To assess the heterogeneous impact of colonial origins by market access, we use proximity to the sea as our main measure of market access (see Section 8.2 below) and four other measures for robustness checks (see Appendix Section B2 for a description of these measures). These latter measures are based on the networks of roads that connect different locations to both the export market and the domestic markets within a country. These measures include a networked-based measure of access to major cities, a networked-based measure of access to port cities, the minimum travel time to major cities, and the minimum travel time to an international port.

The main advantage of proximity to the sea as a measure of market access is that it is exogenous. However, one may argue that ethnic groups that are closer to the sea are culturally different from those farther from the sea. We address this issue by controlling for ethnic homeland fixed effect, which means that we are comparing the fertility behavior of individuals who are culturally identical and who differ only by their proximity to the sea. This also controls for pre-colonial factors such as exposure to the slave trades. Below we elaborate on why proximity to the sea is generally used to measure market access in the literature.

8.1 Proximity to the Sea as an Exogenous Determinant of Access to the Export Market

Our main measure of market access is the geodesic distance to the sea coast. Studies examining the historical origins of the contemporary divergence in economic development across countries and regions in Africa have sometimes compared coastal areas to the hinterland, with the former being economically wealthier than the latter. This literature provides two main explanations for the persistent economic preeminence of coastal areas relative to the hinterland in former African colonies. The first explanation is the initial geographical endowment of coastal areas. In a pre-industrial context where mobility and economic activity were largely influenced by geographical conditions (Diamond (2005)), early Europeans engaged in trade mainly landed in Africa where coastal geography was favorable; that is, where coastal areas featured the presence of natural harbors[27] and capes amenable to docking ships (Ricart-Huguet (2018), Huillery (2009)). This geographical advantage drove massive European settlements in territories close to the coast, which therefore became centers of transatlantic trade activities during the pre-colonial era at the expense of the hinterland. This spatial concentration of economic activity is consistent with the literature suggesting that due to low transportation costs and an extended scope of the market, industrialization is expected to almost always proceed first upon the coast before extending to the hinterland of a country (Smith (1977)). In addition, in a study theorizing the creation of industrial hubs, Krugman (1991) emphasizes the role of transportation costs in the location decision of manufacturing firms in order to explain the coexistence of an "industrialized core" and an "agricultural periphery" within a country. One could argue that the commercial activities along the Western and Eastern coast of Africa during the transatlantic trade therefore contributed to these areas offering more economic opportunities and becoming richer. The empirical results in the first column of Appendix Table A13 support these theoretical argu-

[27] For instance, in the Western African coast, the Portuguese and later the French first established trade ports in the natural harbor of the Senegal River and the Cape which later became the cities of Saint-Louis and Dakar in Senegal. Similarly, the British landed in the natural harbor of Tagrin Bay in Freetown and Cape Coast in Ghana.

ments. Using light density and wealth as indicators for contemporary economic development, we examine the association between distance to the sea coast and economic development in a fixed effects model. Consistent with the literature, we find a negative association between distance to the sea and both measures of economic development. The results in *Panel A* show that areas close to sea are more developed today than areas far from sea. In addition, the results in *Panel B* show that women living in areas close to sea enjoy higher living standards compared to their counterparts in areas far from sea. We now turn to the heterogeneous effect of colonial origins on fertility by market access.

8.2 Colonial origins and Fertility: Heterogeneity by Market Access

First, we present a graphical illustration of how the fertility discontinuity at the British-French border varies by market access. As in the previous sections, Figure 8 presents standard two-dimensional RD plots for our fertility, with distance to the British-French border as the running variable and a local linear trend to each side of the discontinuity. We draw the RD plots separately for women living in areas with high and low market access. In these graphs, market access is measured by the geodesic distance to the sea coast. We see a large discontinuity in fertility at the British-French border only in areas with low market access (areas far from the coast); there is no fertility gap in areas with high market access (areas close to the coast).

Second, we formally assess the differential effect of British colonization on fertility by market access in a regression-based analysis including an interaction term between the British dummy and an indicator of access to the market. Specifically, we estimate the following equation:

$$Y_{iaet} = \beta_0 + \beta_1 British_a + \beta_2 MA_{it} + \beta_3 British_c \times MA_{it} + f(distance_a) + X_i'\mu + Z_a'\lambda + \delta_e + \sigma_{b(a)} + \theta_t + \varepsilon_{iaet} \quad (3)$$

All the variables in equation (3) are defined similarly as in our main specification in equation (1), except that in equation (3) we introduce an interaction term between the British dummy and an indicator for access to the market captured by the variable MA_{it}. For each measure of market access, MA_{it} is an indicator equal to 1 if its value is above the median value of the corresponding measure of market access and 0 otherwise.[28] In all cases, the highest and lowest values refer to localities with the highest and lowest access to the market, respectively.

As already mentioned, note that by controlling for ethnic homeland fixed effects, we are exploiting variations in market access within the same ethnic homeland, therefore controlling

[28] While in the main paper, we only present results using distance to sea, we show robustness to other measures of market access in the Appendix.

for ethnic-specific characteristics (e.g., traditions, subsistence activities, settlement patterns, family arrangements, etc.) that can confound the effect of market access. Interestingly, this also controls for the effect of pre-colonial factors including the effect of ancestral traditions and historical shocks like the trans-atlantic and other slave trades.

Results are summarized in columns (1) and (3) of Table 9. Each column shows estimates using distance to sea as a measure of market access. Columns (1) shows results using the optimal bandwidth. Column (3) shows results for areas within 70km of the boundary. We find that women in former British colonies have significantly fewer children than their counterparts in former French colonies only in areas with low market access. Close to sea, the coefficient on the British dummy is negative but the magnitude is very small and it is not statistically significant. This means that colonial origins have little effect on fertility in areas with high market access. At the same time, the coefficients on the interaction terms are negative and statistically significant. These results are consistent with the RD graphs in Figure 8 and imply that the negative effect of British colonization on fertility is stronger in localities with low market access. Relative to areas close to sea, the estimated fertility effect of British colonization in areas farthest from the sea is higher by -0.25 children (see column (1), *Panel A*).

In Appendix Table A14 we also show that these results are robust across the other measures of market access. For example, relative to localities with the highest access to international ports, the British-French gap in fertility in areas with low access is larger by -0.46 to -0.37 children (see columns (1) and (2), *Panel A* in Appendix Table A14). The findings are qualitatively similar when we consider the two measures of access to domestic markets (see columns (3) and (4), *Panel A* in Appendix Table A14). In *Panel B* we show that the heterogeneous results are robust when we choose a bandwidth of 70 km around the borders.

8.3 Interaction between Market Access and Birth Control Policies

We now investigate how market access interacts with birth control policies to affect the British-French gap in fertility. This analysis gives a suggestive answer to the question of whether family planning policies should be bundled with policies that increase market incentives in order to reduce fertility. We address this question by estimating a model that includes a triple interaction term between British colonization, a dummy for the cohorts born after 1968 (which measures the introduction of family planning policies in Francophone countries in 1980), and market access. We estimate the following equation:

$$Y_{iaet} = \beta_0 + \beta_1 British_a + \beta_2 MA_{it} + \beta_3 Post_i + \beta_4 British_c \times MA_{it} + \beta_5 British_c \times Post_i + \beta_6 British_c \times MA_{it} \times Post_i + f(distance_a) + X_i'\mu + Z_a'\lambda + \delta_e + \sigma_{b(a)} + \theta_t + \varepsilon_{iaet} \quad (4)$$

The results are presented in columns (2) and (4) of Table 9. We find that while the introduction of family planning policies in Francophone countries reduces the fertility gap between Francophone and Anglophone women, this reduction is larger in locations with low market access. Column (2), whose estimates are based on the optimal bandwidth, implies that prior to the introduction of these policies, fertility was, on average, lower for Anglophone women by 0.148 children in locations with high market access and by 0.626 ($0.148 + 0.478$) children in locations with low market access. Following the introduction of these more recent policies, the British-French fertility gap decreased by 0.173 children for women living in locations with high market access and by 0.501 ($0.137 + 0.328$) children for women living in areas with low market access. We note that these estimates are inefficient because of the reduced sample size. The results of Column (4), based on a bandwidth of $70km$ around the border, largely corroborate those of Column (2). According to these results, prior to the introduction of family planning policies in Francophone countries, fertility was lower by 0.256 children for an average Anglophone woman living in a location with high market access and by 0.784 for an average Anglophone woman living in a location with low market access. Following the introduction of family planning policies in Francophone countries, the British-French fertility gap was reduced by 0.223 children on average in locations with high market access and by 0.641 ($0.223 + 0.418$) children on average in locations with low market access.

Taken together, these findings suggest that birth control policies and policies that increase market access are more likely to be substitutes than complements as far as reducing the fertility gap is concerned. Birth control policies should prioritize remote locations, without ignoring locations with high market access.

9 Conclusion

We know little about the extent to which the long-term effects of history are mitigated or amplified by contemporary factors. In this paper, we address this question by documenting the long-term effect of colonial policies and reproductive laws on fertility behavior in Africa, and we show that this effect varies by market access—a proxy for the opportunity cost of childbearing—and is mitigated by more recent birth control policies.

Implementing a spatial Regression Discontinuity Design with ethnic homeland fixed effects, we find that women in former British colonies have significantly fewer children than their counterparts in former French colonies. They are also more likely to delay sexual debut and marriage.

We analyze the channels of persistence and find that the fertility effect of colonial origins is directly linked to differences in the timing of colonial population policies and reproductive laws and their lasting impact on the use of modern methods of birth control. We rule out alternative channels. In particular, we do not find that the impacts of colonial origins on income and women's human capital, labor participation and bargaining power are channels through which the effect of colonial origins on fertility persists. In fact, while British colonization is linked to higher female education and greater participation in household decision-making, these gaps expand after the introduction of family planning policies in Francophone countries, unlike the fertility gap which shrinks. Also, while income levels differ, the fertility gap between British and French colonies opened prior to 1980, whereas the income gap only opened only after 1990, implying that the income gap cannot logically explain the fertility gap. Moreover, British colonization has a positive effect on female labor participation that persists even after the introduction of family planning policies in Francophone countries, which implies that female labor participation does not explain the reduction in the fertility gap that occur after the introduction of these policies. We also rule out domestic violence, child mortality, and maternal mortality as possible channels.

Analyzing heterogeneity in the long-term effect of colonial origins on fertility, we find that this effect is absent in areas with high market access, and is only present in areas with low market access. These findings are robust when using different measures of access to international and domestic markets.

Besides uncovering new findings about the heterogeneous nature of the colonial origins of comparative fertility behavior in Africa, our study suggests that contemporary factors and policies can mitigate the long-term effects of history. In particular, we find that market access and relatively recent birth control policies have helped reduce the long-run impact of colonial population policies on the fertility gap between Anglophone and Francophone women. Our analysis further suggests that market access and birth control policies act more as substitutes to reduce the fertility gap, implying that these latter policies should prioritize areas with low market access.

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Figure 1: Colonial population policies and the introduction of family planning programs in former British and French colonies in Africa

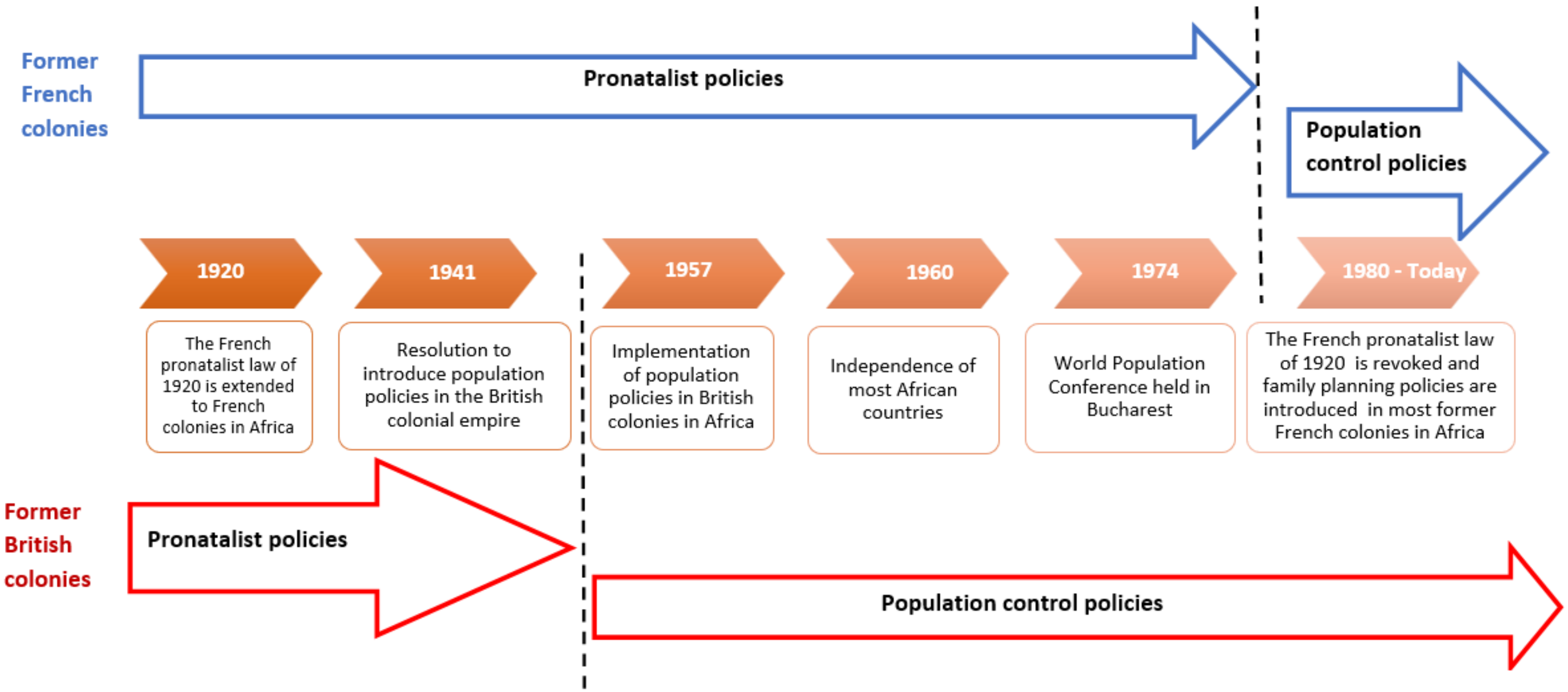
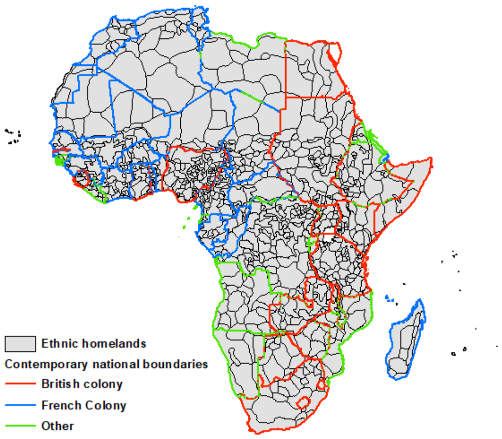
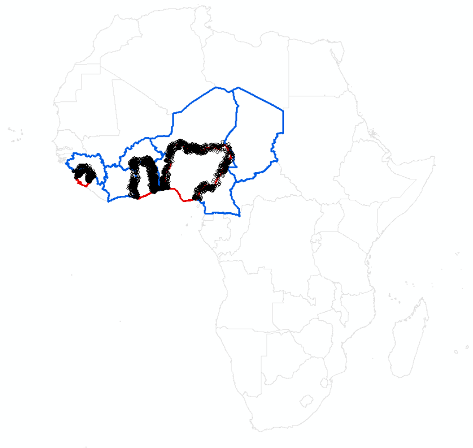


Figure 2: Map of historical ethnic homelands, colonial borders, and DHS clusters

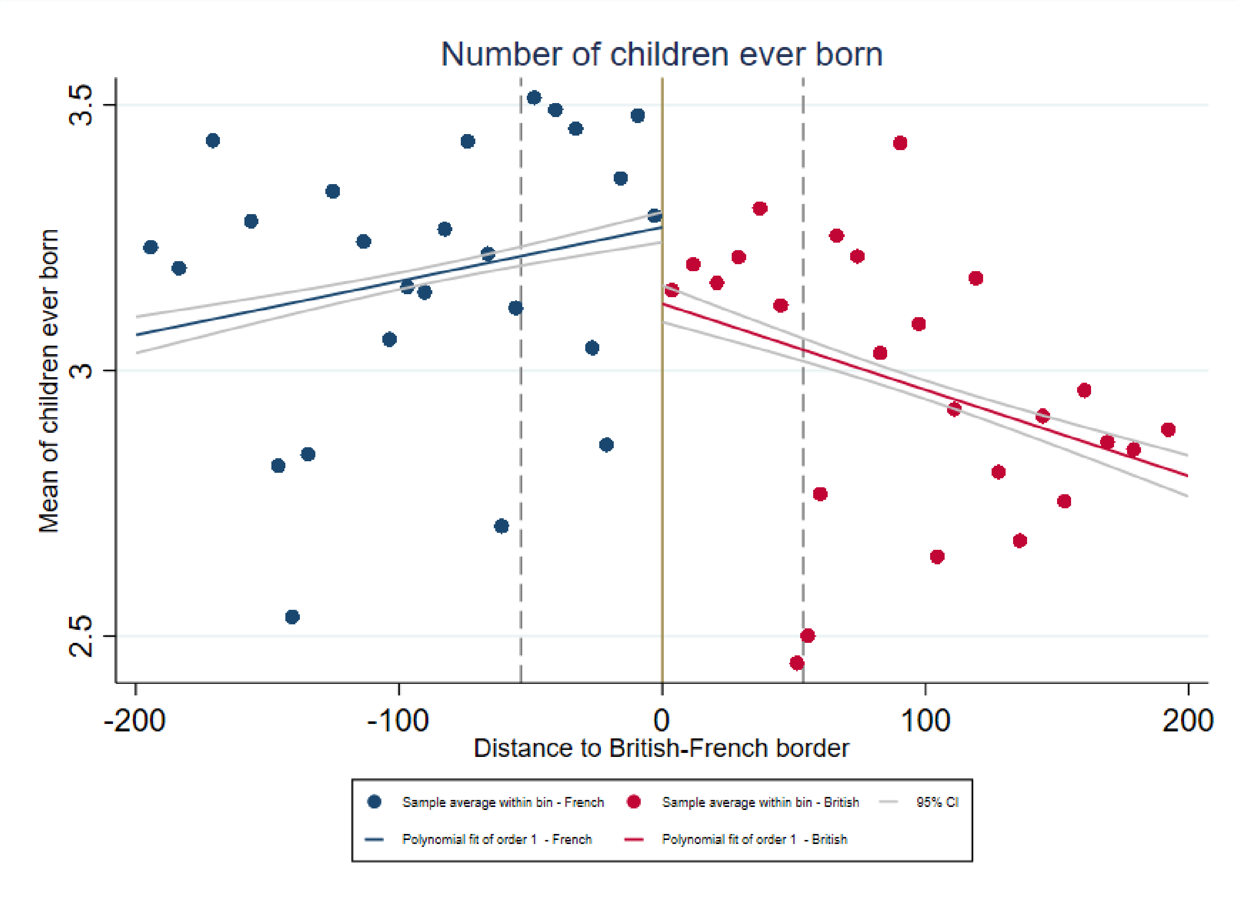


(a) Maps of colonial borders and historical ethnic homelands



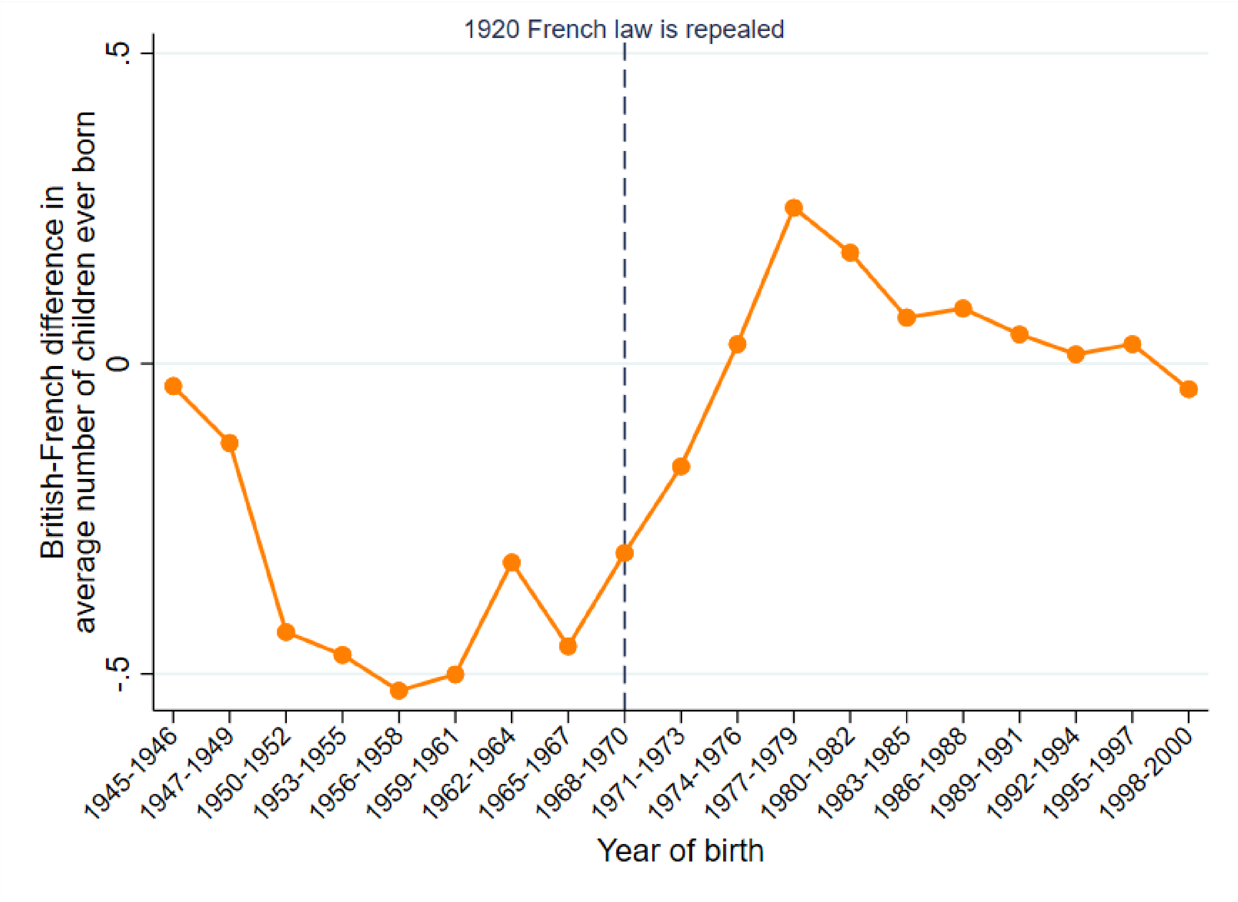
(b) Map of eligible British-French borders and DHS clusters within 70 km

Figure 3: RD plot for fertility



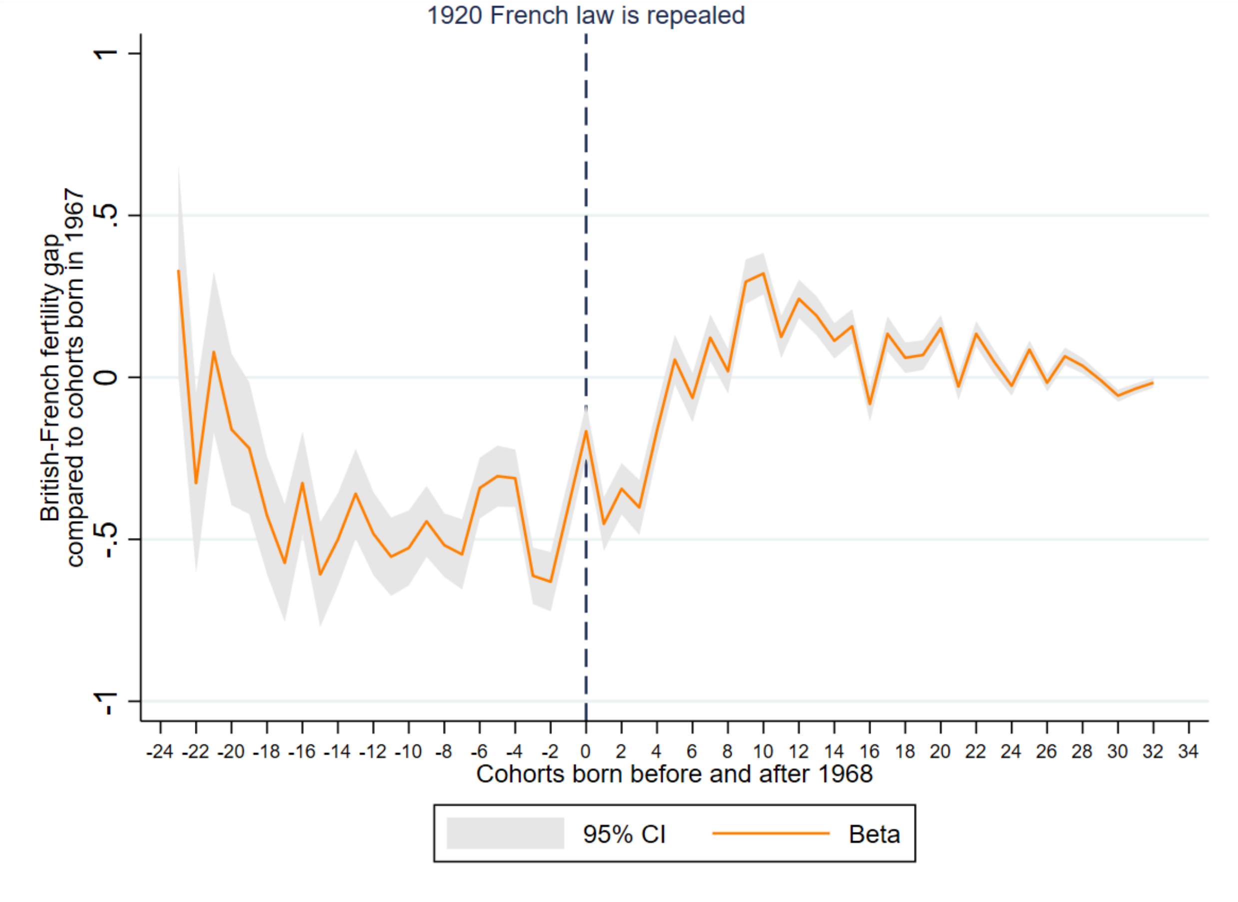
Note: The figure presents standard two-dimensional RD plots for number of children ever born, with distance to the British-French border as the running variable and a local linear trend to each side of the discontinuity. The vertical line is the British-French border. Each dot is the mean value of the number of children ever born within equal-sized bins.

Figure 4: Trend in the British-French fertility gap for cohorts born before and after 1968



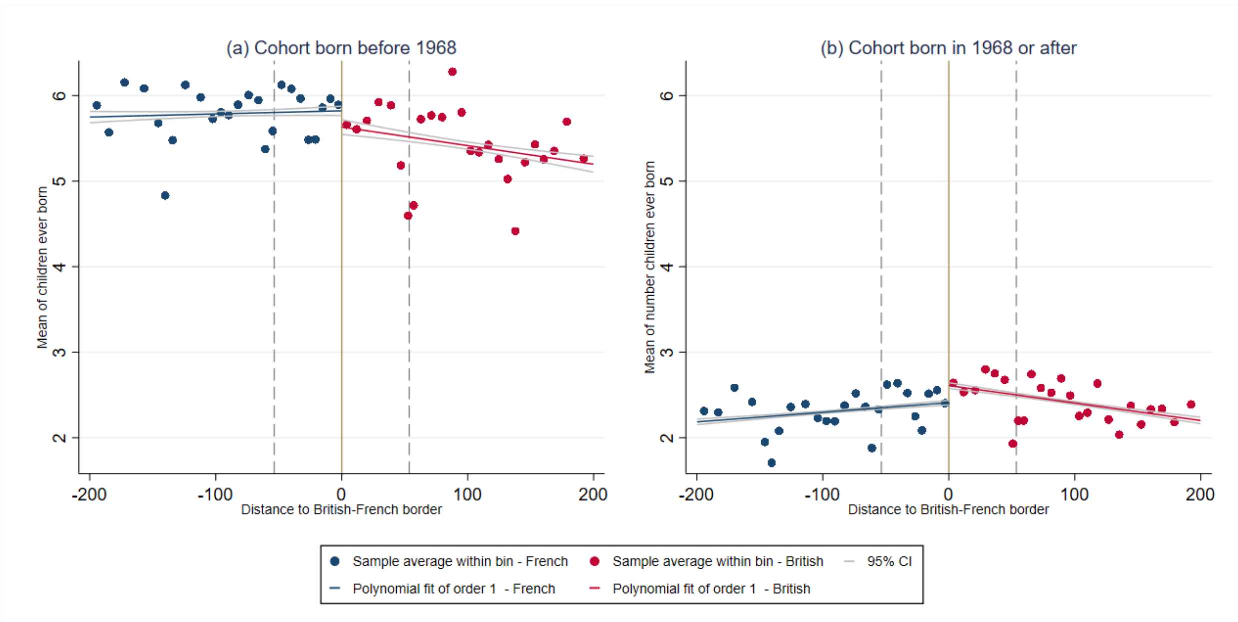
Note: The figure depicts the trend in the British-French difference in fertility for years leading up to and following the liberalization of contraceptives in former French colonies. The estimation sample consists of the pooled set of former British-French countries with available DHS data.

Figure 5: Event-study estimates of the effect of FP policies on the British-French fertility gap



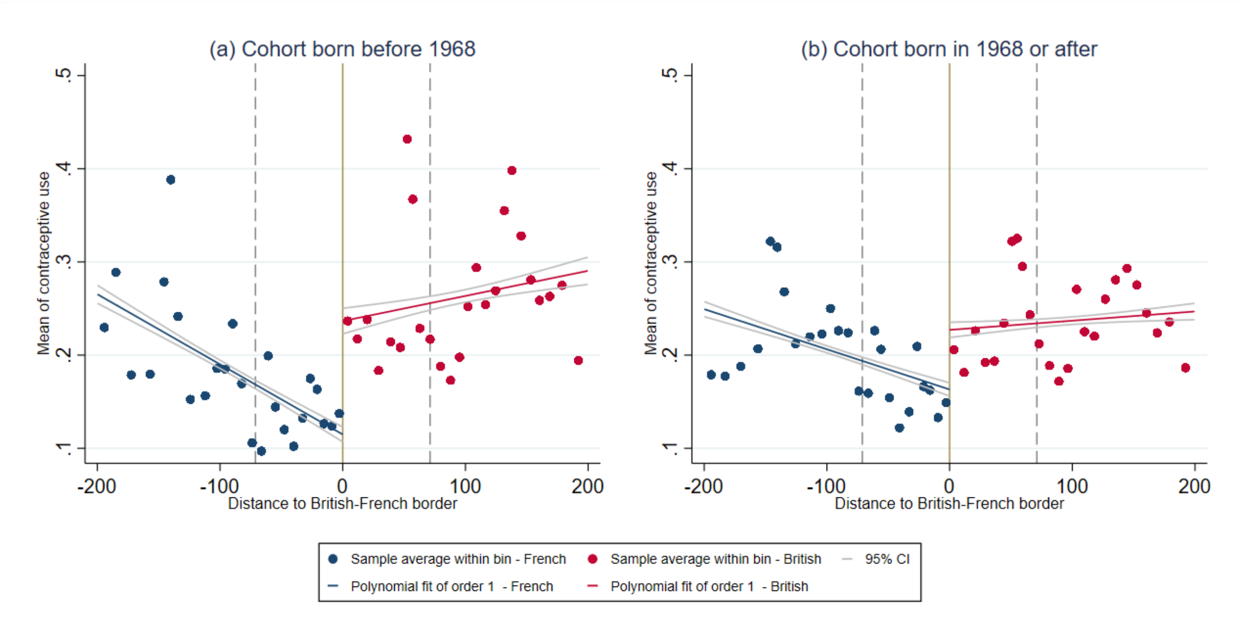
Note: The figure depicts the relative British-French difference in fertility for years leading up to and following the liberalization of contraceptives in former French colonies. The reference cohort is the cohort of woman born in 1967. The estimation sample consists of the pooled set of former British-French countries with available DHS data. Shaded areas represent 95% confidence intervals. Standard errors are clustered by DHS survey cluster.

Figure 6: RD plots for fertility - heterogeneity by cohort born before and after 1968



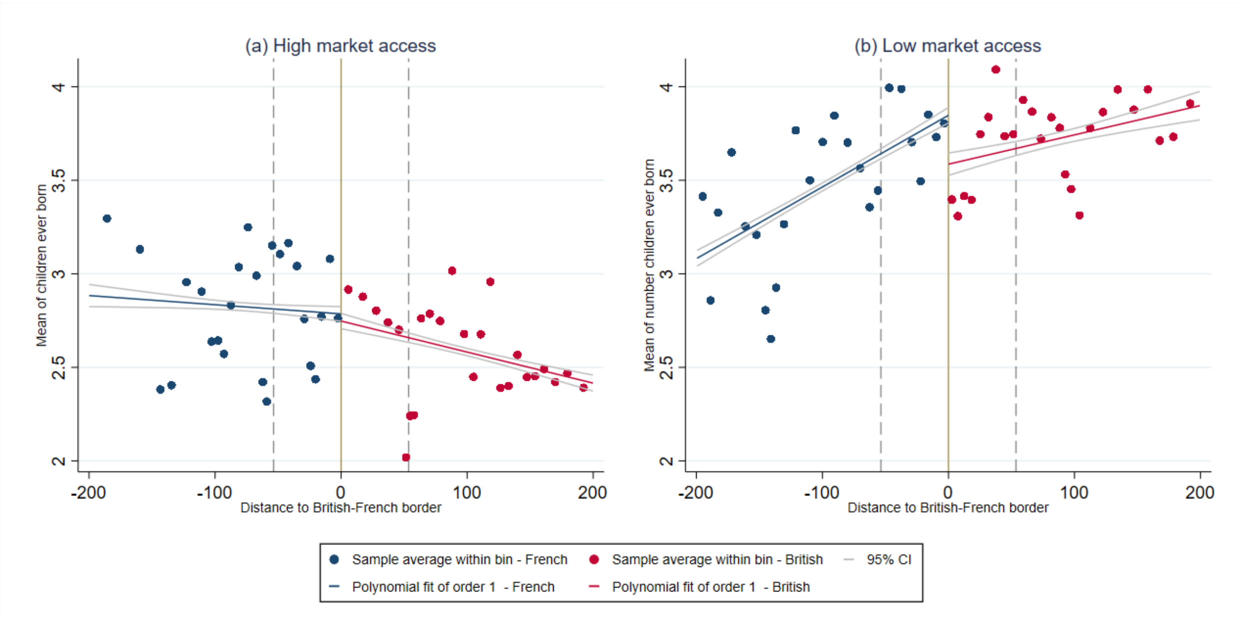
Note: The figure presents standard two-dimensional RD plots for number of children ever born by cohort, with distance to the British-French border as the running variable and a local linear trend to each side of the discontinuity. The vertical line is the British-French border. Each dot is the mean value of the number of children ever born within equal-sized bins.

Figure 7: RD plots for contraceptive use - heterogeneity by cohort born before and after 1968



Note: The figure presents standard two-dimensional RD plots for contraceptive use by cohort, with distance to the British-French border as the running variable and a local linear trend to each side of the discontinuity. The vertical line is the British-French border. Each dot is the mean value of the variable of interest within equal-sized bins.

Figure 8: RD plots for fertility - heterogeneity by market access



Note: The figure presents standard two-dimensional RD plots for number of children ever born by market access, with distance to the British-French border as the running variable and a local linear trend to each side of the discontinuity. The vertical line is the British-French border. Each dot is the mean value of the number of children ever born within equal-sized bins.

Table 1: Balance Checks

	British		French		British-French gap
	Mean	Obs.	Mean	Obs.	RD estimate
Geographic characteristics					
Elevation	250.97	31,786	260.53	51,772	-28.371
Soil suitability	0.39	29,954	0.43	46,948	0.021
Precipitation	126.13	31,786	92.29	51,772	-0.268
Location characteristics					
Distance to capital	481.69	31,897	272.02	51,803	222.452***
Distance to sea coast	370.04	31,897	364.95	51,803	4.249
Distance to mission	141.72	31,897	165.02	51,803	6.119
Diseases characteristics					
Malaria suitability index	20.82	31,786	20.34	51,772	0.915
Precolonial characteristics					
Population density	2.91	15,561	2.89	33,103	-0.039
Polygamous	0.08	31,588	0.27	51,688	0.041

Note: Table shows balance of variables between areas in former British and French colonies. Columns (1), (2), (4), and (5) present the mean and number of observations of the corresponding variable. Column (6) gives the estimated RD coefficient that uses the corresponding variable as its outcome using a local linear specification estimated separately on each side of the British-French border. Regression in column (6) includes a nearest border fixed effect, an urban-rural dummy, and wave of survey fixed effect. The sample in this table includes enumeration areas within the RD MSE optimal bandwidth determined using the procedure suggested by Cattaneo et al. (2019). Variable definitions and data sources used in this analysis are described in the text. Distances are measured in kilometres. Standard errors clustered at the pixel level are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table 2: Average effect - Colonial origins and fertility

		Predetermined bandwidths		
	Optimal bandwidth (1)	70 km of bound. (2)	100 km of bound. (3)	150 km of bound. (4)
	Dep var is Total number of children ever born			
British (vs. French)	-0.145***	-0.200***	-0.211***	-0.220***
	(0.055)	(0.051)	(0.045)	(0.041)
Mean Dep. Var.	3.211	3.126	3.164	3.102
Observations	83,276	107,442	145,389	206,956
Clusters	3,144	4,048	5,447	7,881
Bandwidth	57.33	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on the total number of children ever born. Each column reports RD estimates of Equation (1) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 3: Colonial origins, Family Planning Policies, and fertility

	Optimal bandwidth	Predetermined bandwidths		
		70 km of bound.	100 km of bound.	150 km of bound.
	(1)	(2)	(3)	(4)
Dep var is Total number of children ever born				
British (vs. French)	-0.369***	-0.485***	-0.473***	-0.365***
	(0.119)	(0.106)	(0.089)	(0.074)
British (vs. French) x Born in 1968 or after	0.288**	0.368***	0.340***	0.202***
	(0.120)	(0.106)	(0.088)	(0.071)
Mean Dep. Var.	3.211	3.126	3.164	3.102
Observations	83,276	107,442	145,389	206,956
Clusters	3,144	4,048	5,447	7,881
Bandwidth	57.33	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on the total number of children ever born, differentiated by cohort born before or after 1968. Each column reports RD estimates of Equation (3) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 4: Colonial origins, Family Planning Policies, and lifetime contraceptive use

		Predetermined bandwidths		
	Optimal bandwidth (1)	70 km of bound. (2)	100 km of bound. (3)	150 km of bound. (4)
Panel A: Dep var is Ever use of modern contraception				
British (vs. French)	0.076***	0.082***	0.074***	0.068***
	(0.018)	(0.019)	(0.017)	(0.015)
British (vs. French) x Born in 1968 or after	-0.035**	-0.036**	-0.040***	-0.036***
	(0.016)	(0.017)	(0.014)	(0.012)
Mean Dep. Var.	0.192	0.193	0.190	0.210
Observations	60,421	55,014	74,600	108,867
Clusters	2,455	2,240	3,040	4,564
Bandwidth	77.79	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on lifetime contraceptive use, differentiated by cohort born before or after 1968. Lifetime contraceptive use is an indicator equal to 1 if the respondent has ever used a modern method of contraception, and 0 if the respondent has never used contraception or has only used a traditional or folkloric method of contraception. Modern methods of contraception include: pill, IUD, injections, diaphragm, condom, female sterilization, male sterilization, lactational amenorrhea, implants/norplant, female condom, and foam/jelly. Each column reports RD estimates of Equation (3) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 5: Colonial origins, Family Planning Policies, and Education

	Optimal bandwidth	Predetermined bandwidths		
		70 km of bound.	100 km of bound.	150 km of bound.
	(1)	(2)	(3)	(4)
Panel A: Dep var is Education				
British (vs. French)	0.061***	0.067***	0.082***	0.071***
	(0.019)	(0.018)	(0.016)	(0.014)
British (vs. French) x Born in 1968 or after	0.059***	0.059***	0.040***	0.070***
	(0.016)	(0.016)	(0.014)	(0.011)
Mean Dep. Var.	0.292	0.301	0.303	0.336
Observations	92,426	105,187	142,870	204,404
Clusters	3,462	3,950	5,337	7,770
Bandwidth	63.21	70.00	100.00	150.00
Donut size	5	5	5	5
Panel B: Dep var is Literacy				
British (vs. French)	0.001	-0.011	-0.007	0.001
	(0.023)	(0.024)	(0.022)	(0.020)
British (vs. French) x Born in 1968 or after	0.041**	0.045**	0.029*	0.029**
	(0.018)	(0.020)	(0.017)	(0.014)
Mean Dep. Var.	0.355	0.360	0.359	0.388
Observations	90,480	78,833	107,301	153,374
Clusters	3,324	2,907	3,916	5,634
Bandwidth	82.54	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on various human capital outcomes, differentiated by cohort born before or after 1968. *Panel A* reports coefficients for primary education which is an indicator variable equal to 1 if the respondent has completed at least primary school. *Panel B* reports coefficients for literacy rate which is an indicator variable equal to 0 if the respondent cannot read at all. Each column reports RD estimates of Equation (3) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 6: Colonial origins, Family Planning Policies, and Income

		Predetermined bandwidths		
	Optimal bandwidth (1)	70 km of bound. (2)	100 km of bound. (3)	150 km of bound. (4)
Dep var is Female labor force participation				
British (vs. French)	0.234***	0.235***	0.226***	0.200***
	(0.042)	(0.041)	(0.039)	(0.037)
British (vs. French) x Born in 1968 or after	-0.016	-0.019	-0.010	-0.021
	(0.022)	(0.021)	(0.018)	(0.015)
Mean Dep. Var.	0.756	0.756	0.755	0.758
Observations	53,338	55,112	74,972	106,350
Clusters	2,817	2,901	3,905	5,620
Bandwidth	68.16	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on various human capital outcomes, differentiated by cohort born before or after 1968. The dependent variable is female labor force participation which is an indicator equal to 1 if a woman is working for in cash or in kind earnings. Each column reports RD estimates of Equation (3) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 7: Colonial origins, Family Planning Policies, and Health

	Optimal bandwidth	Predetermined bandwidths		
		70 km of bound.	100 km of bound.	150 km of bound.
	(1)	(2)	(3)	(4)
Panel A: Dep var is Child mortality				
British (vs. French)	-0.011	-0.016*	-0.013	-0.011
	(0.009)	(0.009)	(0.008)	(0.007)
British (vs. French) x Born in 1968 or after	-0.013	-0.010	-0.009	-0.008
	(0.010)	(0.009)	(0.008)	(0.007)
Mean Dep. Var.	0.189	0.188	0.190	0.186
Observations	217,406	252,351	346,916	484,613
Clusters	3,426	4,048	5,446	7,879
Bandwidth	61.63	70.00	100.00	150.00
Donut size	5	5	5	5
Panel B: Dep var is Maternal mortality				
British (vs. French)	0.067	0.069	-0.008	0.039
	(0.089)	(0.089)	(0.062)	(0.038)
British (vs. French) x Born in 1968 or after	-0.049	-0.052	-0.027	-0.027
	(0.044)	(0.044)	(0.036)	(0.027)
Mean Dep. Var.	0.090	0.090	0.092	0.092
Observations	24,013	24,062	33,143	46,867
Clusters	2,375	2,379	3,209	4,562
Bandwidth	69.90	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on various human capital outcomes, differentiated by cohort born before or after 1968. *Panel A* reports coefficients for child mortality which is an indicator equal to 1 if a child died before five years old. *Panel B* reports coefficients for maternal mortality which is an indicator for the total number of sisters who died from any cause while pregnant, during childbirth, within six weeks after the delivery or within two months after the delivery. Each column reports RD estimates of Equation (3) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. *Panel A* additionally controls for the sex and the year of birth of the child. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 8: Colonial origins, Family Planning Policies, and Female Bargaining Power

	Optimal bandwidth	Predetermined bandwidths		
		70 km of bound.	100 km of bound.	150 km of bound.
	(1)	(2)	(3)	(4)
Panel A: Dep var is Participation in decision making				
British (vs. French)	0.068	0.145	0.080	0.118
	(0.109)	(0.116)	(0.104)	(0.095)
British (vs. French) x Born in 1968 or after	0.198**	0.126	0.216***	0.148**
	(0.081)	(0.090)	(0.075)	(0.062)
Mean Dep. Var.	-0.050	-0.045	-0.058	-0.016
Observations	73,070	60,111	81,855	116,290
Clusters	3,514	2,907	3,916	5,634
Bandwidth	88.10	70.00	100.00	150.00
Donut size	5	5	5	5
Panel B: Dep var is Experience of domestic violence				
British (vs. French)	0.151	0.148	0.135	-0.290
	(0.326)	(0.328)	(0.303)	(0.309)
British (vs. French) x Born in 1968 or after	-0.174	-0.183	-0.150	-0.104
	(0.166)	(0.172)	(0.138)	(0.117)
Mean Dep. Var.	0.028	0.033	0.016	0.040
Observations	21,128	20,092	27,113	38,403
Clusters	1,283	1,225	1,658	2,492
Bandwidth	74.10	70.00	100.00	150.00
Donut size	5	5	5	5
Panel C: Dep var is Justification of domestic violence				
British (vs. French)	-0.412***	-0.168	-0.142	-0.216**
	(0.133)	(0.109)	(0.098)	(0.091)
British (vs. French) x Born in 1968 or after	0.082	-0.063	-0.048	-0.051
	(0.106)	(0.084)	(0.072)	(0.060)
Mean Dep. Var.	-0.066	-0.056	-0.028	-0.046
Observations	46,846	75,279	102,534	146,479
Clusters	1,850	2,907	3,916	5,634
Bandwidth	44.96	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on women empowerment outcomes, differentiated by cohort born before or after 1968. *Panel A* reports coefficients for participation in decision making which is a score generated using the principal components of women's participation in household decisions over health, purchases, and visits to relatives. *Panel B* reports coefficients for experience of domestic violence which is a score generated using the principal components of women's experience of any form of physical and sexual violence. *Panel C* reports coefficients for justification of domestic violence which is a score generated using the principal components of women's acceptance of domestic violence. Each column reports RD estimates of Equation (3) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 9: Heterogeneity by market access - colonial origins and fertility

	Optimal bandwidth		70 km of bound.	
	(1)	(2)	(3)	(4)
Dep var is Total number of children ever born				
British (vs. French)	-0.016	-0.148	-0.084	-0.256**
	(0.071)	(0.141)	(0.065)	(0.125)
British (vs. French) x Low MA	-0.251**	-0.478**	-0.227**	-0.528***
	(0.100)	(0.220)	(0.092)	(0.199)
British (vs. French) x Born in 1968 or after		0.173		0.223*
		(0.137)		(0.120)
British (vs. French) x Born in 1968 or after x Low MA		0.328		0.418**
		(0.219)		(0.194)
Mean Dep. Var.	3.211	3.211	3.126	3.126
Observations	83,276	83,276	107,442	107,442
Clusters	3,144	3,144	4,048	4,048
Bandwidth	57.33	57.33	70.00	70.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the heterogeneous effects of colonial origins on the total number of children ever born by market access. Low MA stands for Low Market Access which is an indicator equal to 1 for value below the median. MA is measured by the geodesic distance to the sea coast. Columns (1) and (3) report RD estimates of Equation (3). Columns (2) and (4) report RD estimates of Equation (4) Columns (1) and (2) report coefficients using the Optimal bandwidth derived from the MSE-minimizing procedure suggested by Cattaneo et al. (2019). Columns (3) and (4) reports coefficients using a window of 70km around the British-French boundary. All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Appendix For online publication

A1 Appendix Figures

Figure A1: Colonial population laws

Cinquante-deuxième année. — N° 208. Le Numéro : Cinquante centimes. Dimanche 1er Août 1920.

JOURNAL OFFICIEL

DE LA RÉPUBLIQUE FRANÇAISE

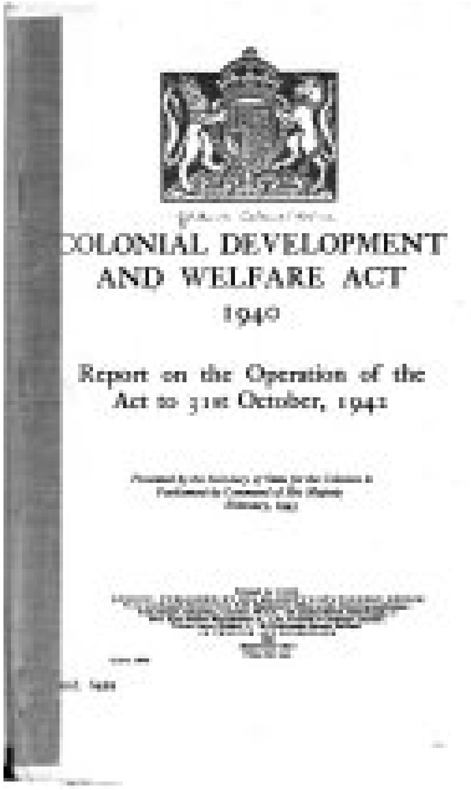
ABONNEMENTS

Art. 2. — Sera puni des mêmes peines quiconque aura vendu, mis en vente, ou fait vendre, distribué, ou fait distribuer, de quelque manière que ce soit, des remèdes, substances, instruments ou objets quelconques, sachant qu'ils étaient destinés à commettre le crime d'avortement, lors même que cet avortement n'aurait été ni consommé, ni tenté, et alors même que ces remèdes, substances, instruments ou objets quelconques proposés comme moyens d'avortement efficaces seraient, en réalité, inaptes à les réaliser.

Art. 3. — Sera puni d'un mois à six mois de prison et d'une amende de cent francs (100 fr.) à cinq mille francs (5,000 fr.), quiconque, dans un but de propagande anticonceptionnelle, aura, par l'un des moyens spécifiés aux articles 1er et 2, décrit ou divulgué, ou offert de révéler des procédés propres à prévenir la grossesse, ou encore faciliter l'usage de ces procédés.

Les mêmes peines seront applicables à quiconque, par l'un des moyens énoncés à l'article 23 de la loi du 29 juillet 1881, se sera livré à une propagande anticonceptionnelle ou contre la natalité.

(a) French law of 1920



COLONIAL DEVELOPMENT AND WELFARE ACT

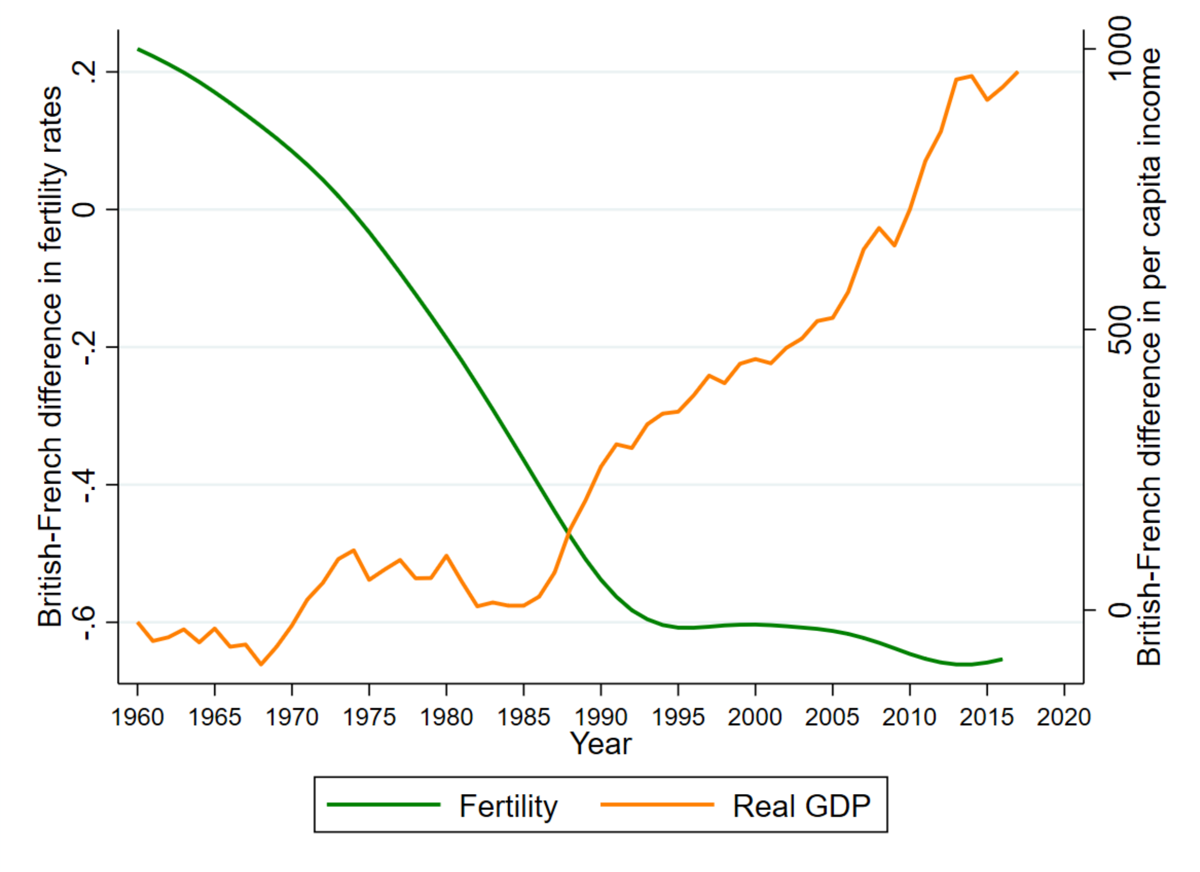
1940

Report on the Operation of the Act to 31st October, 1942

(b) British Colonial Development and Welfare Act of 1940

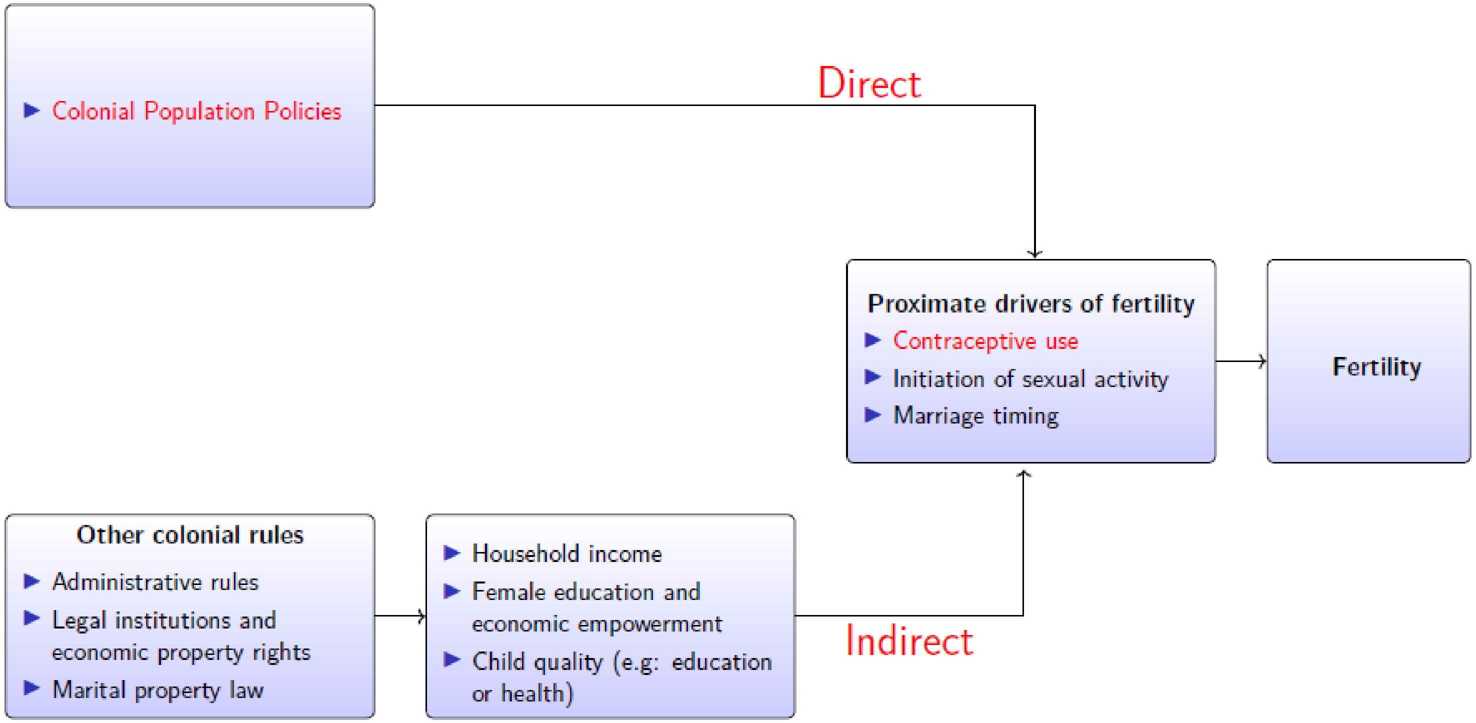
Note: Figure A1-*a* displays selected pages of the "Journal Officiel de la République Française" published in 1920, advertising the major legal official information for the national Government of France and the French Parliament. Figure A1-*b* shows the first page of the British colonial development and welfare act adopted in 1940.

Figure A2: British-French differences in fertility and income, 1960-2016



Note: The figure depicts the trends in the British-French differences in fertility rates and per capita income. Data are drawn from the World Bank Development Indicators.

Figure A3: Conceptual Framework



A2 Appendix Tables

Table A1: List of countries, DHS surveys, and contraceptive laws

Countries	DHS year of surveys	Laws on the sale of contraceptives		
		Status at independence	Year of legalization	Source of law
French colonies				
Benin	1996, 2001, 2011-12	Illegal	2003	Act No. 2003-04 of January 24, 2003
Burkina Faso	1993, 1998-99, 2003, 2010	Illegal	1986	Act No. AN IV-008/CNR/EF-SN of October 24,1986
Cameroon	1991, 2004, 2011	Illegal	1980	Act No. 80/10 of July 14, 1980
Chad	2014-15	Illegal	1993	Order No. 008/PR/93 of April 30, 1993
Ivory Coast	1994, 1998-99, 2011-12	Illegal	1981	Act No. 81-640 of July 13, 1981
Guinea	1999, 2005, 2012	Illegal	2000	Act L/010/AN 2000 of 10 July 2000
Niger	1992, 1998, 2012	Illegal	2006	Act No. 15 of May 24, 2006
Togo	1988, 1998, 2013-14	Illegal	2007	Act No. 2007-005 of January 10, 2007
British colonies				
Ghana	1993, 1998, 2003, 2008, 2014	Legal		
Nigeria	1990, 2003, 2008, 2013	Legal		
Sierra Leone	2008, 2013	Legal		

Note: Table shows the list of the 11 eligible countries and DHS wave of surveys included in the main analysis.

Table A2: Summary statistics

	Whole sample		British		French		T-test
	Mean	Obs.	Mean	Obs.	Mean	Obs.	P-value
Children ever born	3.21	83,700	3.14	31,897	3.25	51,803	0.000
Ever use of modern contraception	0.18	42,497	0.22	16,745	0.15	25,752	0.000
Has at least primary education	0.27	81,773	0.38	31,897	0.20	49,876	0.000
Literacy rate	0.33	61,092	0.35	27,388	0.32	33,704	0.000
Work for Cash/in kind earnings	0.75	42,964	0.69	18,962	0.80	24,002	0.000
Decision making participation	-0.08	47,285	-0.17	20,755	-0.00	26,530	0.000
Experience of domestic violence	0.00	15,798	-0.02	9,830	0.04	5,968	0.027
Justification of domestic violence	-0.08	58,411	0.10	26,089	-0.24	32,322	0.000
Age	28.80	83,700	28.96	31,897	28.70	51,803	0.000
Year of birth	1976.92	83,700	1978.88	31,897	1975.71	51,803	0.000
Living in urban areas	0.32	83,700	0.30	31,897	0.33	51,803	0.000
Child is a boy	0.51	268,613	0.52	100,062	0.51	168,551	0.010
Year of birth	1995.30	268,613	1997.46	100,062	1994.02	168,551	0.000
Living in urban areas	0.24	268,613	0.23	100,062	0.24	168,551	0.000
Child mortality	0.19	201,576	0.20	74,864	0.19	126,712	0.000

Note: Table shows relevant summary statistics. Statistics are computed separately for the whole sample of respondents (columns (1) and (2)), the sample of respondents living in former British colonies (columns (3) and (4)), and the sample of respondents living in former French colonies (columns (5) and (6)). The p-value of the British-French difference in means is shown in column (7). The sample in this table includes individuals within the RD MSE optimal bandwidth determined using the procedure suggested by Cattaneo et al. (2019). Variable definitions and data sources used in this analysis are described in the text.

Table A3: Average effect - Colonial Origins and Other Fertility Outcomes

	Optimal bandwidth (1)	Predetermined bandwidths: 70 km of bound. (2)	100 km of bound. (3)	150 km of bound. (4)
Panel A: Dep var is First birth before age 18				
British (vs. French)	-0.045***	-0.044***	-0.047***	-0.042***
	(0.012)	(0.012)	(0.011)	(0.010)
Mean Dep. Var.	0.402	0.400	0.407	0.400
Observations	83,903	81,103	109,750	154,114
Clusters	4,184	4,048	5,447	7,881
Bandwidth	72.50	70.00	100.00	150.00
Donut size	5	5	5	5
Panel B: Dep var is Age at first sexual intercourse				
British (vs. French)	0.239**	0.274***	0.301***	0.314***
	(0.096)	(0.088)	(0.079)	(0.069)
Mean Dep. Var.	16.353	16.379	16.320	16.411
Observations	66,219	85,284	115,875	164,866
Clusters	2,983	3,851	5,205	7,593
Bandwidth	57.42	70.00	100.00	150.00
Donut size	5	5	5	5
Panel C: Dep var is Early marriage (before 18 years old)				
British (vs. French)	-0.045***	-0.049***	-0.046***	-0.046***
	(0.014)	(0.013)	(0.012)	(0.010)
Mean Dep. Var.	0.589	0.582	0.590	0.583
Observations	64,866	84,314	114,209	160,579
Clusters	3,063	4,048	5,447	7,881
Bandwidth	56.05	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on other fertility outcomes. Each column reports RD estimates of Equation (1) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table A4: Robustness to various RD parameters

	Bandwidth type					
	mserd bandwidth (1)	msetwo bandwidth (2)	msesum bandwidth (3)	cerrd bandwidth (4)	certwo bandwidth (5)	cersum bandwidth (6)
Dep var is Total number of children ever born						
Panel A: Triangular Kernel						
British (vs. French)	-0.145***	-0.217***	-0.183***	-0.267***	-0.220***	-0.277***
	(0.055)	(0.054)	(0.056)	(0.064)	(0.068)	(0.065)
Mean Dep. Var.	3.211	3.215	3.218	3.159	3.241	3.155
Observations	83,276	113,862	79,358	54,388	72,297	52,392
Clusters	3,144	4,360	3,001	2,130	2,797	2,058
Optimal Bandwidth left	-57.33	-100.83	-54.89	-35.76	-62.91	-34.24
Optimal Bandwidth right	57.33	50.98	54.89	35.76	31.81	34.24
Donut size	5	5	5	5	5	5
Panel B: Uniform Kernel						
British (vs. French)	-0.288***	-0.249***	-0.222***	-0.383***	-0.365***	-0.316***
	(0.065)	(0.063)	(0.057)	(0.089)	(0.080)	(0.071)
Mean Dep. Var.	3.156	3.192	3.210	3.213	3.188	3.162
Observations	52,008	81,070	69,110	32,640	53,745	45,932
Clusters	2,040	3,147	2,641	1,277	2,089	1,793
Optimal Bandwidth left	-33.96	-67.01	-46.58	-21.19	-41.81	-29.06
Optimal Bandwidth right	33.96	36.57	46.58	21.19	22.82	29.06
Donut size	5	5	5	5	5	5
Panel C: Epanechnikov Kernel						
British (vs. French)	-0.225***	-0.222***	-0.152***	-0.312***	-0.229***	-0.277***
	(0.058)	(0.054)	(0.054)	(0.072)	(0.068)	(0.063)
Mean Dep. Var.	3.206	3.220	3.196	3.163	3.236	3.162
Observations	68,347	109,122	86,028	44,559	69,653	55,826
Clusters	2,615	4,176	3,247	1,744	2,694	2,177
Optimal Bandwidth left	-45.64	-95.36	-58.85	-28.47	-59.49	-36.72
Optimal Bandwidth right	45.64	51.28	58.85	28.47	31.99	36.72
Donut size	5	5	5	5	5	5
Border FE	✓	✓	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓	✓	✓
Other controls	✓	✓	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on the total number of children ever born for various RD parameters. Each column reports RD estimates of Equation (1) for different bandwidth around the British-French boundary using method corresponding to the column title. Each bandwidth type represents the optimal bandwidth selection procedure used for each regression: mserd choses one common MSE-optimal bandwidth; msetwo choses two different MSE-optimal bandwidths (below and above the cutoff); msesum choses one common MSE-optimal bandwidth selector for the sum of regression estimates (instead of the difference); cerrd choses one common CER-optimal bandwidth; certwo two different CER-optimal bandwidths (below and above the cutoff); cersum choses one common CER-optimal bandwidth for the sum of regression estimates (see Cattaneo et al. (2019) for more details). Each panel estimates the optimal bandwidth using different kernel function represented by the panel title. All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table A5: Robustness - various RD parameters + Higher order polynomial

	Bandwidth type					
	mserd bandwidth (1)	msetwo bandwidth (2)	msesum bandwidth (3)	cerrd bandwidth (4)	certwo bandwidth (5)	cersum bandwidth (6)
	Dep var is Total number of children ever born					
	Panel A: Triangular Kernel					
British (vs. French)	-0.184***	-0.188***	-0.175***	-0.267***	-0.268***	-0.260***
	(0.060)	(0.059)	(0.060)	(0.081)	(0.080)	(0.081)
Mean Dep. Var.	3.158	3.162	3.158	3.219	3.201	3.221
Observations	136,460	163,074	135,938	79,386	101,592	79,103
Clusters	5,128	6,103	5,112	3,002	3,875	2,994
Optimal Bandwidth left	-94.17	-138.12	-93.86	-54.92	-80.55	-54.74
Optimal Bandwidth right	94.17	93.21	93.86	54.92	54.36	54.74
Donut size	5	5	5	5	5	5
	Panel B: Uniform Kernel					
British (vs. French)	-0.235***	-0.181***	-0.202***	-0.272***	-0.275***	-0.267***
	(0.069)	(0.065)	(0.061)	(0.097)	(0.092)	(0.083)
Mean Dep. Var.	3.133	3.148	3.153	3.195	3.235	3.218
Observations	112,369	140,933	132,754	65,266	80,986	76,700
Clusters	4,228	5,298	4,997	2,510	3,095	2,910
Optimal Bandwidth left	-73.37	-108.62	-91.22	-42.79	-63.35	-53.20
Optimal Bandwidth right	73.37	77.83	91.22	42.79	45.39	53.20
Donut size	5	5	5	5	5	5
	Panel C: Epanechnikov Kernel					
British (vs. French)	-0.209***	-0.178***	-0.213***	-0.290***	-0.297***	-0.278***
	(0.062)	(0.060)	(0.055)	(0.086)	(0.084)	(0.073)
Mean Dep. Var.	3.154	3.124	3.142	3.214	3.217	3.126
Observations	128,401	180,332	165,717	73,558	109,096	102,111
Clusters	4,820	6,736	6,206	2,803	4,173	3,861
Optimal Bandwidth left	-87.15	-162.45	-114.47	-50.82	-94.74	-66.76
Optimal Bandwidth right	87.15	89.28	114.47	50.82	52.07	66.76
Donut size	5	5	5	5	5	5
Border FE	✓	✓	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓	✓	✓
Other controls	✓	✓	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on the total number of children ever born for various RD parameters and using a second order RD polynomial. Each column reports RD estimates of Equation (1) for different bandwidth around the British-French boundary using method corresponding to the column title. Each bandwidth type represents the optimal bandwidth selection procedure used for each regression: mserd choses one common MSE-optimal bandwidth; msetwo choses two different MSE-optimal bandwidths (below and above the cutoff); msesum choses one common MSE-optimal bandwidth selector for the sum of regression estimates (instead of the difference); cerrd choses one common CER-optimal bandwidth; certwo two different CER-optimal bandwidths (below and above the cutoff); cersum choses one common CER-optimal bandwidth for the sum of regression estimates (see Cattaneo et al. (2019) for more details). Each panel estimates the optimal bandwidth using different kernel function represented by the panel title. All regressions include a second-order polynomial specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table A6: Robustness - Non-parametric estimation

	Bandwidth type					
	mserd bandwidth (1)	msetwo bandwidth (2)	msesum bandwidth (3)	cerrd bandwidth (4)	certwo bandwidth (5)	cersum bandwidth (6)
Dep var is Total number of children ever born						
Panel A: Triangular Kernel						
British (vs. French)	-0.225***	-0.257***	-0.236***	-0.307***	-0.302***	-0.313***
	(0.040)	(0.039)	(0.041)	(0.049)	(0.048)	(0.050)
Mean Dep. Var.	3.209	3.135	3.219	3.161	3.077	3.157
Observations	83,276	113,862	79,358	54,388	72,297	52,392
Clusters						
Optimal Bandwidth left	57.33	100.83	54.89	35.76	62.91	34.24
Optimal Bandwidth right	57.33	50.98	54.89	35.76	31.81	34.24
Conventional P-value	0.000	0.000	0.000	0.000	0.000	0.000
Robust P-value	0.000	0.000	0.000	0.000	0.000	0.000
Donut size	5	5	5	5	5	5
Panel B: Uniform Kernel						
British (vs. French)	-0.266***	-0.234***	-0.198***	-0.302***	-0.322***	-0.285***
	(0.048)	(0.041)	(0.041)	(0.058)	(0.053)	(0.050)
Mean Dep. Var.	3.158	3.071	3.211	3.215	3.209	3.163
Observations	52,008	81,070	69,110	32,640	53,745	45,932
Clusters						
Optimal Bandwidth left	33.96	67.01	46.58	21.19	41.81	29.06
Optimal Bandwidth right	33.96	36.57	46.58	21.19	22.82	29.06
Conventional P-value	0.000	0.000	0.000	0.000	0.000	0.000
Robust P-value	0.000	0.000	0.000	0.000	0.000	0.000
Donut size	5	5	5	5	5	5
Panel C: Epanechnikov Kernel						
British (vs. French)	-0.255***	-0.240***	-0.192***	-0.315***	-0.280***	-0.290***
	(0.043)	(0.038)	(0.039)	(0.053)	(0.048)	(0.047)
Mean Dep. Var.	3.208	3.132	3.194	3.165	3.112	3.164
Observations	68,347	109,122	86,028	44,559	69,653	55,826
Clusters	2,624	3,866	3,264	1,749	2,541	2,183
Optimal Bandwidth left	45.64	95.36	58.85	28.47	59.49	36.72
Optimal Bandwidth right	45.64	51.28	58.85	28.47	31.99	36.72
Conventional P-value	0.000	0.000	0.000	0.000	0.000	0.000
Robust P-value	0.000	0.000	0.000	0.000	0.000	0.000
Donut size	5	5	5	5	5	5
Border FE	✓	✓	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓	✓	✓
Other controls	✓	✓	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on the total number of children ever born with a non-parametric estimation using the Stata package rdrobust developed by Calonico et al. (2014). Each column reports RD estimates for different bandwidth around the British-French boundary using method corresponding to the column title. Each bandwidth type represents the optimal bandwidth selection procedure used for each regression: mserd choses one common MSE-optimal bandwidth; msetwo choses two different MSE-optimal bandwidths (below and above the cutoff); msesum choses one common MSE-optimal bandwidth selector for the sum of regression estimates (instead of the difference); cerrd choses one common CER-optimal bandwidth; certwo two different CER-optimal bandwidths (below and above the cutoff); cersum choses one common CER-optimal bandwidth for the sum of regression estimates (see Cattaneo et al. (2019) for more details). Each panel estimate the optimal bandwidth using different kernel function represented by the panel title. All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table A7: Robustness - Geographic and locations controls

		Predetermined bandwidths		
	Optimal bandwidth (1)	70 km of bound. (2)	100 km of bound. (3)	150 km of bound. (4)
Dep var is Total number of children ever born				
Panel A: Geographic controls				
British (vs. French)	-0.160***	-0.203***	-0.211***	-0.220***
	(0.055)	(0.051)	(0.045)	(0.041)
Mean Dep. Var.	3.217	3.126	3.164	3.102
Observations	82,075	107,421	145,368	206,935
Clusters	3,098	4,047	5,446	7,880
Bandwidth	56.65	70.00	100.00	150.00
Donut size	5	5	5	5
Panel B: Location controls				
British (vs. French)	-0.177***	-0.234***	-0.232***	-0.234***
	(0.055)	(0.051)	(0.046)	(0.042)
Mean Dep. Var.	3.303	3.228	3.244	3.156
Observations	78,402	98,406	135,494	196,742
Clusters	2,929	3,686	5,052	7,469
Bandwidth	58.45	70.00	100.00	150.00
Donut size	5	5	5	5
Panel C: Geographic and location controls				
British (vs. French)	-0.154***	-0.187***	-0.202***	-0.203***
	(0.055)	(0.051)	(0.045)	(0.041)
Mean Dep. Var.	3.215	3.126	3.164	3.102
Observations	82,860	107,421	145,368	206,935
Clusters	3,127	4,047	5,446	7,880
Bandwidth	57.03	70.00	100.00	150.00
Donut size	5	5	5	5
Panel D: Control for distance to missions				
British (vs. French)	-0.206***	-0.236***	-0.276***	-0.335***
	(0.074)	(0.068)	(0.059)	(0.055)
Mean Dep. Var.	3.217	3.126	3.164	3.102
Observations	82,209	107,442	145,389	206,956
Clusters	3,103	4,048	5,447	7,881
Bandwidth	56.68	70.00	100.00	150.00
Donut size	5	5	5	5
Panel E: Control for distance to missions and religious affiliation				
British (vs. French)	-0.160***	-0.203***	-0.211***	-0.220***
	(0.055)	(0.051)	(0.045)	(0.041)
Mean Dep. Var.	3.217	3.126	3.164	3.102
Observations	82,075	107,421	145,368	206,935
Clusters	3,098	4,047	5,446	7,880
Bandwidth	56.65	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on the total number of children ever born. Each column reports RD estimates of Equation (1) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Geographic controls in *Panel A* include elevation, precipitation, and soil suitability for agriculture. Location controls in *Panel B* include distance to the capital. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table A8: Robustness - Drop hybrid countries

	Optimal bandwidth (1)	Predetermined bandwidths 70 km of bound. (2)	100 km of bound. (3)	150 km of bound. (4)
Dep var is Total number of children ever born				
Panel A: Excluding Cameroon				
British (vs. French)	-0.165***	-0.199***	-0.201***	-0.211***
	(0.056)	(0.051)	(0.045)	(0.041)
Mean Dep. Var.	3.209	3.113	3.164	3.125
Observations	76,804	100,678	135,399	189,539
Clusters	2,894	3,792	5,069	7,201
Bandwidth	56.42	70.00	100.00	150.00
Donut size	5	5	5	5
Panel B: Excluding Togo				
British (vs. French)	-0.232***	-0.290***	-0.279***	-0.219***
	(0.066)	(0.061)	(0.055)	(0.049)
Mean Dep. Var.	3.201	3.132	3.171	3.100
Observations	72,696	91,391	127,636	188,915
Clusters	2,787	3,484	4,821	7,246
Bandwidth	59.08	70.00	100.00	150.00
Donut size	5	5	5	5
Panel C: Excluding Cameroon and Togo				
British (vs. French)	-0.268***	-0.280***	-0.259***	-0.203***
	(0.068)	(0.062)	(0.056)	(0.050)
Mean Dep. Var.	3.228	3.116	3.171	3.126
Observations	61,847	84,627	117,646	171,498
Clusters	2,380	3,228	4,443	6,566
Bandwidth	54.78	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on the total number of children ever born for various subset of countries defined in each panel title. Each column reports RD estimates of Equation (1) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table A9: Robustness - Donut hole

		Predetermined bandwidths		
	Optimal bandwidth (1)	70 km of bound. (2)	100 km of bound. (3)	150 km of bound. (4)
Dep var is Total number of children ever born				
Panel A: No donut hole				
British (vs. French)	-0.158***	-0.138***	-0.170***	-0.186***
	(0.053)	(0.046)	(0.041)	(0.038)
Mean Dep. Var.	3.116	3.116	3.145	3.106
Observations	62,171	107,824	146,251	208,435
Clusters	2,462	4,102	5,529	7,964
Bandwidth	40.03	70.00	100.00	150.00
Donut size	0	0	0	0
Panel B: Donut hole of 10km				
British (vs. French)	-0.139**	-0.226***	-0.218***	-0.215***
	(0.066)	(0.058)	(0.052)	(0.046)
Mean Dep. Var.	3.226	3.152	3.174	3.101
Observations	75,638	104,573	142,519	203,074
Clusters	2,848	3,922	5,321	7,759
Bandwidth	53.59	70.00	100.00	150.00
Donut size	10	10	10	10
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on the total number of children ever born. Each column reports RD estimates of Equation (1) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table A10: Robustness - Selective migration

	Optimal bandwidth (1)	Predetermined bandwidths 70 km of bound. (2)	100 km of bound. (3)	150 km of bound. (4)
	Dep var is Total number of children ever born			
British (vs. French)	-0.258***	-0.226***	-0.226***	-0.224***
	(0.066)	(0.059)	(0.053)	(0.049)
Mean Dep. Var.	3.102	3.029	3.070	3.018
Observations	51,579	76,129	104,081	146,717
Clusters	2,739	3,990	5,364	7,734
Bandwidth	49.83	70.00	100.00	150.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on the total number of children ever born for the subsample of natives. Natives are individuals who never lived elsewhere than their place of birth since they were born. Each column reports RD estimates of Equation (1) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table A11: Robustness - Spatial autocorrelation

	Optimal bandwidth (1)	Predetermined bandwidths 70 km of bound. (2)	100 km of bound. (3)	150 km of bound. (4)
	Dep var is Total number of children ever born			
Treatment dummy	-0.145**	-0.200***	-0.211***	-0.220***
	(0.072)	(0.066)	(0.059)	(0.059)
Mean Dep. Var.	3.209	3.119	3.155	3.095
Observations	83,276	107,442	145,389	206,956
Clusters				
Bandwidth	57.33	70.00	100.00	150.00
Donut size	5	5	5	5
Conley cut-off	10	10	10	10
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the effects of colonial origins on the total number of children ever born. Each column reports RD estimates of Equation (1) for different bandwidth around the British-French boundary. Optimal bandwidth is chosen using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered using Conley standard errors with a cut-off window of 10km (Conley (1999)) are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table A12: Summary statistics by cohort of birth

	Whole sample		British		French		T-test
	Mean (1)	Obs. (2)	Mean (3)	Obs. (4)	Mean (5)	Obs. (6)	p-value (7)
Panel A: Cohort born before 1968							
Children ever born	5.72	18,819	5.63	5,622	5.75	13,197	0.007
Ever use of modern contraception	0.16	15,873	0.23	4,633	0.14	11,240	0.000
Has at least primary education	0.15	17,352	0.25	5,622	0.10	11,730	0.000
Literacy rate	0.19	7,113	0.20	3,065	0.18	4,048	0.032
Work for Cash/in kind earnings	0.80	6,276	0.76	2,641	0.84	3,635	0.000
Decision making participation	0.38	6,462	0.19	2,756	0.52	3,706	0.000
Experience of domestic violence	-0.05	1,669	-0.07	1,110	-0.00	559	0.429
Justification of domestic violence	0.16	6,929	0.21	2,976	0.12	3,953	0.048
Age	38.98	18,819	40.53	5,622	38.33	13,197	0.000
Year of birth	1960	18,819	1961	5,622	1960	13,197	0.000
Living in urban areas	0.26	18,819	0.26	5,622	0.26	13,197	0.251
Panel B: Cohort born after 1968							
Children ever born	2.48	64,881	2.60	26,275	2.40	38,606	0.000
Ever use of modern contraception	0.19	26,624	0.22	12,112	0.16	14,512	0.000
Has at least primary education	0.30	64,421	0.40	26,275	0.23	38,146	0.000
Literacy rate	0.35	53,979	0.37	24,323	0.34	29,656	0.000
Work for Cash/in kind earnings	0.75	36,688	0.68	16,321	0.79	20,367	0.000
Decision making participation	-0.15	40,823	-0.23	17,999	-0.09	22,824	0.000
Experience of domestic violence	0.01	14,129	-0.01	8,720	0.05	5,409	0.043
Justification of domestic violence	-0.12	51,482	0.09	23,113	-0.29	28,369	0.000
Age	25.85	64,881	26.49	26,275	25.41	38,606	0.000
Year of birth	1982	64,881	1983	26,275	1981	38,606	0.000
Living in urban areas	0.33	64,881	0.31	26,275	0.35	38,606	0.000

Note: Table shows relevant summary statistics for women born before 1968 (*Panel A*) and for women born after 1968 (*Panel B*). In each panel, statistics are computed separately for the whole sample of respondents (columns (1) and (2)), the sample of respondents living in former British colonies (columns (3) and (4)), and the sample of respondents living in former French colonies (columns (5) and (6)). The p-value of the British-French difference in means is shown in column (7). The sample in this table includes individuals within the RD MSE optimal bandwidth determined using the procedure suggested by Cattaneo et al. (2019). Variable definitions and data sources used in this analysis are described in the text.

Table A13: Market access and the opportunity cost of childbearing

	Sea coast	MA port	TT port	MA cities 50,000	TT cities 50,000
	(1)	(2)	(3)	(4)	(5)
Panel A: Dep var is light density					
Low MA	-7.188***	-7.820***	-7.498***	-6.765***	-6.856***
	(1.870)	(1.753)	(1.747)	(1.260)	(1.485)
Mean Dep. Var.	6.421	7.405	7.405	6.440	6.440
Observations	3,157	2,693	2,693	3,148	3,148
Clusters	1,472	1,206	1,206	1,463	1,463
Bandwidth	57.33	57.33	57.33	57.33	57.33
Donut size	5	5	5	5	5
Panel B: Wealth index					
Low MA	-0.237**	-0.182***	-0.079	-0.290***	-0.148***
	(0.099)	(0.057)	(0.057)	(0.029)	(0.038)
Mean Dep. Var.	-0.284	-0.205	-0.205	-0.281	-0.281
Observations	56,441	48,934	48,934	56,241	56,241
Clusters	3,144	2,684	2,684	3,136	3,136
Bandwidth	57.33	57.33	57.33	57.33	57.33
Donut size	5	5	5	5	5
Country FE	✓	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓	✓
Other controls	✓	✓	✓	✓	✓

Note: Table shows estimates of the effects of various measures of market access on proxies for the opportunity cost of childbearing. In Panel A, the outcome is light density measured at the pixel level. In Panel B, the outcome is wealth score which is a score generated using the principal component of asset ownership. Each column of each panel reports coefficients from a separate regression. The explanatory variable of interest is low MA which refers to low Market Access. The measure of market access in each regression is denoted by the corresponding column title. In column (1), MA is measured by distance to the sea coast. In column (2), MA is measured by a networked-based measure of access to port cities (that is a discounted sum of port cities' populations, where the discount factor is inversely related to the travel time to each port). In column (3), MA is measured by the minimum travel time to an international port. In column (4), MA is measured by a networked-based measure of access to major cities. In column (5), MA is measured by the minimum travel time to major cities. Other controls include urban/rural dummy. Panel B additionally controls for age and age squared. Standard errors clustered at the pixel level and the DHS cluster level are reported in parentheses in Panel A and Panel B, respectively. ****p<0.01, **p<0.05, *p<0.1.*

Table A14: Heterogeneity by other measures of market access - colonial origins and fertility

	MA port	TT port	MA cities 50,000	TT cities 50,000
	(1)	(2)	(3)	(4)
Dep var is Total number of children ever born				
Panel A: Optimal bandwidth				
British (vs. French)	0.014	-0.024	-0.016	0.107
	(0.084)	(0.081)	(0.093)	(0.089)
British (vs. French) x Low MA	-0.465***	-0.370***	-0.236**	-0.421***
	(0.122)	(0.118)	(0.105)	(0.104)
Mean Dep. Var.	3.077	3.077	3.207	3.207
Observations	70,836	70,836	83,028	83,028
Clusters	2,684	2,684	3,136	3,136
Bandwidth	57.33	57.33	57.33	57.33
Donut size	5	5	5	5
Panel B: 70 km of boundary				
British (vs. French)	-0.064	-0.085	-0.123	-0.011
	(0.079)	(0.076)	(0.087)	(0.081)
British (vs. French) x Low MA	-0.438***	-0.382***	-0.158	-0.325***
	(0.113)	(0.109)	(0.099)	(0.095)
Mean Dep. Var.	2.992	2.992	3.123	3.123
Observations	92,507	92,507	107,076	107,076
Clusters	3,491	3,491	4,036	4,036
Bandwidth	70.00	70.00	70.00	70.00
Donut size	5	5	5	5
Border FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Year survey FE	✓	✓	✓	✓
Other controls	✓	✓	✓	✓

Note: Table shows RD estimates of the heterogeneous effects of colonial origins on the total number of children ever born by market access. Each column reports RD estimates of Equation (3) for different measures of market access. Low MA stands for Low Market Access which is an indicator equal to 1 for value below the median. In column (1), MA is measured by a networked-based measure of access to port cities (that is a discounted sum of port cities' populations, where the discount factor is inversely related to the travel time to each port). In column (2), MA is measured by the minimum travel time to an international port. In column (3), MA is measured by a networked-based measure of access to major cities. In column (4), MA is measured by the minimum travel time to major cities. *Panel A* reports coefficients using the Optimal bandwidth derived from the MSE-minimizing procedure suggested by Cattaneo et al. (2019). *Panel B* reports coefficients using a window of 70km around the British-French boundary. All regressions include a local linear specification estimated separately on each side of the British-French border. Other controls include age, age squared, and urban/rural dummy. Standard errors clustered by DHS survey cluster are reported in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

B1 Conceptual Framework

In this section, we present our conceptual framework, which highlights the possible theoretical channels through which colonial origins may affect reproductive behavior. This framework is summarized in Figure A3. It features two types of channels. The first possible channel, which is the primary channel in operation in this paper, is supported by differences in colonial population policies (presented in Section B1). The second possible channel is related to British-French differences in other institutional dimensions including administrative rules, education policies, legal institutions, and marital property laws which exert influence on female education, economic development, and intra-household bargaining power, all of which are known to determine fertility outcomes. This section summarizes the theoretical literature on the determinants of fertility and describes how they are shape by differences in colonial institutions.

B1.1 Literature on the Drivers of Fertility

It is important to differentiate between proximate determinants of fertility and the distal social drivers of these behaviors. The major proximate determinants of fertility in Africa include delayed age of marriage and sexual activity, contraception use, abortion, and post-partum insusceptibility (Bongaarts (2015), Canning et al. (2015)). These proximate determinants are influenced by fertility desires which depend in turn on child mortality (which induces replacement and insurance fertility. See for example Rossi (2019) for more details), women's education and labor market opportunities (which affect the opportunity cost of children), and female empowerment and social norms (which affect women's bargaining power and decision making).

Following Becker (1960), the literature has also emphasized the forward looking quality-quantity tradeoff in children, as an underlying factor of fertility decisions within the household (Mincer (1963), Becker and Lewis (1973), Galor and Weil (1996), Strulik (2017), Doepke and Tertilt (2018)). Becker's framework assumes that parents derived utility from both the quantity and the quality of their children, viewed as normal goods and treated similarly as other consumption goods. A key insight from this model is the child quantity-quality trade-off theory, whereby an increased demand for future child quality lowers the demand for child quantity. Moreover, Becker's theory implies that a high level of wages induces parents to demand fewer, higher quality children, because of an increase in the opportunity cost of raising children.[29]

The quantity-quality trade-off theory has been extended in several directions, uncovering new insights. An important literature emphasizes the role of female relative wages and education in explaining fertility (Mincer (1963), Schultz (1981), Galor and Weil (1996), Galor and Weil (2000), and Dessy et al. (2021)). Galor and Weil (1996) show that a rise in the relative wage of women due to technological progress increases the opportunity cost of childbearing more than a rise in family income. This in turn enables women to substitute out of childbearing into the labor market, thereby reducing their demand for children. Similarly, Galor and Weil (2000) show that as the return to investment in education rises following technological progress, the opportunity cost of raising children rises as well, lowering fertility. Subsequent studies show that the role of female education in lowering fertility is mediated

[29] Galor and Moav (2002) incorporate technological progress into Becker's framework, uncovering a new quantity-quality theory. In their theory, parents substitute quality for quantity in response to technological progress that increases the returns to child quality.

by delays in marriage and in onset of childbearing, and by a more effective use of modern methods of birth control (see Bongaarts (2010)).

There has been a debate about the relative importance of the proximate and distal determinants of family planning. Pritchett (1994) emphasizes that actual fertility is usually very close to desired fertility in most countries, and so women seem able to achieve their desired fertility even if some of the proximate mechanisms for fertility control, such as contraception and abortion, are difficult to access. However, evidence from intervention studies, and more recent work in Africa has emphasized that while desired fertility remains high there is a considerable unmet need for family planning and that access to family planning methods could have a large impact on fertility (Debpuur et al. (2002), Bongaarts and Casterline (2013)).

Recent studies explicitly incorporate contraceptive use into economic models of fertility (Bhattacharya and Chakraborty (2017), Strulik (2017)). A key insight from these models is that, as income rises, households spend more on contraceptive methods, which allow them to experience utility from sexual activity without a proportional increase in the number of children. Contraceptive use is therefore seen as another factor that mediates the theoretically negative relationship between income and fertility (see also Becker (1960)).

B1.2 Other Colonial Rules

In this section, we highlight important differences in colonial institutions other than colonial population policies[30] that may affect fertility through its proximate and distal determinants.

Legal Marital Laws. The degree of protection of marital property rights differs markedly under the French civil law and the British common law (Anderson (2018)). Under the common law and the underlying separate marital property regime, housewives have no rights to any of the marital property upon the marriage dissolving by either divorce or death. As a result, whereas separate ownership of property might imply benefits for female entrepreneurs through the protection of their own productive assets upon divorce, this marital property law has pernicious consequences for most women, in particular for those working on farms, because it does not recognize non-monetary contributions within the household. In contrast, the community marital property regime that characterizes the civil law system is associated with a stronger protection of marital property rights. In fact, a central feature of this marital regime is the joint ownership of marital property. It implies an equal division of property between the spouses in the case of marriage dissolution.

Long-term consequences of these differences have been documented in the literature. Anderson (2018) analyzes the effect of legal origins on HIV status in Africa. She finds that women under the common law regime are more likely to be infected with HIV than their counterparts under the civil law regime, but no effect is found among men. She argues that the community property regime (and thus the French civil law system) leads to empowerment of married women by increasing their bargaining power within the household. This translates into increasing use of protective contraception, thus lowering the risk of HIV.

Economic Property Rights. A number of studies focusing on the differences in the legal system inherited from colonization to explain cross-country variation in economic development have stressed the superiority of the common law system in two major legal outcomes: (i) the legal protection of private investors vis-à-vis the state; and (ii) the extent of judicial independence (La Porta et al. (1998), LaPorta et al. (1999), Beck et al. (2003)). In this literature, it is claimed that by fostering greater independence of the judicial system and offering

[30] For a description of differences in colonial population policies, see Section B1.

lighter government ownership and stronger legal protection of investors, the common law system limits the extent of expropriation and promotes contract enforcement and secured property rights. This is in sharp contrast with the French civil law system characterized by government ownership and regulation, which discourages investment and impedes economic development. Consistent with these theoretical propositions, many empirical studies show that the common law system is associated with more secure property rights, higher quality of government, greater political freedom, and better financial development in the present-day (La Porta et al. (1998), Djankov et al. (2002), Glaeser and Shleifer (2002)). The common law advantage in economic outcomes is illustrated in Appendix Figure A2, which compares former British and French colonies in terms of different measures of contemporary institutional quality. We see that former British colonies significantly outperform former French colonies in terms of the protection of property rights, level of democracy, bureaucracy quality, and quality of the business environment.

Colonial Administrative Rules. Historians of European expansion in former colonies have compared the British policy of indirect rule to the French policy of direct rule, arguing most of the time that the former was more conducive to economic growth and human capital accumulation (Crowder (1964), Bertocchi and Canova (2002), Iyer (2010)). While French direct rule was highly centralized and based on the idea of assimilating colonial territories, British indirect rule was much more decentralized and dedicated to preserving local traditions and practices through collaboration with traditional chiefs. This difference contributed to the empowerment and legitimization of local governments in former British (vs. French) colonies, thereby building strong local political structures more complementary to economic growth and public goods provision.

Colonial Education Policies. Another difference between the British and the French colonization that is likely to influence fertility through its main proximate determinants is related to educational policies. In order to satisfy the increasing demand for an educated administrative workforce within former colonies, both the British and the French colonial governments developed a dual system of private and public schools, although with a different intensity. Unlike the French, the British relied heavily on mission societies to provide and diffuse education. This may have contributed to generating a British advantage in educational outcomes. This advantage was especially strong for women in former British colonies given that Protestant missions prioritized female education and were more present in the British colonial empire, as opposed to the Catholic missions more present among the French (Nunn et al. (2014)). British-French differences in education system have persisted to the present-day with consequences on educational outcomes (see for example Dupraz (2017)).

B2 Measures of Market Access

To assess the heterogeneous impact of colonial origins by market access, we use five different accessibility measures. The first measure is a measure of access to export markets defined as the geodesic distance to the sea coast. Second, we use a networked-based measure of access to major cities to construct our first measure of access to domestic markets and a networked-based measure of access to port cities to construct another measure of access to export markets. Third, we rely on the minimum travel time to major cities to define our last measure of access to domestic markets and the minimum travel time to an international port to define our last measure of access to export markets. It follows that we use three measures of access to export (or international) markets and two measures of access to domestic markets. These measures are described below.

B2.1 Network-based Measures of Market Access: Domestic and External Markets

Following the standard approach in the literature, we define our first measure of domestic market access for a given location as a function of the weighted sum of the populations of all other locations, with a weight that decreases with transport time. It is a network-based approach to computing the degree of connection of a given node to other nodes in a networked environment, where the degree of connection to a node increases linearly in the "importance" of the latter and decays exponentially as a function of "distance". When applying this approach to market access where nodes are localities connected by a transportation network, a locality's importance is generally measured by its economic activities (or its population) and the distance between two localities by the travel time that separates them. The measure of accessibility we use is given by the following formula:

$$MA_{i,t} = \sum_{j \neq i} P_{j,t} \tau_{ij,t}^{-\theta} \tag{4}$$

where $P_{j,t}$ is the population of locality j at time t (which proxies for the size of the local market in j), $\tau_{ij,t}$ is the time required to travel between localities i and j given the state of the road network at time t, and θ is a measure of trade elasticity. Following Donaldson and Hornbeck (2016), we use an elasticity of trade, θ, equal to 3.8.[31] From the formula of Equation (4), it is easy to see that the market access indicator is the discounted sum of the populations of all the localities j that surround locality i, where the discount factor is inversely related to travel time. Travel times, $\tau_{ij,t}$, are calculated on the reconstructed countrywide road network assuming that speed is a function of road type. As for the trade elasticity parameter, we use the same value suggested by Donaldson and Hornbeck (2016).

We follow the exact same approach to define a network-based measure of access to ports, which is our second measure of access to external markets. In the formula of Equation (4), j now denotes a port city, and $P_{j,t}$ is the population of port city j at time t. Also, $\tau_{ij,t}$ is the time required to travel from a locality i to the port in city j given the state of the road network at time t, and θ is a measure of trade elasticity, also assumed to be equal to 3.8. It follows that this measure of access to external markets is also a discounted sum of the

[31] As in Donaldson and Hornbeck (2016) and Berg et al. (2018), we also use alternative values of the trade elasticity as robustness checks. Our results do not change.

populations of all port cities j surrounding a locality i.

B2.1.1 Travel Time to Domestic and External Markets

Inspired by the network-based approach presented in the preceding section, and following the literature (Blankespoor et al. (2017)), we also use the travel time between a given locality and the nearest major city (resp. port) as an alternative measure of access to domestic (resp. external) markets. An advantage of this measure is that it relies on fewer assumptions, and it is more exogenous with respect to fertility.

Using the digitized map of road networks in Africa, we define our second measure of access to domestic markets by calculating travel time between each locality and the nearest city with at least 50,000 inhabitants in each 10-year period since 1960 using ESRI's network analyst.[32]

Finally, we define our third measure of access to external markets by calculating the travel time over the road network between a locality and the nearest international port. Here, population does not enter the calculation. This provides an alternative measure to the geodesic distance to the sea.

Overall, we are using three distinct measures of access to external markets and two measures of access to domestic markets. Our preferred measure is the geodesic distance to the sea because it is exogenous with respect to fertility and road development. We use the four other measures mostly to show the robustness of our findings. These findings are presented in Section 8.

[32] In results not shown, we also use alternative population cutoffs for the nearest city– with at least 10,000 and 100,000 inhabitants, respectively–to generate the travel time variable. Overall, our results are robust to these alternative specifications.

B3 Data Sources for Geographic and Location Variables

Light density at night: Light Density is calculated by averaging light density observations across pixels that fall within the unit of analysis. We use the 2013 Nighttime Light (NTL) data (stable lights dataset) from the U.S. Air Force's Defense Meteorological Satellite Program/Operational Linescan System (DMSP/OLS). This dataset is made available by the U.S. National Oceanographic and Atmospheric Administration (NOAA). The pixel light (gain) values range from 0 to 63 with 0 being the absence of light. *Available at* https://www.ngdc.noaa.gov/eog/dmsp/downloadV4composites

Elevation: The elevation data is provided by the National Oceanic and Atmospheric Administration (NOAA) and U.S. National Geophysical Data Center, TerrainBase, release 1.0 (CD-ROM), Boulder, Colo. and *available at* https://sage.nelson.wisc.edu/data-and-models/atlas-of-the-biosphere/mapping-the-biosphere/ecosystems/topography/. This data provides elevation information in meters at the 30 arc-second resolution (approximately at the 1 km2 level near the equator). Our paper's elevation variable calculates the mean elevation for each 12 km by 12 km pixel in meters.

Precipitation: Precipitation data is provided by the Global Climate Database created by Hijmans et al. (2005) and *available at* http://www.worldclim.org/.Thisdataprovidesmonthlyaverage We calculate the average rainfall for each month for each 12 km by 12 km pixel and average this over the twelve months to obtain our yearly precipitation measure in millimeters of rainfall per year.

Soil suitability for agriculture: Soil suitability is the soil component of the land quality index created by the Atlas of the Biosphere *available at* https://sage.nelson.wisc.edu/data-and-models/atlas-of-the-biosphere/mapping-the-biosphere/land-use/suitability-for-agriculture/. This data uses soil characteristics (namely soil carbon density and the acidity or alkalinity of soil) and combines them using the best functional form to match known actual cropland area and interpolates this measure to be available for most of the world at the 0.5 degree in latitude by longitude level. This measure is normalized to be between 0 and 1, where higher values indicate higher soil suitability for agriculture. Our Soil Suitability variable measures the average soil suitability in each 12km by 12km pixel to provide a measure of soil suitability that also ranges between 0 and 1, with higher values indicate higher soil suitability for agriculture.

Malaria index: From Kiszewski et al. (2004), it indicates strength of malaria transmission based on local temperatures, precipitation, and human biting preference of the locally dominant Anopheles. Extended in McCord and Anttila-Hughes (2017), and validated against children's malaria positivity from bloodwork in DHS surveys. Data is *available at* https://sites.google.com/site/gordoncmccord/datasets.

Distance to the sea coast: The geodesic distance (in kilometers) from the centroid of each pixel to the nearest coastline. Constructed using Africa coastline data. *Available at* http://omap.africanmarineatlas.org/BASE/pages/coastline.htm

Distance to the capital: The geodesic distance (in kilometers) from the centroid of each pixel to the capital city in the same country. Geographical coordinates for the capital cities were derived from the CShapes dataset. Source: Weidmann, Nils B., Doreen Kuse, and Kristian Skrede Gleditsch. 2010. The Geography of the International System: The

CShapes Dataset. International Interactions 36 (1). *Available at* http://nils.weidmann.ws/projects/cshapes.html

Distance to the national border: The geodesic distance to the nearest national border from the centroid of each pixel. Constructed using the border from the digital chart of the world projection *Available at* https://worldmap.harvard.edu/data

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