Stanford | King Center on Global Development

Colonial Origins and Fertility: Can the Market Overcome History?

David Canning

Marie Christelle Mabeu

Roland Pongou

March, 2022

Working Paper No. 2014

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

David Canning
Harvard University

Marie Christelle Mabeu
Stanford University

Roland Pongou
University of Ottawa

March, 2022

Abstract

Can market incentives overcome 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 the British-French colonial borders, we find that women in former British areas are more likely to delay sexual debut and marriage, and have fewer children. However, these effects disappear in areas with high market access, where the opportunity cost of childbearing appears to be high irrespective of colonizer identity. This heterogeneous impact of colonial origins is robust across different measures of access to international and domestic markets. Examining causal mechanisms, we collect archival data on colonial reproductive laws and policies to conduct an event-study analysis. We find that the effect of colonial origins on fertility is entirely driven by differences in the timing of colonial population policies and their lasting impact on the use of modern methods of birth control. We find little evidence that the fertility effect of British colonization operates through education or income. While British colonization is linked to higher female education, this occurs mainly in areas with higher market access while the fertility effects do not. Again, while income levels differ, the fertility gap between British and French colonies opened prior to 1980, whereas the income gap only opened after 1990. Our analysis highlights the heterogeneous nature of the colonial origins of comparative fertility behavior, and implies that economic incentives may overcome historical determinism.

Keywords: Fertility, Colonial Origins, Colonial Reproductive Laws and Policies, Market Access, Historical Determinism, Africa.

JEL Classification: I12, J13, J15, J16, O15.

*We would like to thank Kehinde Ajayi, Siwan Anderson, Victoria Barham, Augustin Bergeron, Fernando Bizzarro, Moussa Blimpo, Jacob Bor, Theophile Bougna, Abel Brodeur, Katherine Casey, Kevin Croke, Pascaline Dupas, David Evans, Marcel Fafchamps, James Fenske, Carolyn Fischer, Jocelyn Finlay, Willa Friedman, Jason Garred, Fink Günther, Remi Jedwab, Hans-Peter Kohler, Sara Lowes, Césaire Meh, Stelios Michalopoulos, Grant Miller, Nguedia Pierre Nguimkeu, Louis Putterman, Joan Ricart-Huguet, Laura Vargas, Atheendar Venkataramani, Alessandra Voena, Leonard Wantchekon, Matt Webb, David Weil, Myra Yazbeck, Wilfried Youmbi, and Albert Zeufack for useful discussions and insightful suggestions. We are also grateful for valuable comments from seminar participants at CESAG, Harvard University, Shanghai University, Stanford University, Western University, University of Ottawa, and the World Bank. We also thank participants at the 2021 BREAD Conference, 2021 Annual Meeting of the Royal Economic Society, 2021 MPSA Annual Meeting, the 2020 APSA Annual Meeting, the WGAPE 2020 Regional Meeting, the 2020 NEUDC Conference, the 2020 H2D2 Research Day, the ASSA 2020 Annual Meeting, the Fourth Annual PHS Workshop at UPenn, the 94th WEAI Annual Conference in San Francisco, the 53rd Annual Conference of the Canadian Economics Association, the 18th Canadian Health Economics Study Group Annual Meeting, the Africa Meeting of the Econometric Society in Morocco, and the University of Ottawa Brown-bag workshop. Address correspondence to: David Canning at dcanning@hsph.harvard.edu, Marie Christelle Mabeu at cmabeu@stanford.edu, and Roland Pongou at rpongou@uottawa.ca.

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)). However, the demographic transition in most sub-Saharan African countries 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 rate of 4.8 children per woman in 2016, roughly double the global average of 2.4 children per woman (The World Bank (2016)). However, this high level of fertility masks significant variation across and within African countries, as the demographic transition is much more advanced in certain parts of the continent than in others.[1] This variation has been attributed to initial differences in geographic factors, historical accidents, culture, and institutional endowments (Galor (2011)). Yet, there has been no empirical exploration of the link between historical political institutions and reproductive behavior, especially the persistence of high fertility rates in Africa. What is more, we know very little about whether policy interventions can mitigate the long-term impact of history.

In this paper, we address these important knowledge gaps by studying the causal effects of colonial origins and population policies on fertility behavior in sub-Saharan Africa. We collect new data on the timing of these policies from archives and other sources to document the nature of the mechanisms governing these effects. Central to our study is the question of whether certain policy interventions can mitigate the long-run effect of colonial history. We address this question by studying heterogeneity in the fertility effect of colonial origins by market access. We construct different measures of market access, including measures of access to the export (hence international) market and measures of access to the domestic market. Higher market access is linked to increased female labor force participation, which increases the opportunity cost of childbearing and hence should also increase the use of modern methods of birth control. If the market effect dominates the colonial effect on fertility, one should expect the latter effect to be smaller in areas with higher market access, a hypothesis that we test.

Importantly, our analysis directly addresses a concern raised in policy circles about the importance of research documenting the long-term economic impacts of historical events for policymaking. The argument usually advanced is that, since history cannot be changed, such research is unlikely to inspire the design of policies.[2] Departing from this paradigm,

[1]For example, in 2016, the fertility rate was 2.5 children per woman in South Africa, 3.2 in Lesotho, and 7.1 in Niger (The World Bank (2016)).

[2]See Banerjee and Duflo (2014) for a review of the literature contrasting the different views on the extent

our analysis implies that economic incentives can break the bonds of historical determinism. Indeed, contrasting the two major colonial powers in Africa, namely the British and the French, we document significant average effects of colonial origins on fertility behavior. However, we find that these effects completely disappear in areas with high market access, showing that exogenous access to economic opportunities is able to mitigate the long-term consequences of differential colonial legacies.

The increasing divergence in fertility rates between former British and French colonies in recent decades is evidence of the differential pace of demographic transition across African countries. These countries experienced growing fertility rates during their transitions to independence and in parts of the 1970s (see *Panel A* in Figure 1). During those years, fertility rates were slightly lower in former French colonies. However, by the end of the 1970s, the gap had reversed and fertility rates started to decrease more rapidly in former British colonies. Indeed, the fertility gap between former British and French colonies more than tripled between 1975 and 2016 (*Panel C* in Figure 1). Quite remarkably, there is a parallel between these differing trends in fertility and trends in income per capita. *Panel B* in Figure 1 shows that former French and British colonies had comparable levels of economic development during the independence years, but former British colonies experienced a radical take-off in the mid 80s and have grown much faster than former French colonies. Economic growth in former French colonies has basically stagnated since 1960. Importantly, as *Panel C* in Figure 1 shows, the reversal of the fertility gap between former British and French colonies started more than two decades before the per capita income gap became visible. This difference in timing implies that the income gap is unlikely to explain the fertility gap.[3]

In our conceptual framework, differences in fertility behavior across African countries can be *directly* linked to differences in colonial population policies. The timing of the implementation of these policies is described in Figure 2. In 1920, France adopted pronatalist laws, in part due to worries about its population size relative to those of its European rivals. These laws were subsequently extended to its colonies. The laws prohibited any propaganda on contraceptive use or directed against having children, and severely repressed abortion (Latham (2002), Garenne (2018)). While these laws were repealed in France in 1967, they remained in effect in all former French colonies in Africa until the 1980s. In the 1980s, former French colonies began to promote family planning following the adoption of the resolutions of the World Population Conference held in Bucharest in 1974. The French pronatalist laws contrasted with the more liberal culture of reproductive rights in Great Britain in this period (Oliver (1995), Caldwell and Sai (2007), Beach and Hanlon (2019)).

British colonial population policies went through several phases (Ittmann (1999, 2013)). In the 1920s, these policies were pronatalist, due to high death rates and a desire for a large native work force. However, in the 1930s the British Eugenics movement lobbied for

to which history is ultimately deterministic.

[3]We further demonstrate that the effect of colonial origins on fertility cannot logically be mediated by economic development when analyzing the micro-level mechanisms underlying this effect.

population control in the colonies, and some small scale family planning initiatives were launched, mainly in Asia and the Caribbean. A major shift occurred with World War II, due to concerns about population trends, political unrest, and economic difficulties in the British empire. Colonial policy, which historically allowed local administrators a great deal of autonomy, was centralized in the Colonial office in London, to aid the war effort. In 1941, a colonial population control policy was adopted, as a method of promoting economic development in the colonies.

In investigating how colonial origins affect fertility, we 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 on women aged 20 to 49 years old from Demographic and Health Surveys (DHS) with data on historical ethnic homelands from Murdock's Ethnographic Map of Africa and geographic data from several sources (see Section 4), 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. In addition, by only comparing observations that are close enough to the border, our strategy accounts for natural endowments, initial differences in economic development, and other hard-to-account-for unobserved geographical factors. Reassuringly, we do not find a wide range of geographical factors and natural endowments (e.g. elevation, soil suitability for agriculture, and natural resources) to vary across the colonial border.

We find that, on average, women in former British colonies have significantly fewer children than their counterparts in former French colonies. Our baseline estimates show that women in former British colonies have on average 0.3 to 0.4 fewer children than their counterparts in former French colonies. This difference represents about 8% to 11% of the average number of children per woman in the sample. In the context of fertility, this gap is large. In fact, the differential trends in fertility presented in Figure 1-*a* and Figure 1-*b* suggest that closing a gap of such magnitude might take several decades. 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). Importantly, these findings are robust to controlling for proximity to historical foreign mission stations, declared religion (Catholicism, Protestantism, Islam, other religions), and all the aforementioned geographic factors and natural endowments.[4] They are also robust to controlling for internal and cross-border migration.[5]

[4]Note that by controlling for ethnic homeland and distance to sea, our analysis controls for traditions and other pre-colonial variables such as the transatlantic slave trade (Nunn (2008)).

[5]These controls account for the fact that certain families that were close enough to the arbitrary colonial border were themselves split across countries. Because these families are likely to maintain ties with individuals living across the border and even cross the border to reside temporarily on the other side, this is likely to attenuate the fertility effect of British colonization owing to these individuals being exposed to both British and French colonial legacies. We address this issue by estimating the effect of colonial origins on two additional subsamples–the sample of natives and the sample of natives living beyond 5km from the

Analyzing the mechanism through which colonial origins affect fertility, we show that this effect is *directly* linked to differences in the timing of colonial population policies and their subsequent impact on the use of modern methods of birth control. We collect data on these policies from archival resources and the literature, and perform two tests to identify the importance of this primary channel. In the first test, we exploit the timing of colonial population policies (as described in Figure 2) to examine how the British-French fertility gap evolved following the introduction of family planning policies in former colonies. Using an event-study approach, we find that the fertility gap between anglophone and francophone women is entirely driven by the cohorts of women who were exposed to family planning policies in former British colonies. In fact, there is no statistically significant difference in fertility among women whose reproductive lifespan began prior to the introduction of these policies. Following the introduction of family planning policies in former British colonies, the British-French fertility gap appeared and increased significantly. However, this gap gradually decreased and almost disappeared for cohorts whose reproductive lifespan began after former French colonies adopted the resolutions of the World Population Conference held in Bucharest in 1974 and began promoting family planning policies in the 1980s. These findings are also confirmed in a setting that combines RDD and difference-in-differences to evaluate the effects of these policies on the British-French fertility gap.

Central to our study is the analysis of how colonial origins interact with market access to shape fertility behavior. We show 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.[6] As a preliminary to our heterogeneity analysis, we show that women in areas with greater market access have higher labor participation today, implying a greater opportunity cost of childbearing. We next test the hypothesis that the market effect dominates the colonial effect on fertility. Indeed, analyzing the heterogeneous effect of colonial origins on reproductive outcomes by market access, we find that British colonization has little effect on these outcomes 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 fertility effect of colonial origins does not persist when the opportunity cost of having a child is sufficiently high. From a policy perspective, our analysis suggests that even if history is immutable, its long-term effects can be modified through appropriately designed policy

British-French border. Because natives never lived elsewhere than their place of birth, they have been only influenced by the culture of their ancestral ethnic homeland. A previous version of this paper (Canning et al. (2020)) replicates most of the analyses in the current version on these two subsamples and finds them to be robust; some results are removed from the current draft for expositional purposes.

[6] We make use of five different measures: (a) proximity to the sea coast; (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. It follows that the first three measures mainly reflect access to export (and international) markets, whereas the last two measures reflect access to domestic markets.

interventions that generate economic opportunities for women.

After establishing that colonial origins have a lasting effect on fertility behavior but that this effect completely disappears in areas with high market access, we turn to the task of distinguishing between channels of causality. As stated earlier, one mechanism, which is the paper's primary focus, is that the British-French fertility gap can be *directly* linked to differences in the timing of colonial population policies and their subsequent impact on the use of modern methods of birth control. Indeed, we find that British colonization has a positive and significant effect on the use of modern methods of birth control, but this effect is less pronounced in areas with higher market access. This is the only mechanism that we find to be consistent with the heterogeneous effect of British colonization on fertility. Indeed, our analysis shows that the market effect overcomes the fertility effect of colonial origins by increasing the use of birth control methods both in former British and French colonies.

We rule out alternative channels. Our conceptual framework presented in Appendix Section A1.1 and summarized in Appendix Figure B1 acknowledges a possible *indirect* role of colonial rules in shaping fertility, through its effects on the *distal* determinants of fertility. 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 three distal determinants of fertility: (a) female education; (b) female economic empowerment (income and labor participation); and (c) child quality (measured by child survival). We show that British colonization has a positive *average* effect on each of these variables, which is consistent with its negative *average* effect on fertility. However, the analysis of the *heterogeneous* effect of British colonization by market access shows that British colonization has a larger effect on female education in areas with high market access, in contrast to its heterogeneous effect on fertility. As a result, education is less likely to be the primary channel through which colonial origins operate. We also find that the effect of British colonization on female economic empowerment does not explain its effect on fertility behavior in areas with low market access for three reasons. First, British colonization negatively affects labor market participation in areas with low market access, which cannot explain its negative fertility effect given that labor participation negatively affects fertility. Second, the fertility gap between former British and French colonies preceded the income gap as previously mentioned (Figure 1-*c*). Third, the effect of colonial origins on fertility in areas with low market access persists even after controlling for household income (and/or female education). Finally, we find that the effect of colonial origins on under-five mortality is weak and inconsistent, which does not support the child replacement theory as an explanation. Overall, the findings are more supportive of the direct mechanism that operates through colonial reproductive laws and their lasting impact on the use of modern methods of birth control as an explanation for the average and heterogeneous effects of British colonization on fertility.

2 Contributions to the Literature.

We make four contributions to the literature. First, our paper asks a new question. It explores the broad and important question of whether economic policies can mitigate the long-term impact of history, even though history itself is immutable. We focus on colonial reproductive laws and policies as a historical fact, but it is evident that this question is generalizable to other historical facts such as the slave trades, colonial property rights institutions, and so on. Our main finding that market incentives can mitigate the long-term impact of colonial population policies implies that appropriately designed economic policies may be able to overcome the bonds of historical determinism. As a result, this finding can also be viewed as a contribution to the recurrent and often uneasy debate over the range of policy actions that can be undertaken to repair the damages of bad historical shocks.

Second, our work nurtures the current debate on variation in the pace of demographic transition in Africa (see Bongaarts and Casterline (2013) 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, and that these factors matter primarily in areas with low market access.

Third, we focus on colonial reproductive laws and policies, a feature of colonial institutions that has received little attention in the literature. Indeed, colonialism as a determinant of present-day social and economic outcomes has generally 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 the timing of colonial population policies 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 Africa. In fact, we do not find that the fertility effect of colonial origins is driven by economic development or even by education. 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 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); see also Michalopoulos and Papaioannou (2020) and Nunn (2020) for a comprehensive literature review). However, our paper distinguishes itself from this literature in that we answer a completely different question. Indeed, it is quite surprising that the link between colonial population policies and comparative economic development has not been documented so far, as economic development was the most important reason for Britain introducing family planning programs in its colonies (Ittmann (1999, 2013)). In documenting this relationship, our analysis is also the first to highlight the heterogeneous nature of the colonial origins of comparative fertility behavior in Africa, a finding that has significant policy relevance.

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 analyze heterogeneity in the effect of colonial railroads, finding that its effect is only present in areas with low pre-railway access to the coast. 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 clearly differs from the aforementioned studies in its scope, analysis, and policy implications.

The rest of this paper unfolds as follows. In Section 3, we begin our analysis by first laying out the historical and conceptual groundwork. Section 4 discusses the data. Section 5 presents our empirical strategy. Section 6 and Section 7 present the average effect of colonial origins on fertility and highlight the key role of the timing of colonial population policies and laws. Section 8 presents the analysis of the heterogeneous effect of colonial origins on fertility. Section 9 distinguishes between channels of causality. Section 10 concludes.

3 Historical Background: Colonial Population Policies and Reproductive Laws in Africa

We argue that differences in fertility behavior across African countries can be *directly* linked to differences in colonial population policies. Following World War I and World War II, Great Britain and France adopted very different population policies, which translated into different cultures around the use of modern birth control methods. These population policies were extended to the British and French colonies. Figure 2 provides a timeline of these policies in colonial Africa.

On July 31, 1920 France adopted a pronatalist population policy in order to raise fertility rates and allow the country to regain the numerical superiority that it had in the centuries before the demographic deficit caused by World War I. The French law known as "Loi de 1920" (see Appendix Figure B2) was designed to severely repress abortion and to prohibit the sale of contraceptives and anti-conception propagandas (Latham (2002), Garenne (2018)).[7]

[7]The pronatalist law of 1920 was reinforced by a law called the *"Code de la Famille"* introduced by the French government in July 30, 1939. This law 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.

As part of French civil law, the application of the 1920 pronatalist law was extended to the French colonies. Despite subsequent amendments to the 1920 law and its repeal on December 28, 1967 in the metropole (*"Loi Neuwirth"*)[8], with great liberalization of reproductive health laws, this pronatalist law remained in application in all former French colonies in Africa after their independence. In fact, in most francophone African countries, it was not until the early 1980s that the pronatalist law of 1920 was repealed, and reforms authorizing information and awareness campaigns on family planning were gradually introduced (see Garenne (2018)).

France's pronatalist laws contrasted with the liberal culture of reproductive rights in Great Britain. The influence of Malthusianism, alongside the emergence of a national conversation about family planning following the famous *Bradlaugh-Besant* trial that took place in England in 1877, democratized ideas of birth control in England and in societies with strong cultural ties to Great Britain. The *Bradlaugh-Besant* trial, named after two secular activists, Annie Besant and Charles Bradlaught, who were prosecuted for publishing a book providing elementary contraceptive information (see Appendix Figure B2), brought substantial attention to a subject highly controversial in Victorian Society. The central debate during this trial focused on the contemporary widespread argument that family size should be an optimal conscious choice. Despite the guilty verdict, the publicity surrounding the trial, inside and outside England, radically increased the demand for information about contraception. Following the trial, the sales of books and pamphlets on family planning and contraception increased, and England experienced a sharp decline in fertility. Beach and Hanlon (2019) demonstrate that the changing societal norms about family planning and contraception induced by this trial partly explained this sharp decline in fertility. Moreover, they show that the consequence of this trial also resonated in countries with strong cultural ties with England. In particular they associate the fertility decline in South Africa and English Canada (two former British colonies) to the shift in societal norms surrounding family planning.

In reality, Historians show that British colonial population policies went through several phases (Ittmann (1999, 2013)). 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. However, 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 move-

[8] The Neuwirth Law is a French law which lifted the ban on birth control methods on December 28, 1967, including oral contraception

> ment. 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. (Ittmann, 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. (Ittmann, 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 1941, a colonial population control policy was adopted, as a method of promoting economic development in the British colonial empire (Ittmann (1999, 2013)).[9] Ittmann (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. (Ittmann, 1999, p. 55)

Population control was also promoted to address other perceived threats of population growth in the colonies. For example, it was argued that population growth among Africans

[9] 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 B3). See also paragraphs 10 and 11 in the conclusion and recommendations of West Indies Royal Commission Report 1945 (Appendix Figure B4). 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. Paragraph 10 of this document presents the economic difficulties facing West Indies, and paragraph 11 recommends birth control and changing public opinion on this as a solution to these problems.

would not only increase political discontent, but it would also alter the racial composition of colonies in favor of the natives. As reported by Ittmann (1999), in a letter addressed to Olivier Stanley in 1943, the secretary of state for the colonies, Julian Huxley, an English evolutionary biologist, eugenicist and proponent of natural selection, wrote that "the population (of Africa) will start shooting up just when all the white people (except the USSR) will be starting to go down." These concerns led to the promotion of family planning and migration as ways to control native populations. In East Africa, white settlers even requested that birth control be encouraged among Africans (Ittmann (1999)).

Despite the adoption of a colonial population control policy by the Colonial Office in London during World War II, family planning programs were not instituted in the British colonies in Africa up until the late 1950s. Among African countries, 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)).

During this period, as already mentioned, former French colonies were still under the 1920 pronatalist law. It was not until the World Population Conference held in Bucharest in 1974 that attitudes toward family planning began to change in these countries. This conference was a turning point essentially because it reunited representatives of 139 member states who drafted the "World Population Plan of Action", in which principles and directives for population policy and action were formulated. Beginning in 1980, several former French colonies revoked the 1920 law, and by 1990 almost all of these former colonies had revoked it. This policy changed again at the World Population Conference held in Cairo in 1994 which saw a turn away from population control policies, particularly from coercive policies, and the emergence of a rights-based approach to family planning. However, at this point, modern methods of birth control had already been introduced in these countries.

It follows that former British colonies introduced family planning policies much earlier than former French colonies (Garenne (2018), Sala-Diakanda (1991)). However, 1980 marks the beginning of population policy convergence across these countries. This policy convergence does not necessarily imply that 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, studies have found that even at present, former French colonies have more restrictive reproductive health laws in terms of access to family planning and abortion than former British colonies (Finlay and Erin (2017)). Exploiting an index of changes in reproductive health laws in sub-Saharan Africa (see Finlay et al. (2012)), 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.

4 Data and Descriptive Statistics

For our analysis, we matched individual-level information on reproductive behavior from Demographic and Health Surveys with georeferenced data on historical ethnic homelands and geographic data from Africa. We also collected information on the timing of colonial population policies from archival resources and the literature. In this section, we describe the main datasets we analyze and how we match them.

4.1 Individual-level Data

Information on reproductive behavior, social, economic, and demographic characteristics is drawn from Demographic and Health Surveys (DHS). These surveys are conducted every five years since 1986 in most African countries. In each DHS[10], a nationally representative sample of women aged 15 to 49 years old and men aged 15 to 59 years old is selected. Each survey gathers detailed information on a host of demographic, health, and socio-economic characteristics of interviewed women and men. In this paper, we only consider DHS that also collect the geographical coordinates of the centroids of each survey clusters defined by enumeration areas from a country's most recent census (DHS (2012)).

We match each country in the DHS data with information about the identity of the colonizer who administered the country the longest during the colonial era, and we focus our analysis on DHS collected in sub-Saharan African countries colonized by either Great Britain or France. To implement our identification strategy (described in Section 5 below), we further restrict our analysis to the set of former British (or French) colonies that share a border with a former French (or British) colony. Additionally, to account for full exposure to the risk of early marriage (one of our outcomes of interest) and for internal and cross-border migration, our analysis focuses on women aged 20-49 years old and women whose migration status is known.[11] These restrictions leave us with a sample of $38,297$ women living in 10 countries, among which 7 countries are former French colonies and 3 countries are former British colonies.[12] Appendix Table B1 provides summary statistics for the main outcomes of interest as well as for selected individual socioeconomic and demographic variables used in the empirical analysis. The average woman in our sample is 31 years old and the mean number of children per woman in the sample is 4, which is similar to the regional average.

[10]Information collected through DHS is generally recorded at different levels. The analysis in this paper relies mainly on the Individual Recode (IR) files, the Household member Recode (PR) files, and the Birth Recode (BR) files.

[11]Including women whose migration status is not known does not change our results.

[12]Former French colonies are: Benin, Burkina Faso, Cameroon, Ivory Coast, Guinea, Niger, and Togo. Former British colonies are: Ghana, Nigeria, and Sierra Leone. In a robustness analysis, we exclude Cameroon and Togo, whose first colonizer was Germany; this does not affect our main results.

Among the 74% of the women in the sample declaring that they are currently working, more than half are either low-skilled workers or agricultural workers.[13]

4.2 Historical Variables

To effectively circumscribe the causal impact of British (vs French) colonization on fertility behavior, we control for ethnic homeland fixed effects in our empirical strategy. Ethnic homeland fixed effects ensure that our estimated effect is not biased by ethnic-specific characteristics such as culture or norms surrounding gender and fertility. Additionally, it is possible that former British and French colonies have different pre-colonial characteristics that also determine reproductive behavior. By controlling for ethnic homeland fixed effects, we also partially address this potential source of endogeneity. Religion is also likely to determine fertility outcomes. This is particularly true in our analysis given the fact that Protestant missions were more likely to be present in British colonies whereas French colonies had more Catholic missions (Nunn et al. (2014)). Controlling for religion is even more important because Islam, which predates European missionary activities in Africa, is more present in certain countries than in others. We address this issue by controlling for contemporary religious affiliation (DHS collects data on the religion reported by each respondent). We further account for religion by controlling 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.[14]

We collect data on the location coordinates of historical ethnic homelands by relying on George Peter Murdock's Ethnographic Map of Africa (1959). This 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 on Murdock's map to identify historical ethnic homelands that are split across former colonies in Africa (see Figure 3-*a*). In Figure 3-*b*, we focus on the subset of ethnic homelands divided by a British-French colonial border. As an illustration, Figure 3-*c* looks closely on the historical ethnic homeland of the Ewe group divided between former French Togo and former British Ghana. Using geo-referenced data from the DHS, we associated each DHS cluster (and thus individuals in this DHS cluster) with the corresponding ethnic-country area.

[13]DHS collects information on the type of occupation of each respondent. Using this variable we define 3 categories of workers. The first category is *skilled workers*, which includes professional, technical, managerial, clerical and sales activities. The second category is *low-skilled workers*, which includes household and domestic activities, services, skilled manual, and unskilled manual. The third category is *agricultural worker*, which is the type of occupation that includes self-employed individuals and employees in the agricultural sector.

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

4.3 Geographic Variables

To account for geographic variation across the British-French border, we augment our data with geographic information measured at a very fine level. Following Michalopoulos and Papaioannou (2013), we divide Africa into pixel units of $12\text{km} \times 12\text{km}$. For each pixel, we rely on various sources (see Section A2) to collect information on the following measures of geographic and natural endowments: elevation, soil suitability for agriculture, area under water (rivers, lakes, streams), natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border. In addition, To implement our empirical strategy, we define the RD running variable as the nearest distance from the centroid of a pixel to the British-French border. In Section 5, we show that these geographic variables do not vary across the British-French border, which is reassuring as it implies that within each ethnic homeland, 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 precolonial era. Nevertheless, we also show regression results that control for these variables. Importantly, controlling for these 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)).

4.4 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) 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.[15] With data on travel time and urban population, we compute our network-based measures of accessibility as described in Section 8.

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

5 Identification Strategy: Regression Discontinuity Design

We estimate the causal effect of colonial origins on reproductive outcomes using a spatial Regression Discontinuity Design (RDD) with ethnic homeland fixed effects. A central feature of this identification strategy is to exploit within-ethnic homeland variation across individuals residing close to the British-French border. Our baseline strategy consists of applying this methodology to the whole sample of women described in the data section. However, this strategy is likely to suffer from internal and cross-border migration, leading to an attenuation bias. We address this concern using a second strategy that consists of restricting the analysis either to natives or to natives that live at least 5km to the border on each side. In this section, we describe these two empirical strategies before discussing the validity of our RDD design.

5.1 Baseline Strategy

Our baseline strategy is expressed as follows:

$$Y_{ipcet} = \alpha + \beta \mathsf{British}_c + f(BD_{pce}) + \delta_e + \gamma_t + \sigma_a + \theta_r + Z'_{pce}\mu + \varepsilon_{ipcet} \quad (1)$$

Where Y_{ipcet} is the outcome of interest for an individual i born at time t, living in country c, ethnic homeland e, and pixel p. The variable $\mathsf{British}_c$ is equal to one if the country was colonized by Great Britain and zero if it was colonized by France. Our coefficient of interest here is β. This coefficient gives the local average effect of British colonization on the outcome of interest. δ_e, γ_t, σ_a, and θ_r are ethnic homeland fixed effects, year of birth fixed effects, age fixed effects, and religion fixed effects, respectively. Z'_{pce} is a vector of location controls (distance from the centroid of a pixel p to the sea coast and distance from the centroid of a pixel p to the nearest national border) and geographic controls (area under water, elevation, soil suitability for agriculture, pixel area, and natural resources), all measured at the pixel level.

Lastly, the function $f(BD_{pce})$ represents a second-order RD polynomial of the distance from the centroid of each pixel to the British-French border. Yet, for robustness checks and to account for the multidimensional nature of the cut-off in a spatial RDD, we show that our results are robust to alternative specifications including RD analysis without RD polynomial, with linear and third-order RD polynomial and with a cubic polynomial in latitude and longitude of a pixel (see for instance Dell (2010)).

For inference purposes, we follow the method of Cameron et al. (2011) and cluster standard errors along both the country and ethnic-family dimensions.[16] As pointed by Cameron et al. (2011), the double-clustering enables us to account for spatial correlation and other

[16] Murdock (1959) identifies more that 800 pre-colonial ethnic groups across Africa and assigns them into 96 ethnolinguistic families.

arbitrary correlations within each dimension.

We exploit the empirical specification in equation (1) to estimate the average effect of British (vs. French) colonization on reproductive behavior (see results in Section 6). In addition, in Section 8 we build on the same specification to estimate the heterogeneous impact of British colonization by market access.

We also address potential issues related to internal and cross-border migration that could bias estimates from our baseline identification strategy. First, if areas close to the border attract individuals from other regions of the country and from different cultural backgrounds, then 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, one would expect norms around fertility to converge across border communities. As such, our estimates are likely downward biased. We address these issues using the subsample of natives[17] and the subsample of natives excluding individuals in pixels falling within 5km of each side of the British-French border. This latter approach is similar to an RDD estimation where we assume that the British-French border that divides the ethnic homeland is thick by 10km.[18] As we will see later, these sample restrictions result in our RDD estimates becoming somewhat stronger.

5.2 Validity of the Identification Strategy

There are many challenges associated with spatial RDD. In our setup that compares individuals' reproductive behavior within the homeland of the same ethnicity in adjacent countries with different colonial origins, the validity of the identification strategy requires that observations are close-to-randomly assigned into treatment and control groups across the border. That is, the border between former British and French colonies within the homeland of the same ethnicity should not be influenced by local circumstances such as existing political or institutional factors that themselves are potentially important determinants of reproductive behavior. Historians and social scientists concerned with the European expansion and colonization in Africa provide ample evidence of the randomness of African borders. They argue that at the time of the "Scramble for Africa" in the 1880s, Europeans had, in most cases, drawn the African borders without or with extremely limited knowledge of local conditions (see for instance Michalopoulos and Papaioannou (2015, 2013) for a review of historical arguments supporting the arbitrary drawing of African borders). The incidental nature of this historical event ensures that the border between countries with different colonial origins is locally random.

A direct implication of the randomness of African borders is that the relevant determinants of the outcome of interest, besides the treatment, should vary smoothly at the border.

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

[18] Michalopoulos and Papaioannou (2013) follow a similar approach in a study of the role of pre-colonial ethnic institutions on contemporary African development.

In our setting, this implies that ethnic areas across the border should be similar across all relevant factors of reproductive behavior, with the exception of the identity of the colonizer. We assess the plausibility of this assumption by examining the relationship between colonial origins and a set of observable characteristics that may independently affect reproductive behavior. Using an RDD approach similar to our main specification in equation (1), we estimate the effect of British colonization on various geographic, ecological, and natural resource variables that are likely to shape reproductive outcomes. Results are displayed in Table 1. We find no effect of British colonization on these outcomes. Since these outcome variables are also important determinants of initial economic development, our results also imply that, within ethnic homelands, areas colonized by the British were similar to those colonized by the French in terms of precolonial economic development.

6 Average Effect of Colonial Origins

We now examine empirically the causal relationship between colonial origins and reproductive outcomes by exploiting variation within ethnic groups partitioned between former British and French colonies. Before turning to the main empirical findings, we first provide a graphical illustration of the RD estimates of the British effect on fertility and other reproductive outcomes.

6.1 Graphical Illustration

Figure 4-*a* provides a visual illustration of the RD design, where the running variable is defined as the geodesic distance (in kilometers) from the centroid of each pixel to the nearest British-French border. The vertical line on this graph marks the British-French border (the cut-off at zero). The graph plots, for individuals within $2km$ bins, the average value of the outcome of interest (the number of children ever born), conditional on the colonial origin. The two-dimensional curve overlaid on each scatter plot shows the predicted outcome for a regression that includes a linear polynomial in the running variable, fitted separately using raw data from former British colonies (where distance takes on positive values) and raw data from former French colonies (where distance takes on negative values). Following our preferred empirical identification strategy, which accounts for internal and cross-border migration, we plot the RD graphs using the sample of natives. Figure 4-*a* shows that at the border, women in former British colonies have fewer children than their counterparts in former French colonies. We observe a similar pattern when we draw the RD graphs using the whole sample, that is the sample with both natives and non-natives (see Appendix Figure B5-*a*).

6.2 RDD Effects on Fertility

6.2.1 Baseline Results

The baseline estimates of the effect of British colonization on fertility, which is measured by the number of children ever born, are presented in *Panels A* and *B* of Table 2. In each column of this Table, we control for ethnic homeland fixed effects, age fixed effects, year of birth fixed effects, and religion fixed effects. Below the estimates, we report robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level. We begin by reporting in the first column within-ethnicity Ordinary Least Squares (OLS) estimates which account for idiosyncratic country- and ethnicity-specific characteristics that are likely to confound the results. The OLS estimates of the British effect on fertility is negative and statistically significant. Specifically, we find that females in former British colonies have on average 0.44 fewer children. To account for unobserved factors including geographic and ecological factors, we implement the RDD regression described above. Specifically, using a data-driven optimal bandwidth (following the approach by Calonico et al. (2015)) of 60km, we restrict our sample to pixels within 60km from each side of the British-French border and we estimate equation (1) controlling for a second-order RD polynomial in distance from the centroid of each pixel to the nearest British-French border. The RD estimates using the optimal bandwidth are displayed in column (2) of Table 2. Consistent with the OLS estimates, we find that women in former British colonies have significantly fewer children than their counterparts in former French colonies. As we can see in columns (3)-(5), increasing the bandwidth to 100km, 150km, or 200km does not affect the results. Overall, the fertility effect of British colonization is not only significant, but it is also economically meaningful. The British effect on fertility ranges from -0.33 to -0.44, representing a decline in fertility of about 8% to 11% of the average number of children per woman in the sample.

The fertility effect of British colonization barely changes when we augment the specification with a rich set of geographic and location controls including measures of area under water, elevation, soil suitability for agriculture, area of the pixel, natural resources, and distance to the national border (see *Panel B*). The coefficient on British colonization remains negative and statistically significant in all specifications. Moreover, the size of each coefficient is similar to the estimates obtained when we do not add controls for geographical factors, which reflect the fact that there is no discontinuity in these factors at the border.

6.2.2 Robustness Checks

We conduct several robustness checks. First, we address potential bias in the baseline estimates that could result from internal and cross-border migration. We do this by estimating equation 1 on the subsample of natives and the subsample of natives living at least 5km away from the border. The estimates using the sample of natives are displayed in *Panels C* of Table 2. As we see in column (2), in areas within 60km of the British-French border, the fertility effect of British colonization is negative (-0.39) and statistically significant. The size of the effect increases (up to -0.52) and retains its statistical significance as we increase the bandwidth to include areas beyond 60km. We find qualitatively similar results when we add geographic controls in the analysis (see *Panels D* of Table 2). In addition, 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 natives living at least 5km away from the border. The results from this latter specification are shown in *Panels A* and *B* of Appendix Table B2. The British effect in all specifications is larger (oscillating between -0.47 and -0.60) and significant at the conventional level. Overall, compared with the baseline results in *Panels A* and *B* of Table 2, the negative effects of British colonization on fertility reported while controlling for internal and cross-border migration are quantitatively larger.

Second, following the literature, we investigate the sensitivity of our results to alternative specifications including RD analysis without RD polynomial, with linear and higher-order RD polynomial and with semiparametric polynomial (see, for instance, Dell (2010)). Results are reported in columns (1) to (4) of Appendix Table B3. Our results are robust to these alternative specifications. The negative effect of British colonization on fertility remains globally intact (see *Panel A* of Appendix Table B3). Additionally, in column (3) of Appendix Table B3, we show that our results are robust to a specification that excludes Cameroon and Togo whose first colonizer was Germany.[19]

Third, we also show that our results are not driven by exposure to historical foreign mission stations. In column (4) of Appendix Table B3, we add a control for the geodesic distance from the centroid of each pixel to the closest Catholic or Protestant mission station. We can see that the results remain the same. Indeed, controlling for historical missionary activity has little effect on the estimated impact of British colonization because missionary activity is highly correlated with contemporary religious affiliation and distance to sea in our dataset. Our analysis already controls for these two latter variables. It is also important to note that the fact that we control for ethnic homeland and distance to sea largely accounts for pre-colonial events such as the transatlantic slave trade (Nunn (2008)). In the next section, we find that the effects of colonial origins on other reproductive outcomes are robust to these controls.

Lastly, we examine whether lower fertility in former British colonies is driven by higher maternal mortality in these countries. 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 sibling survival history incorporated into DHS surveys.[20] In the DHS Sibling Survival Module, the respondent is asked about the age and

[19]In analyses not reported here, we find similar results when we exclude Cameroon and Togo separately.

[20]Sibling history data have been shown to be a reliable source of information on maternal mortality (see

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 zero if the respondent reported that his sister's death is not related to pregnancy. Using the aforementioned indicator as the dependent variable in equation 1, we estimate the effect of British colonization on maternal mortality. Results are displayed in Appendix Table B4. Overall, the difference in maternal mortality across women in former British colonies and former French colonies is close to zero and is not significant. We conclude that selection bias resulting from maternal mortality is unlikely to drive the fertility effect of British colonization.

6.3 RDD Effects on Other Reproductive Outcomes

In this section, we report the analysis of the effect of British colonization on other reproductive outcomes. These outcomes include the likelihood of childbearing, the timing of becoming sexually active, and the likelihood of early marriage (that is marriage before 18 years old). Results from this analysis are presented in Table 3. Each panel of this Table reports results from estimating our baseline equation (1), where $\mathsf{Y}_{\mathtt{icept}}$ is: (1) the probability that a randomly selected woman has had her first child before age 18 (*Panels A*; (2) a woman's age at first sexual intercourse (*Panel B*); and (3) the probability to marry before age 18 (*Panel C*). In each column of Table 3, we control for the same set of variables as in Table 2 in addition to controlling for geographic and location variables.

Analyzing the RDD results in columns (2)-(5) of Table 3, we find that on average, women in former British colonies are significantly less likely to have their first child before age 18 compared to their counterparts in former French colonies (*Panel A*). In *Panel B* of Table 3, we focus on the British impact on the timing of first sexual intercourse. This impact is positive and statistically significant at the conventional level. The results show that women in former British areas are more likely to delay initiation of sexual activity compared to women in former French areas. Turning to the impact of British colonization on marriage timing, we find that the risk of child marriage (that is marriage before age 18) is significantly lower for females in former British colonies relative to their counterparts in former French colonies (see *Panel C* in Table 3). These findings are consistent across specifications that use different bandwidths.[21]. Additionally, these results are robust to controlling for a higher-order RD polynomial and an RD polynomial in latitude and longitude of the pixel (see *Panels*

for instance Merdad et al. (2013) and Weitzman (2017)).

[21]In results not shown here, we also find similar effects when controlling for internal and cross-border migration.

B-D in Appendix Table B3). We also find similar results when excluding Cameroon and Togo (see column (3) in Appendix Table B3), and when controlling for historical Catholic and Protestant mission stations (see column (4) in Appendix Table B3).

7 Timing of Colonial Population Policies and Fertility

Our primary mechanism hypothesizes that the fertility effect of colonial origins can be directly linked to colonial reproductive laws and their impact on the introduction of family planning policies in former African colonies. As described in Section 3, former British colonies in Africa introduced family planning policies much earlier than former French colonies. Using the historical timeline of the introduction of family planning policies in former African colonies (see Figure 2), we undertake three different exercises to show evidence that the British-French fertility gap in Africa is entirely driven by differences in colonial population policies. Specifically, we examine how the British-French fertility gap evolved following the introduction of family planning policies in former African colonies.

The first evidence is summarized in the non-parametric analysis in Figure 5.[22] This Figure shows a cohort analysis of the British-French difference in fertility level. The orange line on this graph represents the average British-French fertility gap for each cohort of women born between 1939 and 2001. Assuming that 12 years old is the minimum age at menarche (Garenne (2020), Leone and Brown (2020)). [23], we consider women aged 12 or younger following the introduction of family planning policies as treated or fully exposed to these policies.[24] Therefore, we assume that cohorts of Anglophone women born in 1945 or after (that is, women aged 12 years old or younger in 1957) are fully exposed to family planning policies introduced in former British colonies starting in 1957; and cohorts of Francophone women born in 1968 or after (that is, women aged 12 years old or younger in 1980) are fully exposed to family planning policies implemented starting in 1980 in former French colonies. Figure 5 closely tracts differences in the timing of colonial population policies. As we can see from this Figure, the British-French fertility difference is close to zero for cohorts of women born before 1945. For cohorts of women born after 1968, the gap gradually decreases to stabilize at zero. Strikingly, the British-French difference is the largest for cohorts of women born between 1945 and 1968. This pattern is consistent with the fact that anglophone women born in 1945 or after were exposed to population control policies while their counterparts in French colonies, especially those born between 1945 and 1968, were not.

In our second approach, we implement an event-study cohort analysis to document causation. 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 implementation of

[22] The parametric analysis using an RDD-DiD strategy is described below and summarized in Figure 6.

[23] This is also consistent with the fact that the minimum age at first birth for women in our sample is 12.

[24] In results not shown, we assume the onset of a woman's reproductive lifespan to vary between 12 and 15 years old, and our results change little.

family planning policies in former African colonies. In particular, we estimate the following specification:

$$Y_{ipcet} = \lambda_0 + \lambda_1 \text{British}_c + \sum_{t=-6}^{34} \lambda_{2(t+1)} P_{(t+1)} + \sum_{t=-6}^{34} \lambda_{3(t+1)} P_{(t+1)} \times \text{British}_c + \varepsilon_{ipcet} \tag{5}$$

Where $P_{(t+1)}$ are dummy variables for the $t+1$ years before the introduction of family planning policies, in former British colonies, in 1945 for negative values and the $t+1$ years after 1945 for positive values. Cohorts of women born between 1939 and 1945 serve as the reference cohorts. For example, the estimated coefficients on the $P_{(3)}$ dummy interacted with the British dummy should therefore be interpreted as the British-French fertility gap for the cohort of women born 3 years after 1945 (women aged 9 years old in 1957) as compared to the cohort of women born at least 7 years before 1945. Results from estimating equation (5) are represented in Figure 6. We find no statistically significant difference in fertility among women whose reproductive lifespan began prior to the introduction of these policies. Following the introduction of family planning policies in former British colonies, the fertility gap appeared and increased significantly. However, this gap gradually decreased and almost disappeared for cohorts whose reproductive lifespan began after the former French colonies adopted the resolutions of the 1974 World Population Conference and began to promote family planning policies in the 1980s.

Third, we supplement the evidence above with results from a regression-based analysis where we use an RDD design combined with a difference-in-differences to estimate the change in the British-French fertility following the introduction of family planning policies. We estimate the following equation:

$$\begin{aligned} Y_{ipcet} &= \alpha_0 + \alpha_1 \text{British}_c + \alpha_2 \text{Cohort}_{it} + \alpha_3 \text{dist}_{it} + \alpha_4 \text{British}_c \times \text{Cohort}_t \\ &+ \alpha_5 \text{British}_c \times \text{dist}_{it} + \alpha_6 \text{British}_c \times \text{Cohort}_t \times \text{dist}_{it} + \delta_e + \gamma_t + \sigma_a + \theta_r + Z'_{pce}\mu + \varepsilon_{ipcet} \end{aligned} \tag{6}$$

where Y_{ipcet} refers to the outcome of interest. British_c is a dummy variable indicating whether the respondent is living in a country colonized by France or Great Britain. Cohort_t is the treatment variable that takes value 1 for cohorts exposed to the policy and zero otherwise. Cohorts exposed to the policy are represented by all women aged 12 years old or younger at the time of the introduction of the family planning policy. dist_{it} denotes an individual's date of birth relative to the cutoff date which is the date of the introduction of family planning policies. The coefficient of interest is α_4. It indicates how the British-French fertility gap changes following the introduction of family planning policies. As stated earlier, family planning policies were first introduced in former British colonies in 1957 while these policies were first introduced in former French colonies in 1980. Based on this timing, we assess the fertility effect of these different policies in two different specifications. In the first specification, we estimate the fertility effect of the introduction of family planning policies in former British colonies in 1957. In the second specification, we estimate the fertility effect of the subsequent adoption of family planning policies by former French colonies in 1980.

In the analysis examining the fertility effect of family planning policies introduced in former British colonies, the treatment group is the cohorts of women born in 1945 or after. We evaluate this effect using equation (6). Results are reported in *Panel A* of Table 4. The effects are estimated over the whole sample (columns (1) and (2)) and when restricting the sample to women born within 10 years before or after 1945[25] (columns (3) and (4)). In columns (1) and (3), we control for a set of fixed effects including ethnic homeland, age, year of birth, and religion fixed effects. In addition, we control for the difference between the year of birth of the respondent and the treatment cut-off and its interaction with the British dummy. In columns (2) and (4), we add a set of geographic and location controls. We see that the coefficient on the interaction term between the treated cohorts (cohorts born in 1945 or after) and the British dummy is negative and statistically significant. This implies that the introduction of family planning policies in former British colonies translated into fewer children for anglophone African women exposed to these policies relative to their francophone counterparts. We find similar results when we restrict the sample to women born within 10 years before or after the treatment cut-off (see columns (3) and (4)).

In a second analysis we examine the effect of the subsequent adoption of family planning policies by former French colonies in the early 1980s. In this second exercise the treatment group is the cohort of women born in 1968 or after. We estimate equation (6) and report results in *Panel B* of Table 4. As for the analysis in *Panel A*, the effects are estimated over the whole sample (columns (1) and (2)) and when restricting the sample to women born within 10 years before or after the treatment cut-off (columns (3) and (4)). The controls are the same as those in *Panel A*, except that the difference between the year of birth and the cohort cut-off is now defined with respect to the new treatment cut-off which is the year 1968. We find that the coefficient on the interaction term is small and statistically insignificant for all the specifications. This result means that the fertility difference between anglophone and francophone women that we found previously disappears as soon as Francophone women are exposed to family planning policies. These results are consistent with the findings in Figures 5 and 6.

[25] The year 1945 is cut-off defining exposition to the policy.

8 Heterogeneous Effects of Colonial Origins by Market Access

The findings uncovered so far demonstrate that deep-rooted political institutions have persistent effects on fertility and other reproductive outcomes. However, the extent to which such institutions interact with exogenous economic forces to determine outcomes has not been widely studied. In this section, we address this knowledge gap by studying how the effect of British colonization varies 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 is likely to attenuate the fertility effect of colonial origins due to an increased use of modern methods of birth control. If this hypothesis is validated empirically, it will have important policy implications because this will show that appropriately designed economic interventions can break the bounds of historical determinism. We now turn to the analysis of the heterogeneous effect of colonial origins on fertility by market access.

8.1 Measures of Market Access

To assess the heterogeneous impact of colonial origins by market access, we resort to five different accessibility measures. Our 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.

8.1.1 Proximity to the Sea: An Exogenous Determinant of Access to the Export Market

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 are largely influenced by geographical conditions (Diamond (2005)), early Europeans engaged in trade mainly landed in Africa where coastal geography was favor-able. That is, where coastal areas featured the presence of natural harbors[26] 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 Table 5 support these theoretical arguments. Indeed, using a fixed effects model, we find a highly significant negative association between distance to the sea and several measures of local economic development, including light density, an indicator for whether the respondent is engaged in activities requiring high skills, an indicator for whether the respondent receives cash earnings, and an index for asset holdings.[27] To the extent that the latter measures constitute good proxies for the costs of childbearing, results from the first column in Table 5 imply that the opportunity cost of having a child effectively decreases with distance to sea. Put another way, the opportunity cost of having a child is higher in areas close to the sea compared to areas far from the sea. In results not shown here, we find that this is the case when analyzing the subsamples of former British and French colonies separately.

8.1.2 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,

[26] For instance, in the East and 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.

[27] High-skilled workers include professional, technical, managerial, and clerical activities. The asset index takes value 1 if the respondent is living in a household holding at least one of the following assets: radio, television, refrigerator, bicycle, motorcycle, and car, and 0 otherwise.

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:

$$MA_{i,t} = \sum_{j \neq i} P_{j,t} \tau_{ij,t}^{-\theta} \quad (3)$$

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.[28] From the formula of equation (3), 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 (3), 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 populations of all port cities j surrounding a locality i.

8.1.3 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.[29]

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.

[28] 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 does not change.

[29] 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.

Here, population does not enter the calculation. This provides an alternative measure to the geodesic distance to the sea.

We have therefore defined 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 the next sections.

8.2 Heterogeneous Effects of Colonial Origins on Reproductive Behavior

Having established in Section 8.1.1 that in areas closer to the sea, economic opportunities are greater both for former British and French colonies, we first examine the heterogeneous effects of British colonization on reproductive behavior by proximity to the sea, one of our two measures of access to international markets. To do so, we implement the RDD specification in equation (1), separately for observations falling in the pixels that are close and far from the sea (with areas close to sea also defined as areas with high market access). A graphical illustration of the results is summarized in Figures 4-*b* and 4-*c*. In these graphs, the running variable is defined as the geodesic distance (in kilometers) from the centroid of each pixel to the nearest British-French border. The vertical line on this graph marks the British-French border (the cut-off at zero). The graph plots, for individuals within 2km bins, the average value of the outcome of interest (the number of children ever born), conditional on the colonial origin. The two-dimensional curve overlaid on each scatter plot shows the predicted outcome for a regression that includes a linear polynomial in the running variable, fitted separately using raw data from former British colonies (where distance takes on positive values) and raw data from former French colonies (where distance takes on negative values). Following our preferred empirical identification strategy which accounts for internal and cross-border migration, we plot the RD graphs using the sample of natives. In Figure 4-*b*, we restrict the analysis to observations close to the coast, while in Figure 4-*c*, we restrict the analysis to observations that are far from the coast. The graphs clearly show that the jump at the border is larger and only present when we consider areas far from the coast. We find similar results when using the whole sample as shown in Appendix Figure B5-*b* and Appendix Figure B5-*c*.

The graphical results are confirmed in a regression-based analysis where we estimate equation (1), separately for observations falling in pixels close and far from the sea (with areas close to sea also defined as areas with high market access). Results are displayed in Table 6. As in Section 8.1.1, even-numbered columns show estimates for the subsample of pixels close to the sea, whereas in odd-numbered columns, we report the effect of British colonization on reproductive behavior for pixels far from the coast. Focusing on *Panel A* and *Panel B* in Table 6, estimates in columns (1) and (2) show that women in former British colonies have significantly fewer children than their counterparts in former French colonies, but only in areas far from the coast. In areas close to the coast, the effect is economically small and not statistically significant. These findings are consistent with our theoretical argument. The heterogeneous results are robust to controlling for internal and cross-border migration (see *Panel C* and *Panel D* in Table 6) and to increasing the bandwidths of the spatial RDD (see columns (3)-(8) in Table 6).

While estimating the effect of colonial origins separately for areas with low market access and areas with high market access is informative, this approach has some limitations. In fact, if ethnic groups that are closer to the sea systematically differ from other ethnic groups in characteristics that affect fertility behavior, these characteristics rather than market access might be the main driver of the observed heterogeneous effects. In order to address this potential issue, we estimate 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 market. Specifically, we estimate the following equation:

$$Y_{ipcet} = \beta_0 + \beta_1 British_c + \beta_2 MA_{pcet} + \beta_3 British_c \times MA_{pcet} + f(BD_{pce}) + \delta_e + \gamma_t + \sigma_a + \theta_r + Z'_{pce}\mu + \varepsilon_{ipcet} \quad (4)$$

All the variables in equation (4) are defined similarly as in our main specification in equation (1), except that we now introduce an interaction term between the British dummy and an indicator of access to market captured by the variable MA_{pcet}. In the analysis that follows, MA_{pcet} is a trichotomous indicator representing the tertiles of our different measures of market access described above. In all cases, the first and third tertile refer to localities with the highest and lowest access to markets, respectively.

Using equation (4), we will estimate the effect of the interaction of British colonization with market access on fertility and other reproductive outcomes. This specification differs from the specification estimated in the preceding section in that it accounts for differences in market access between ethnic groups. By interacting the British dummy with market access while also controlling for ethnic homeland fixed effects, we are exploiting variations in market access within the same ethnic group, therefore controlling for ethnic-specific characteristics 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 slave trade.

Fertility. Table 7 shows estimates of the heterogeneous impact of British colonization on the total number of children born to a woman. Each panel of this Table presents estimates from alternate model specifications that differ on whether they address the issue of internal and cross-border migration. In each column, we show estimates using different measures of access to international and domestic markets amongst the five measures of market access described above. Using the baseline sample in *Panel A* and *Panel B* of Table 7, we find that women in former British colonies have significantly fewer children than their counterparts in former French colonies only in areas with lower market access. In particular, the coefficient on the British dummy is small and not significant regardless of our measure of market access. This means that colonial origins have little effect on fertility in areas with sufficiently high access to international or domestic markets. In contrast, the coefficients on the interaction terms are negative and statistically significant. Consistent with the RD graphs and our theoretical argument, these results imply that the negative effect of British colonization on fertility is stronger in localities with low market access. These results are robust across the different measures of market access. For example, relative to area close to sea, the estimated fertility effect of British colonization in areas farthest from the sea is higher by -0.67 children (see columns (1)). Similarly, relative to localities with the highest access to international ports, the British-French gap in fertility in areas with low access to international ports is higher by -0.62 to -0.65 children (see columns (2) and (3)). The findings are qualitatively similar when we consider the two measures of access to domestic markets (see columns (4) and (5)), although British colonization tends to reduce fertility more in localities with medium market access. These heterogeneous results are robust to controlling for internal and cross-border migration. In *Panel C* and *Panel D* of Table 7 we restrict the heterogeneous analysis to natives. The coefficients of the interaction term between the British dummy and our indicator of low market access remain negative and highly significant regardless of the definition of market access. All together, these results show that colonial origins affect fertility only in areas with higher market access where we also find that the opportunity cost of childbearing is low. Although we only show results for the optimal bandwidth, in tables not shown here, we find that our results are robust to alternate specifications with larger bandwidths of the RDD.

Other reproductive outcomes. Table 8 shows the effect of the interaction of British colonization with market access on the other reproductive outcomes analyzed in this paper: the likelihood of childbearing before age 18 (*Panel A*), age at first sexual intercourse (*Panel B*), and the risk of child marriage (*Panel C*). Overall, for each outcome, the effect of British colonization is qualitatively similar to the findings with the number of children. In absolute value, this effect is larger and globally significant in areas with high market access. These results are robust across all the measures of market access. In particular, the effects of British colonization on the probability of having a child before age 18 and the risk of getting married before age 18, are negative and statistically significant only in areas with low market access. In areas with high market access, these effects are much smaller and not statistically significant in most cases (see *Panels A* and *C*). This result implies that women in former British colonies are less likely to have a child before age 18 and they are more likely to delay marriage, and that this effect is only visible in areas with high market access. Turning to the timing of first sexual intercourse, the coefficients in *Panel B* show that British colonization increases the age at first sexual intercourse in both areas with low and high market access. However, this effect is larger in areas with low market access even though the coefficient on the interaction term between the British colonization dummy and the market access index is only statistically significant in some cases. These results are consistent across the different measures of market access we have constructed.

Overall, the analysis above shows that the effect of British colonization on reproductive outcomes is significantly larger in areas with lower market access. This leads us to conclude that colonial origins have little effect on reproductive outcomes when the opportunity cost of having a child is sufficiently high. In the next section, we document the micro-founded channels of the fertility impact of British colonization, which are mechanisms operating at the individual level.

9 Mechanisms

In our conceptual framework presented in Appendix Section A1.1 and summarized in Appendix Figure B1, we investigate two types of channels that may link colonial origins to fertility behavior in the African context. The first is a *direct* channel supported by differences in colonial population policies and their impact on the onset of family planning policies in former African colonies. This is our *primary* channel. We show two main results to support this channel. First, in Section 7, using information on the timing of the introduction of family planning policies in former African colonies collected from archival resources and the literature, we find that differences in fertility behavior between Francophone and Anglophone African women are entirely driven by cohorts of women for whom these policies differed. Second, in this section, we find that these policies have had a lasting effect on the use of modern methods of birth control, with Anglophone women being more likely to use these methods.

We rule out *indirect* channels acknowledged in our conceptual framework. These channels include: (1) female education; (2) female economic empowerment (labor participation and income); and (3) child quality (measured by child survival). The theoretical literature analyzing the determinants of fertility decline emphasizes the role of these factors (e.g. Becker and Lewis (1973); Galor and Weil (2000). See also Appendix Section A1.1 for a complete description of this literature). Looking at fertility as a rational decision made by parents to maximize utility from children, it is argued that improvement of the aforementioned factors will increase the opportunity cost of children thus lowering the demand for children. Combining the latter literature with empirical studies showing that different colonization policies triggered differences in economic outcomes relevant for fertility (e.g. La Porta et al. (1998); Lee and Schultz (2012). See also Appendix Section A1.2 for a complete description of this literature), one can argue that the fertility effect of colonial origins in areas with lower market access is driven by differences in colonial policies (other than colonial population policies) that shape differences in economic outcomes relevant for fertility decline. To test whether these other factors are driving our results we analyze the heterogeneous effect of British colonization on each factor. We estimate equation (4) where the outcome of interest is in alternative specifications female education, female labor participation, income and child mortality respectively. We find empirically that these channels are not important. Results are discussed below.

9.1 Use of modern methods of birth control.

Our primary mechanism implies that women in former British colonies should be more likely to use modern (vs. traditional) methods of birth control compared to women in former French colonies. In addition, consistent with our findings in Section 8 showing that the opportunity cost of having a child is greater in areas with higher market access regardless of the colonizer's identity, the effect of British colonization on contraceptive use should be larger in areas with low market access compared to areas with high market access. We assess this hypothesis using the specification in equation (4). For this analysis, the outcome variable is the current use of modern methods of birth control. We define this variable as a binary indicator, which is equal to one if the respondent is using a modern method of birth control, and zero if the respondent is using a traditional method. Traditional methods of birth control include: periodic abstinence, abstinence, withdrawal, standard days method, and other methods. Modern methods include: pill, IUD, injections, diaphragm, condom, female sterilization, male sterilization, lactational amenorrhea, implants/norplant, female condom, and foam/jelly. In *Panel A* of Table 9, we see that women in former British colonies are significantly more likely to use a modern method of birth control in both areas with low market access and areas with high market access. Moreover, consistent with our predictions, this positive effect of British colonization is economically much larger in areas with lower market access. This corroborates the notion that economic opportunities induced by proximity to global and domestic markets raise the opportunity cost of childbearing, thus triggering a demand for more effective methods of birth controls regardless of colonial origins.[30] These results are also consistent across the different measures of market access we have constructed.

[30]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.

9.2 Ruling out Alternative Explanations

As mentioned above, colonial origins could have influenced a number of other determinants of fertility: female education, female labor force participation, household income, and child mortality. In this section, we use our RD design to show that some of these factors (child mortality) are not differential between former French and English colonies, therefore they are unlikely to be mediating factors for the fertility effect we observe. Other factors (female labor force participation, female education and income) are differential across sides of the borders, but we argue that they cannot be mediating factors either, due to either their spatial or temporal distribution. This suggests that the primary channel through which colonial origins influenced fertility is indeed the population policies channel.

Female Education. Economic growth theory argues that an exogenous increase in the returns to investment in education raises the opportunity cost of childbearing, thereby lowering fertility demand. To test this channel, we define female education as the total number of years of education for each woman in our sample. We use this measure as our dependent variable in equation (4) and report results in Table 9 (*Panel B*). We find that British colonization positively affects female education in areas with high market access. Thus, one could argue that the effect of colonial origins on contraceptive use is mediated by female education. This is unlikely to be the case in our context because if this were the case, British colonization would have a greater effect on contraceptive use in areas with higher market access, mirroring its heterogeneous effect on female education. But this is not what we find. The interaction term in *Panel B* of Table 9 shows that the British effect on education is much lower in areas with low market access. Note that this is in contrast to the fact that the effect of British colonization on fertility behavior is much stronger in areas with low market access.

Overall, unlike its effect on education, British colonization has a greater effect on contraceptive use in areas with lower market access, which is consistent with the notion that the latter effect is more direct. These findings are consistent across our five measures of international and domestic market access. These findings imply that education is not the main channel through which British colonization affects fertility in Africa. Moreover, consistent with the literature on the effect of lower fertility induced by an increased use of modern contraception on female economic empowerment, the stronger effect of British colonization on education in areas with high market access can be seen as a by-product of the *direct* impact of British colonization on fertility behavior in these areas.

Female Labor Participation. Female economic empowerment is another factor likely to mediate the effect of colonial origins on fertility behavior. We define female economic empowerment based on participation of women in the labor market. Taking advantage of the fact that DHS collects information on the respondent's type of occupation, we construct an indicator for female labor participation based on whether the respondent is currently working or not. Using this variable as a dependent variable in equation (4), we find no significant difference in the likelihood of working between anglophone and francophone women in areas with higher market access. However, we find that in areas with lower market access, women in former British colonies are significantly less likely to work compared to their counterparts in former French colonies (*Panel C* in Table 9). This result is inconsistent with the fertility effect of British colonization in areas with low market access. As a result, it is unlikely that female labor participation mediates the fertility effect of British colonization observed in areas with low market access.

Income. We argue that income does not mediate the fertility effect of colonial origins in areas with low market access. This is for two reasons. The first reason is that the fertility gap between former British and French colonies preceded the income gap (*Panel C* in Figure 1), which logically implies that the latter cannot explain the former. Second, following a similar approach as in Anderson (2018), we directly control for female education and income (measured by household assets and light density) when estimating the differential effect of colonial origins on reproductive behaviors by market access. We find that this differential effect is strongly robust to these controls (Table B5). Taken together, these findings suggest that female economic empowerment is unlikely to be the primary channel through which colonial origins affect fertility. 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 and the patterns shown in *Panel C* in Figure 1.

Child Quality. The divergence in reproductive behavior across former British and French colonies could also be the result of the demand for child quality being higher in former British colonies. We test this channel by assessing the long-term impact of colonial origins on child mortality which is a measure of whether a child died before the age of five years old. 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)). Results are reported in *Panel E* in Table 9. Overall, we find that in areas with high market access there is no statistically significant difference in the likelihood of under-five mortality between children residing in former British and French colonies. In contrast, in areas with lower market access children born to mothers residing in former British colonies are less likely to die within the first five years of life compared to their counterparts born to mothers living in former French colonies. However, this differential effect on child mortality is weak and not significant across most of the specifications shown in *Panel E* in Table 9. This result suggests that child quality is unlikely to be the primary channel through which British colonization affects fertility in areas with low market access.

Overall, the results presented in this section are consistent with the idea that the negative effect of British colonization on fertility outcomes in areas with lower market access operates primarily through its direct and lasting effect on modern methods of birth control. The analysis provides little support for the other mechanisms.

10 Conclusion

The literature that documents the long-term economic effects of history has largely overlooked the question of whether these effects can be mitigated by appropriately designed economic incentives. In this paper, we address this important question by studying the long-term effect of colonial policies and reproductive laws on fertility behavior in Africa. Central to our study is the analysis of how this effect varies by market access, a proxy for the opportunity cost of childbearing.

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. However, these effects are absent in areas with high market access, and are only present in areas with low market access. The findings are robust when using different measures of access to international and domestic markets. The analysis therefore suggests that market incentives are likely to mitigate the long-term impact of history.

Analyzing the mechanisms, we 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. Importantly, we do not find that the impact of colonial origins on income and women's human capital and labor participation is a primary channel through which the effect of colonial origins on fertility persists. In fact, while British colonization is linked to higher female education, this occurs mainly in areas with higher market access where the effect of colonial origins on fertility is null. Again, while income levels differ, the fertility gap between British and French colonies opened prior to 1980, whereas the income gap only opened after 1990. Also, British colonization has a negative effect on female labor participation in areas where market access is low, in contrast with the fact that fertility is higher in former French colonies compared to former British colonies in these areas.

Besides uncovering novel findings about the heterogeneous nature of the colonial origins of comparative fertility behavior in Africa, our study contributes directly to the debate about the nature of policy actions that can be undertaken to repair the damages of bad historical shocks. Taken together, our findings imply that appropriately designed economic incentives can overcome the bonds of historical determinism, even though history itself cannot be changed.

References

Acemoglu, D., Gallego, F., & Robinson, J. (2014). *Institutions, human capital and development* (NBER Working Papers No. 19933). National Bureau of Economic Research, Inc.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2001, December). The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review*, *91*(5), 1369-1401.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2002). Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution. *The Quarterly Journal of Economics*, *117*(4), 1231-1294.

Adepoju, A. (2008). Migration in sub-saharan africa. *Current African Issues n° 37 Uppsala, The Nordic Africa Institute*.

Alesina, A., & Ferrara, E. L. (2003). *Ethnic Diversity and Economic Performance* (Harvard Institute of Economic Research Working Papers No. 2028). Harvard - Institute of Economic Research.

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

Alesina, A., Giuliano, P., & Nunn, N. (2013). On the origin of gender roles: Women and the plough. *Quarterly Journal of Economics*, *128*(2), 469-530.

Alesina, A., Michalopoulos, S., & Papaioannou, E. (2013). *Ethnic Inequality* (CAGE Online Working Paper Series No. 155). Competitive Advantage in the Global Economy (CAGE).

Ananat, E. O., & Hungerman, D. M. (2012). The power of the pill for the next generation: oral contraception's effects on fertility, abortion, and maternal and child characteristics. *Review of Economics and Statistics*, *94*(1), 37–51.

Anderson, S. (2018, June). Legal Origins and Female HIV. *American Economic Review*, *108*(6), 1407-1439.

Banerjee, A. V., & Duflo, E. (2014). Under the thumb of history? political institutions and the scope for action. *Annu. Rev. Econ.*, *6*(1), 951–971.

Barro, R., & Becker, G. (1989). Fertility choice in a model of economic growth. *Econometrica*, *57*(2), 481-501.

Beach, B., & Hanlon, W. W. (2019). *Censorship, family planning, and the historical fertility transition* (Tech. Rep.). National Bureau of Economic Research.

Beck, T., Demirguc-Kunt, A., & Levine, R. (2003). Law and finance: why does legal origin matter? *Journal of Comparative Economics*, *31*(4), 653-675.

Becker, G. (1960). An economic analysis of fertility. In *Demographic and economic change in developed countries* (p. 209-240). National Bureau of Economic Research, Inc.

Becker, G. (1965). A theory of the allocation of time. *The economic journal*, 493–517.

Becker, G., & Barro, R. (1988). A reformulation of the economic theory of fertility. *The Quarterly Journal of Economics*, *103*(1), 1-25.

Becker, G., & Lewis, H. G. (1973). On the interaction between the quantity and quality of children. *Journal of Political Economy*, *81*(2), S279-88.

Benavot, A., & Riddle, P. (1988). The expansion of primary education, 1870-1940: Trends and issues. *Sociology of Education*, *61*(3), 191–210.

Berg, C. N., Blankespoor, B., & Selod, H. (2018). Roads and rural development in sub-saharan africa. *The Journal of Development Studies*, *54*(5), 856–874.

Bergh, A., & Fink, G. (2018). *The french curse? on the puzzling economic consequences of french colonization* (Working Paper Series No. 1234). Research Institute of Industrial Economics.

Bertocchi, G., & Canova, F. (2002). Did colonization matter for growth?: An empirical exploration into the historical causes of africa's underdevelopment. *European Economic Review*, *46*(10), 1851-1871.

Bhattacharjee, S., & Dasgupta, A. (2016). Examining the quality-quantity trade off: Evidence from a public health intervention in india. *Working paper*.

Bhattacharya, J., & Chakraborty, S. (2017). Contraception and the demographic transition. *The Economic Journal*, *127, Issue 606*.

Blankespoor, B., Bougna, T., Garduno-Rivera, R., & Selod, H. (2017). *Roads and the geography of economic activities in mexico.* The World Bank.

Bloom, D. E., Canning, D., Fink, G., & Finlay, J. E. (2009, Jun). Fertility, female labor force participation, and the demographic dividend. *Journal of Economic Growth*, *14*(2), 79–101.

Bolt, J., & Bezemer, D. (2009). Understanding long-run african growth: Colonial institutions or colonial education? *Journal of Development Studies*, *45*(1), 24-54.

Bongaarts, J. (2010). The causes of educational differences in fertility in sub-saharan africa. *Vienna Yearbook of Population Research*, *8*(1), 31-50.

Bongaarts, J. (2015). Modeling the fertility impact of the proximate determinants: Time for a tune-up. *Demographic Research*, *33*, 535–560.

Bongaarts, J., & Casterline, J. (2013). Fertility transition: Is sub-saharan africa different? *Population and Development Review*, *38*, 153-168.

Bongaarts, J., Frank, O., & Lesthaeghe, R. (1984). The proximate determinants of fertility in sub-saharan africa. *Population and Development Review.*, *10*(3), 511.

Borg, M. O. (1989, May). The income-fertility relationship: Effect of the net price of a child. *Demography*, *26*(2), 301–310.

Cagé, J., & Rueda, V. (2016, July). The long-term effects of the printing press in sub-saharan africa. *American Economic Journal: Applied Economics*, *8*(3), 69-99.

Caldwell, J. C., & Sai, F. T. (2007). Family planning in ghana. *The global family planning revolution*, 379.

Calonico, S., Cattaneo, M. D., & Titiunik, R. (2015). rdrobust: An r package for robust nonparametric inference in regression-discontinuity designs. *R J.*, *7*(1), 38.

Cameron, A., Gelbach, J., & Miller, D. (2011). Robust inference with multiway clustering. *Journal of Business & Economic Statistics*, *29*(2), 238-249.

Canning, D., Mabeu, M. C., & Pongou, R. (2020). *Colonial origins and fertility: Can the market overcome history?* (Tech. Rep.). Working Paper.

Canning, D., Raja, S., & Yazbeck, A. S. (2015). *Africa's demographic transition: dividend or disaster?* The World Bank.

Chatterjee, S., & Vogl, T. (2018, June). Escaping Malthus: Economic Growth and Fertility Change in the Developing World. *American Economic Review*, *108*(6), 1440-1467.

Chen, X., & Nordhaus, W. D. (2011). Using luminosity data as a proxy for economic statistics. *Proceedings of the National Academy of Sciences*.

Cochrane, S. (1979). Fertility and education: What do we really know? *Baltimore: Johns Hopkins University Press.*.

Cogneau, D., & Dupraz, Y. (2014, June). *Questionable Inference on the Power of Pre-Colonial Institutions in Africa* (Tech. Rep.). HAL.

Cogneau, D., & Moradi, A. (2014). Borders that divide: Education and religion in ghana and togo since colonial times. *The Journal of Economic History*, *74*(3), 694-729.

Cohen, A., Dehejia, R., & Romanov, D. (2013). Financial incentives and fertility. *The Review of Economics and Statistics*, *95*(1), 1-20.

Crowder, M. (1964). Indirect rule: French and british style. *Africa: Journal of the International African Institute*, *34*(3), 197–205.

D'Albis, H., Greulich, A., & Ponthiere, G. (2017). *Development, fertility and childbearing age: A unified growth theory* (PSE Working Papers). PSE Working Papers halshs-01848098, HAL.

Debpuur, C., Phillips, J. F., Jackson, E. F., Nazzar, A., Ngom, P., & Binka, F. N. (2002). The impact of the navrongo project on contraceptive knowledge and use, reproductive preferences, and fertility. *Studies in family planning*, *33*(2), 141–164.

Dell, M. (2010). The persistent effects of peru's mining mita. *Econometrica*, *78*(6), 1863-1903.

Dessy, S., Marchetta, F., Pongou, R., & Tiberti, L. (2021). *Can climate shocks drive up long-run fertility?*

DHS, M. (2012). Sampling and household listing manual. *Calverton, Maryland USA: ICF International*.

Diamond, J. (2005). *Guns, germs, and steel: The fates of human societies (revised).* New York: WW Norton and Co., Inc.

Djankov, S., Porta, R. L., de Silanes, F. L., & Shleifer, A. (2002). The Regulation of Entry. *The Quarterly Journal of Economics*, *117*(1), 1-37.

Doepke, M. (2015, March). Gary becker on the quantity and quality of children. *JODE - Journal of Demographic Economics, Cambridge University Press*, *81*(1), 59-66.

Doepke, M., & Tertilt, M. (2018). Women's empowerment, the gender gap in desired fertility, and fertility outcomes in developing countries. In *Aea papers and proceedings* (Vol. 108, pp. 358–62).

Donaldson, D., & Hornbeck, R. (2016). Railroads and american economic growth: A "market access" approach. *The Quarterly Journal of Economics*, *131*(2), 799–858.

Dupraz, Y. (2017). *French and British Colonial Legacies in Education: Evidence from the Partition of Cameroon* (CAGE Online Working Paper Series No. 333). Competitive Advantage in the Global Economy (CAGE).

Englebert, P. (2000). State legitimacy and development in africa. *Lynne Rienner*(02), 498-499.

Fenske, J., & Kala, N. (2017). 1807: Economic shocks, conflict and the slave trade. *Journal of Development Economics*, *126*, 66–76.

Fernandez-Villaverde, J., Greenwood, J., & Guner, N. (2014). From shame to game in one hundred years: An economic model of the rise in premarital sex and its de-stigmatization. *Journal of the European Economic Association*, *12*, 25-61.

Finlay, J., Canning, D., Po, J. Y., et al. (2012). *Reproductive health laws around the world* (Tech. Rep.). Program on the Global Demography of Aging.

Finlay, J., & Erin, J. (2017). Barriers to contraceptive use: Examination of contraceptive laws and contraceptive use in sub-saharan africa. *J Contracept Stud.*, *2*(2:8).

Galloway, T. A., & Hart, R. K. (2015, November). *Effects of income and the cost of children on fertility. quasi-experimental evidence from norway* (Discussion Papers No. 828). Statistics Norway, Research Department.

Galor, O. (2011). Unified growth theory. *Princeton, NJ: Princeton University Press*.

Galor, O., & Moav, O. (2002). Natural selection and the origin of economic growth. *The Quarterly Journal of Economics*, *117*(4), 1133–1191.

Galor, O., & Weil, D. (1996). The gender gap, fertility, and growth. *American Economic Review*, *86*(3), 374-87.

Galor, O., & Weil, D. N. (1999, May). From malthusian stagnation to modern growth. *American Economic Review*, *89*(2), 150-154.

Galor, O., & Weil, D. N. (2000, September). Population, technology, and growth: From malthusian stagnation to the demographic transition and beyond. *American Economic Review*, *90*(4), 806-828.

Garenne, M. (2017). *Planning familial et fécondité en afrique: Évolutions de 1950 à 2010* (Tech. Rep.). FERDI.

Garenne, M. (2018). Family planning and fertility decline in africa: from 1950 to 2010. In *Family planning.* IntechOpen.

Garenne, M. (2020). Trends in age at menarche and adult height in selected african countries (1950–1980). *Annals of human biology*, *47*(1), 25–31.

Glaeser, E. L., Porta, R. L., de Silanes, F. L., & Shleifer, A. (2004, September). Do institutions cause growth? *Journal of Economic Growth*, *9*(3), 271-303.

Glaeser, E. L., & Shleifer, A. (2002). Legal Origins. *The Quarterly Journal of Economics*, *117*(4), 1193-1229.

Greenwood, J., & Guner, N. (2010). Social change: The sexual revolution. *International Economic Review*, *51*, 893-923.

Grier, R. (1999). Colonial legacies and economic growth. *Public Choice*, *98*(3-4), 317-35.

Henderson, J. V., Storeygard, A., & Weil, D. (2012). Measuring economic growth from outer space. *American Economic Review*, *102*(2), 994-1028.

Henley, D. (2011). Forced labour and rising fertility in colonial indonesia. *Asian Population Studies*, *7*(1), 3-13.

Huillery, E. (2009). History matters: The long-term impact of colonial public investments in french west africa. *American Economic Journal: Applied Economics*, *1*(2), 176–215.

Huillery, E. (March 2011). The impact of european settlement within french west africa: Did pre-colonial prosperous areas fall behind? *Journal of African Economies*, *20*(2, 1), 263–311.

Ittmann, K. (1999). The colonial office and the population question in the british empire, 1918–62. *The Journal of Imperial and Commonwealth History*, *27*(3), 55–81.

Ittmann, K. (2013). *Problem of great importance* (Vol. 7). Univ of California Press.

Iyer, L. (2010). Direct versus indirect colonial rule in india: Long-term consequences. *The Review of Economics and Statistics*, *4*, 693-713.

Jedwab, R., & Storeygard, A. (2020). *The average and heterogeneous effects of transportation investments: Evidence from sub-saharan africa 1960-2010* (Tech. Rep.). National Bureau of Economic Research.

Kennes, J., & Knowles, J. (2013). Can technological change account for the sexual revolution? *CPC Discussion Paper 34*.

Krugman, P. (1991). Increasing returns and economic geography. *Journal of political economy*, *99*(3), 483–499.

LaPorta, R., de Silanes, F. L., Shleifer, A., & Vishny, R. (1999). The quality of government. *Journal of Law, Economics and Organization*, *15*(1), 222-279.

La Porta, R., de Silanes, F. L., Shleifer, A., & Vishny, R. W. (1997, July). Legal Determinants of External Finance. *Journal of Finance*, *52*(3), 1131-1150.

La Porta, R., de Silanes, F. L., Shleifer, A., & Vishny, R. W. (1998, December). Law and Finance. *Journal of Political Economy*, *106*(6), 1113-1155.

La Porta, R., Lopez-de Silanes, F., & Shleifer, A. (2008, June). The economic consequences of legal origins. *Journal of Economic Literature*, *46*(2), 285-332.

Latham, M. (2002). *Regulating reproduction: a century of conflict in britain and france.* Manchester University Press.

Lee, A., & Schultz, K. A. (2012). Comparing british and french colonial legacies: A discontinuity analysis of cameroon. *Quarterly Journal of Political Science*, *7*(4), 365-410.

Leone, T., & Brown, L. J. (2020). Timing and determinants of age at menarche in low-income and middle-income countries. *BMJ global health*, *5*(12), e003689.

Levine, R. (1999). Law, finance, and economic growth. *Journal of Financial Intermediation*, *8*(1-2), 8-35.

Liu, H. (2014). The quality–quantity trade-off: Evidence from the relaxation of china's one-child policy. *Journal of Population Economics*, *27:2*, 565–602.

Lohrmann, R. (1989). "irregular migration: An emerging issue in developing countries", in r. appleyard (ed.), the impact of international migration on developing countries, paris,. *Development Centre for Economic Cooperation and Development*, 129-142.

Mahoney, P. (2001). The common law and economic growth: Hayek might be right. *The Journal of Legal Studies*, *30*(2), 503–525.

May, J. F. (2017). The politics of family planning policies and programs in sub-saharan africa. *Population and development review*, *43*, 308–329.

McNicoll, G. (1980, Sep.). Institutional determinants of fertility change. *Population and Development Review*, *6*(3), pp. 441-46.

Merdad, L., Hill, K., & Graham, W. (2013). Improving the measurement of maternal mortality: the sisterhood method revisited. *PloS one*, *8*(4), e59834.

Michalopoulos, S., & Papaioannou, E. (2013, January). Pre-Colonial Ethnic Institutions and Contemporary African Development. *Econometrica*, *81*(1), 113-152.

Michalopoulos, S., & Papaioannou, E. (2014). National Institutions and Subnational Development in Africa. *The Quarterly Journal of Economics*, *129*(1), 151-213.

Michalopoulos, S., & Papaioannou, E. (2015, February). On the Ethnic Origins of African Development: Traditional Chiefs and Pre-Colonial Political Centralization. *Academic of Management Perspectives*, *29*(1), 32-71.

Michalopoulos, S., & Papaioannou, E. (2016, July). The long-run effects of the scramble for africa. *American Economic Review*, *106*(7), 1802-48.

Michalopoulos, S., & Papaioannou, E. (2020). Historical legacies and african development. *Journal of Economic Literature*, *58*(1), 53–128.

Milligan, K. (2005). Subsidizing the stork: New evidence on tax incentives and fertility. *The Review of Economics and Statistics*, *87*(3), 539-555.

Millimet, D. L., & Wang, L. (2011). Is the quantity-quality trade-off a trade-off for all, none, or some? *Economic Development and Cultural Change, University of Chicago Press*, *60(1)*, 155-195.

Min, B. (2008). Democracy and light: Electoral accountability and the provision of public goods. *Working Paper, mimeo UCLA.*

Mincer, J. (1963). Opportunity costs and income effects. In C. Christ (Ed.), *Measurement in economics.* Stanford University Press.

Murdock, G. P. (1959). Africa: Its peoples and their culture history. *McGraw-Hill Book Company, New York..*

Myers, C. K. (2017). The power of abortion policy: Reexamining the effects of young women's access to reproductive control. *Journal of Political Economy*, *125*(6), 2178–2224.

Nunn, N. (2008). The long term effects of africa's slave trades. *Quaterly Journal of Economics*, *123(1)*, 139-176.

Nunn, N. (2009, April). *The importance of history for economic development* (Working Paper No. 14899). National Bureau of Economic Research.

Nunn, N. (2020). The historical roots of economic development. *Science*, *367*(6485).

Nunn, N., Akyeampong, E., Bates, R., & Robinson, J. A. (2014). Gender and missionary influence in colonial africa. *African development in historical perspective*.

Nunn, N., & Wantchekon, L. (2011). The slave trade and the origins of mistrust in africa. *American Economic Review*, *101 (7)*, 3221-3252.

Okoye, D., & Pongou, R. (2014). Historical missionary activity, schooling, and the reversal of fortunes: Evidence from nigeria. *Schooling, and the Reversal of Fortunes: Evidence from Nigeria (August 20, 2014)*.

Okoye, D., & Pongou, R. (2017). Sea changes: The transatlantic slave trade and missionary activity in africa. *Unpublished manuscript. Retrieved December*, *6*, 2017.

Okoye, D., Pongou, R., & Yokossi, T. (2019). New technology, better economy? the heterogeneous impact of colonial railroads in nigeria. *Journal of Development Economics*, *140*, 320–354.

Oliver, R. (1995). *Contraceptive use in ghana: the role of service availability, quality, and price.* The World Bank.

Pinkovskiy, M. L. (2013). Economic discontinuities across borders: Evidence from satellite data on lights at night. *mimeo, MIT, Department of Economics.*.

Pritchett, L. H. (1994). Desired fertility and the impact of population policies. *Population and development review*, 1–55.

Prosser, G., & Weiskel, T. C. (1971). African education in a colonial context: French and british styles. *New Haven and London:Yale University Press*, *In . Chapter 19*, 663–711.

Rehana, S. (1996). The impact of socio-economic factors on fertility behaviour: A cross-country analysis. *The Pakistan Development Review, Pakistan Institute of Development Economics*, *35*(2), 107-128.

Ricart-Huguet, J. (2018). The origins of colonial investments in former british and french africa. *Submitted*.

Robinson, A. L. (2019). Colonial rule and its political legacies in africa. In *Oxford research encyclopedia of politics.*

Rossi, P., & Godard, M. (in press). The old-age security motive for fertility: Evidence from the extension of social pensions in namibia.

Sala-Diakanda, M. (1991). De l'émergence de politiques de population en afrique. *Politique africaine*(44), 37–49.

Schultz, T. P. (1981). *Investing in people : the economics of population quality* [Book]. University of California Press Berkeley, Calif.

Schultz, T. P. (1993). Demand for children in low income countries. In M. R. Rosenzweig &

O. Stark (Eds.), *Handbook of population and family economics* (1st ed., Vols. 1, Part A, p. 349-430). Elsevier.

Schultz, T. P. (2001, August). *The Fertility Transition: Economic Explanations* (Working Papers No. 833). Economic Growth Center, Yale University.

Shapiro, D. (2012). Women's education and fertility transition in sub-saharan africa. *Vienna Yearbook of Population Research*, *10*, 9–30.

Smith, A. (1977). *An inquiry into the nature and causes of the wealth of nations*. University of Chicago Press.

Strulik, H. (2017, May). Contraception and development: A unified growth theory. *International Economic Review*, *58*, 561-584.

The World Bank. (2016). World development indicators. washington, d.c.

UNDP. (2016). Africa human development report 2016: Accelerating gender equality and women's empowerment in africa. *UNDP Regional Bureau for Africa*.

UNESCO. (2018). *One in five children, adolescents and youth is out of school* (Tech. Rep.). UIS fact sheet No. 48.

Voena, A. (2011, April). *Yours, Mine and Ours: Do Divorce Laws Affect the Intertemporal Behavior of Married Couples?* (Discussion Papers No. 10-022). Stanford Institute for Economic Policy Research.

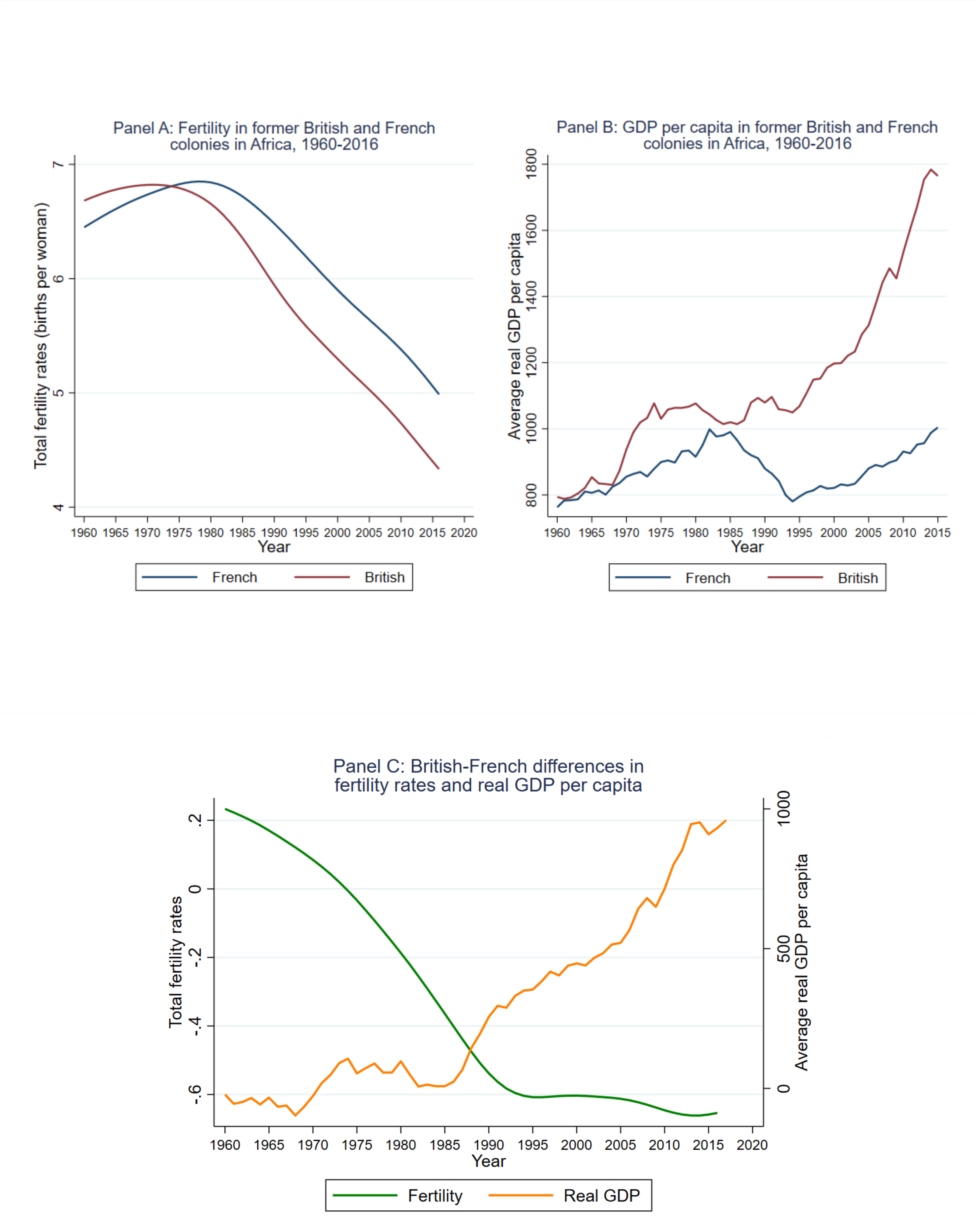
Wantchekon, L., Klašnja, M., & Novta, N. (2015). Education and human capital externalities: Evidence from colonial benin. *The Quarterly Journal of Economics*, *130*(2), 703-757.

Weitzman, A. (2017). The effects of women's education on maternal health: Evidence from peru. *Social science & medicine*, *180*, 1–9.

White, B. W. (1996). Talk about school: Education and the colonial project in french and british africa (1860-1960). *Comparative Education*, *32*(1), 9-26.

Willis, R. (1974). Economic theory of fertility behavior. In *Economics of the family: Marriage, children, and human capital* (p. 25-80). National Bureau of Economic Research, Inc.

Figure 1: British-French differences in fertility and GDP per capita



Source: The World Bank (2016) and Bergh and Fink (2018)

Figure 2: Colonial population policies and the timing of the introduction of family planning programs in former British and French colonies in Africa

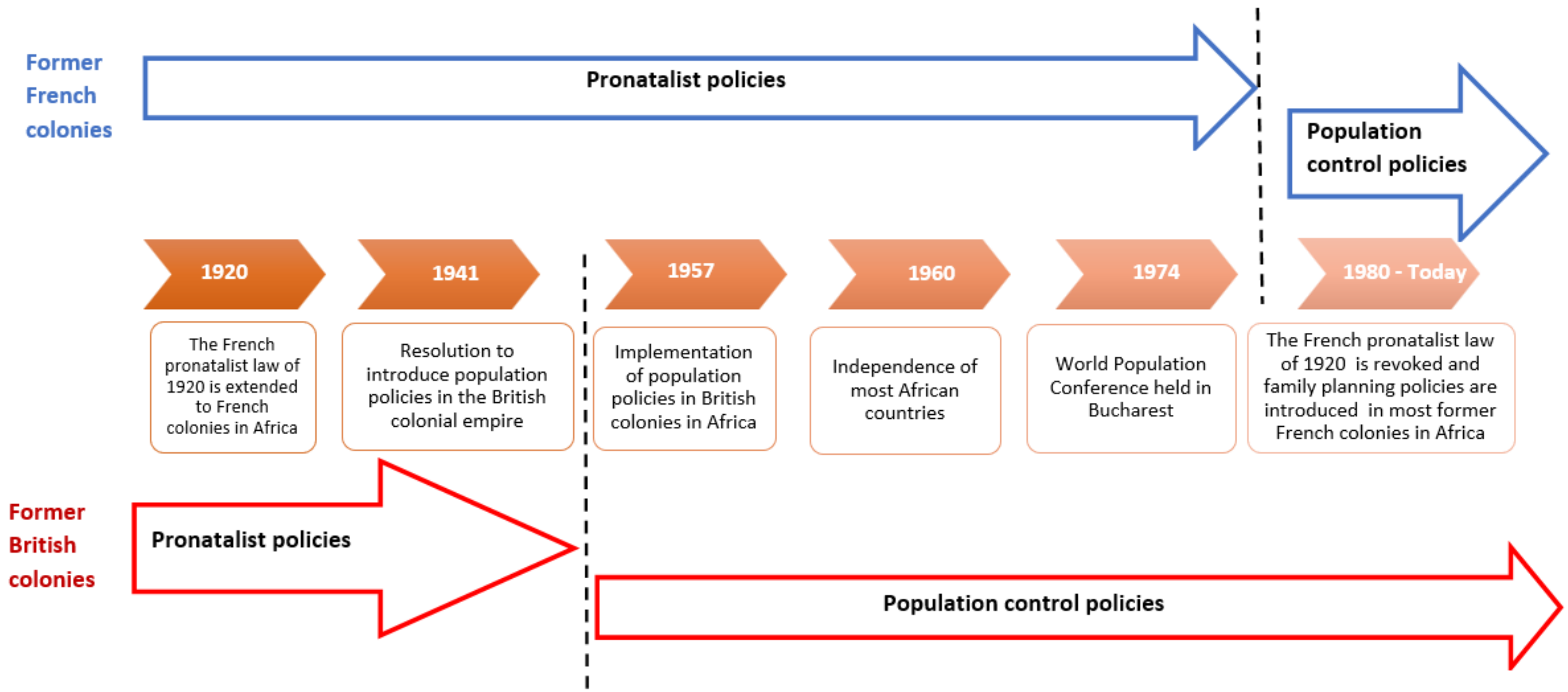
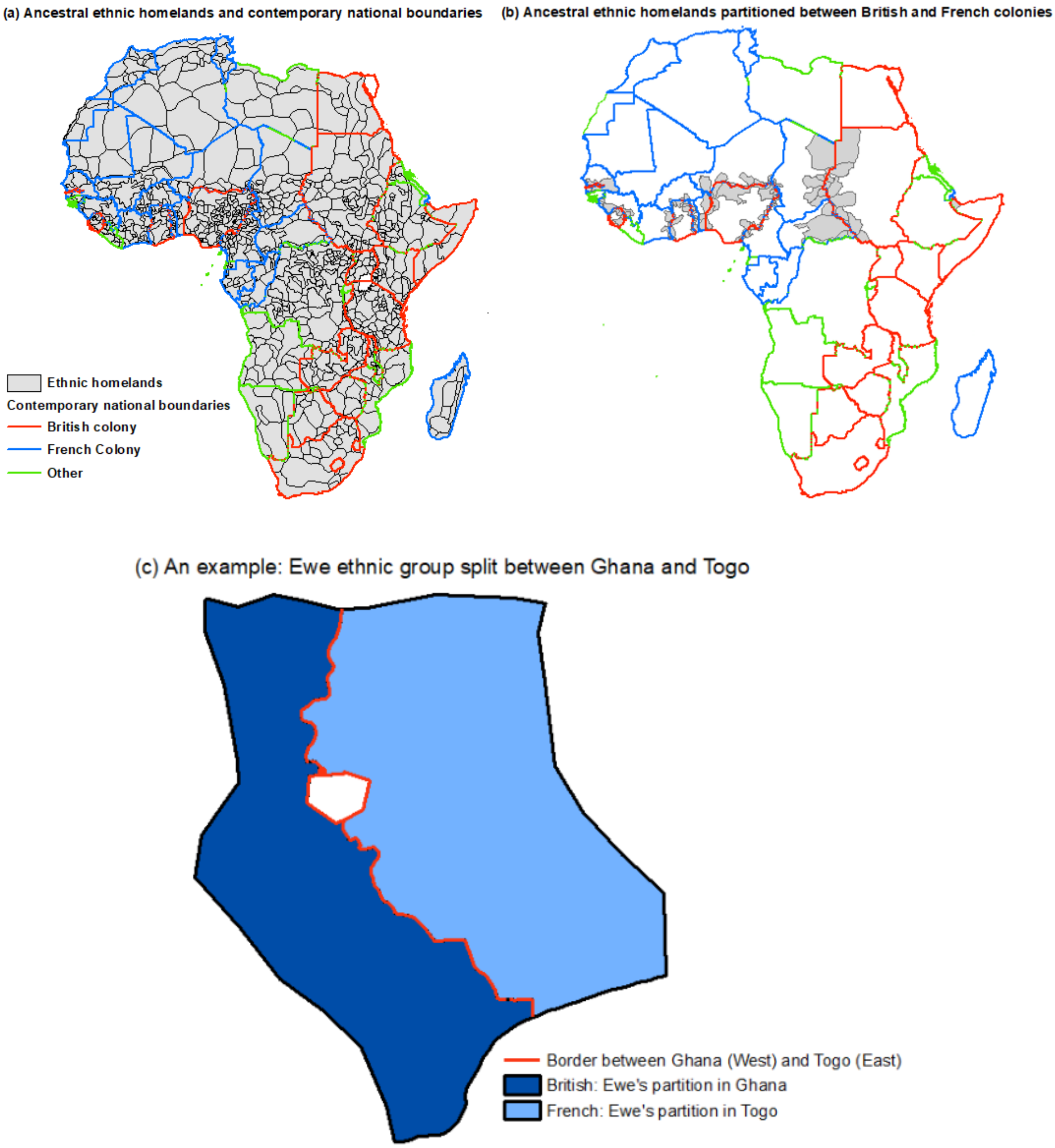


Figure 3: Historical ethnic homelands partitioned between France and Great Britain



Source: The map of national boundaries for Africa comes from the Digital Chart of the World and the map of ancestral ethnic homelands in Africa comes from Murdock (1959) and

Figure 4: RD plots: Fertility discontinuity at the British-French border

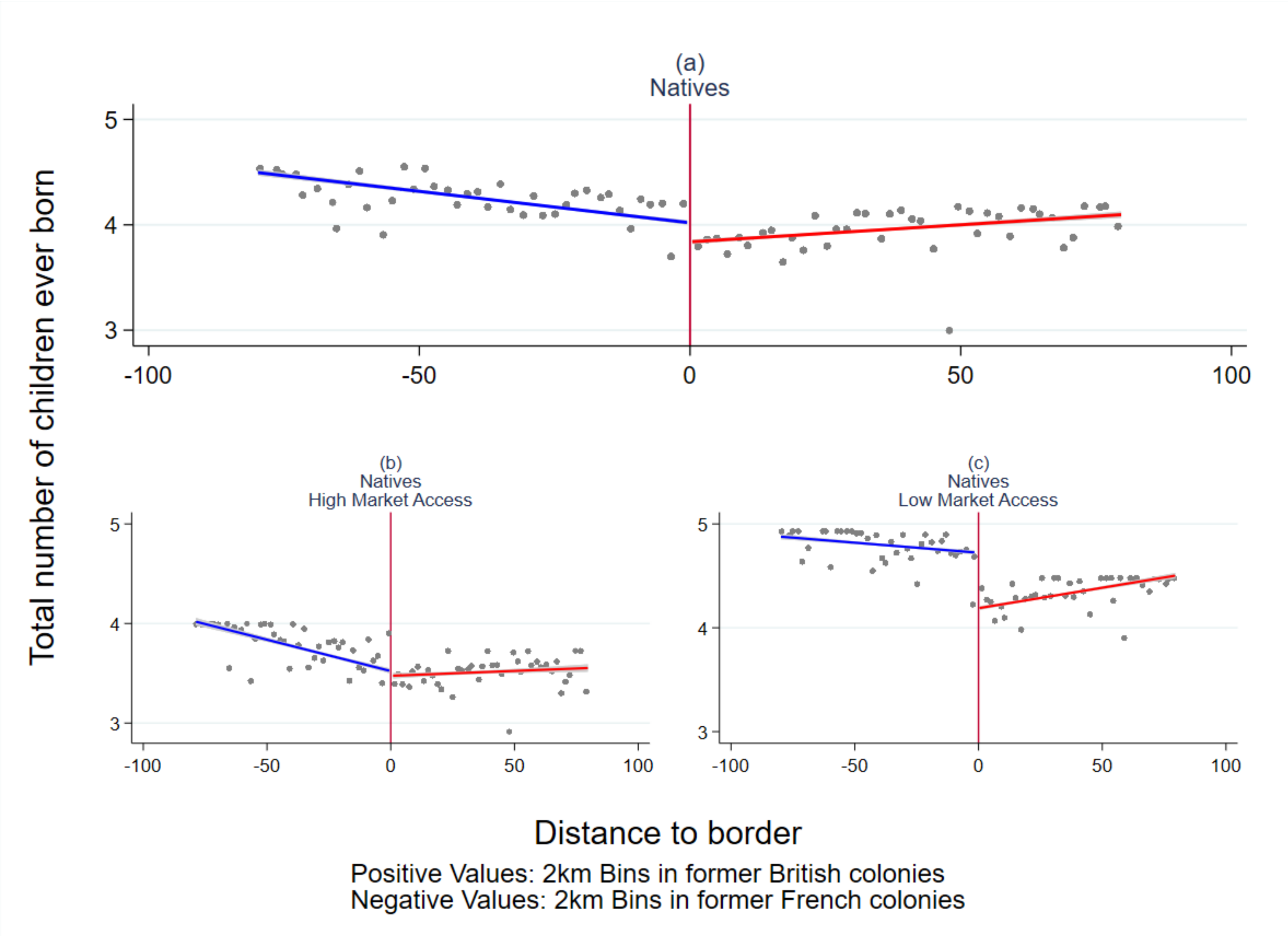


Figure 5: British-French differences in fertility by birth cohort

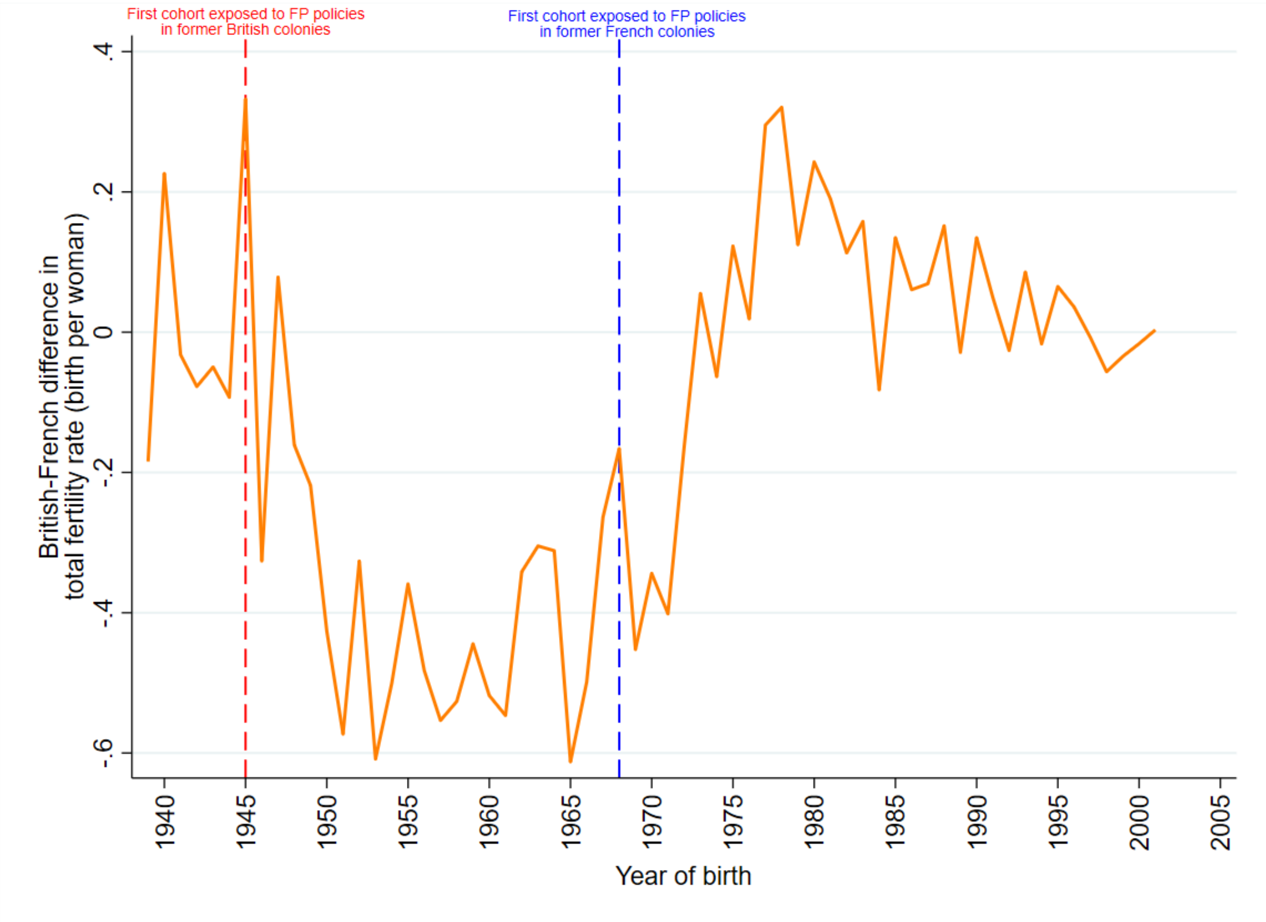


Figure 6: Event-study estimates of the effect of FP policies on the British-French fertility gap

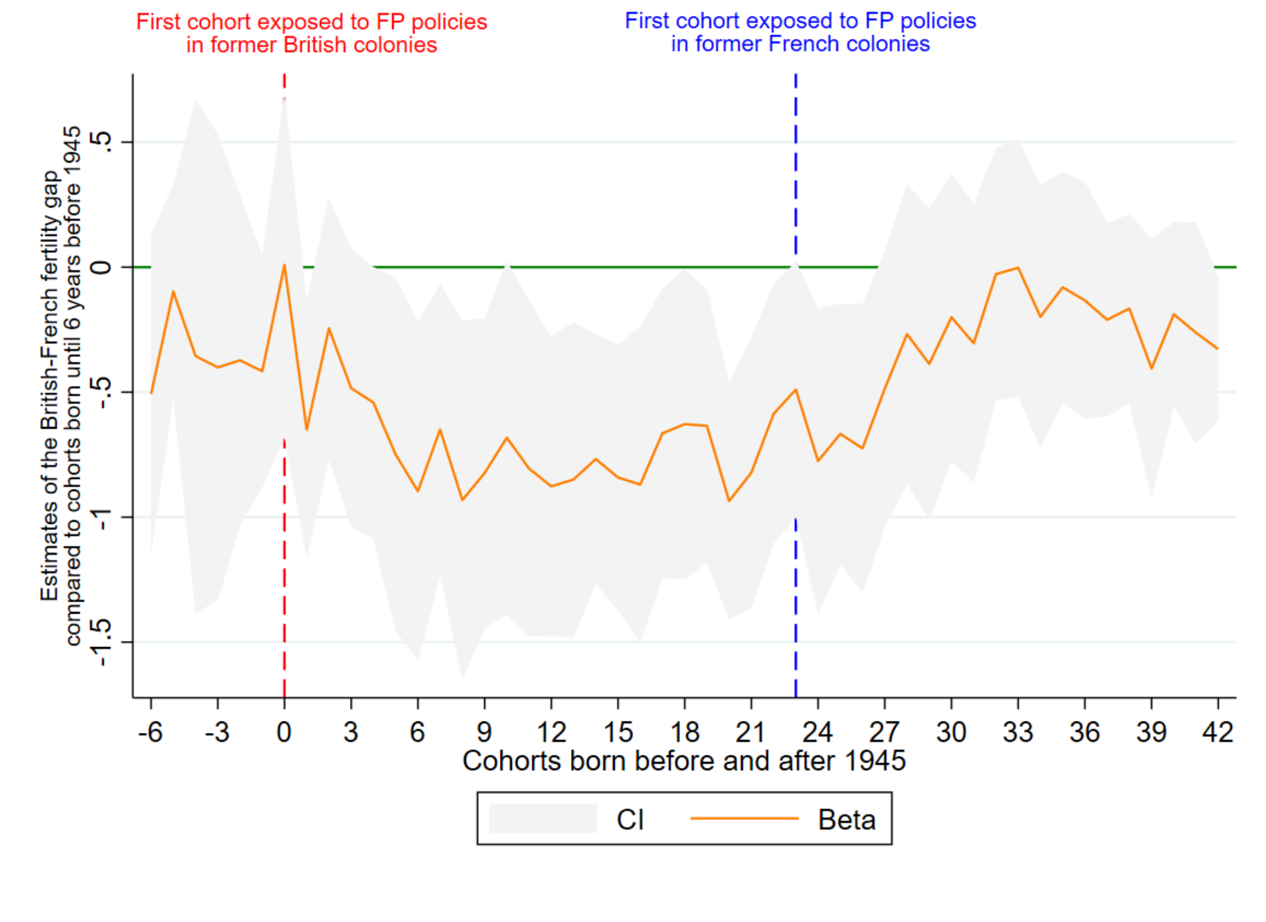


Table 1: Validity of the identification design

	Dependent variable is:						
	Elevation (1)	Soil suitability (2)	Area under water (3)	Pixel area (4)	Nat. resources (5)	Dist. to national border (6)	Dist. to sea (7)
British (vs. French)	-10.49	0.03	-0.12	-1.58	0.00	0.40	-0.10
	(14.267)	(0.021)	(0.159)	(3.663)	(0.004)	(0.278)	(0.062)
N	1,037	1,020	1,037	1,037	1,037	1,037	1,037
Ethnic homeland FE	✓	✓	✓	✓	✓	✓	✓

Note: In each specification, the unit of observation is the pixel. The table reports RDD estimates associating various location and geographical characteristics at the pixel level with the colonial origin. In each specification we restrict the analysis to observations within 60km of the British-French border and we control for a second-order polynomial in the distance from the centroid of each pixel to the British-French border. Standard errors clustered both at the country and the ethno-linguistic family levels using the approach of Cameron et al. (2011) are in parenthesis. ****p<0.01, **p<0.05, *p<0.1.*

Table 2: Average effect - Colonial origins and fertility

		RDD - Bandwidth			
	All sample (1)	<60 km of bound. (2)	<100 km of bound. (3)	<150 km of bound. (4)	<200 km of bound. (5)
Dependent variable: Total number of children ever born					
Panel A: Baseline specification					
British (vs. French)	-0.44***	-0.33***	-0.33***	-0.41***	-0.43***
	(0.110)	(0.107)	(0.090)	(0.110)	(0.114)
Observations	38,212	21,514	29,376	33,554	36,728
Panel B: Geographic controls					
British (vs. French)	-0.42***	-0.33***	-0.33***	-0.39***	-0.41***
	(0.087)	(0.113)	(0.087)	(0.082)	(0.091)
Observations	37,774	21,277	28,938	33,116	36,290
Panel C: Natives					
British (vs. French)	-0.52***	-0.39**	-0.42**	-0.50***	-0.51***
	(0.169)	(0.158)	(0.166)	(0.173)	(0.179)
Observations	15,671	8,496	11,730	13,628	14,925
Panel D: Natives + Geographic controls					
British (vs. French)	-0.47***	-0.39**	-0.40**	-0.44***	-0.47***
	(0.154)	(0.177)	(0.163)	(0.142)	(0.159)
Observations	15,516	8,390	11,575	13,473	14,770
Ethnic homeland FE	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓

Note: Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is the number of children ever born. Each column controls for individual characteristics (including ancestral ethnic homeland, age, year of birth, declared religious affiliation). In columns (2)-(5) we add control for a second-order polynomial in the distance from the centroid of each pixel to the British-French border. Geographic controls in Panels B and D include: elevation, soil suitability for agriculture, area under water, presence of natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 3: Average effect - Colonial origins and other reproductive outcomes

	All sample	RDD - Bandwidth			
		<60 km of bound.	<100 km of bound.	<150 km of bound.	<200 km of bound.
	(1)	(2)	(3)	(4)	(5)
		Baseline specification			
		Panel A: First birth before age 18			
British (vs. French)	-0.06***	-0.06***	-0.06***	-0.06***	-0.06**
	(0.023)	(0.024)	(0.022)	(0.022)	(0.025)
Observations	34,068	19,206	26,095	29,899	32,710
		Panel B: Age at first sexual intercourse			
British (vs. French)	0.48	0.53***	0.48*	0.49*	0.50*
	(0.295)	(0.201)	(0.286)	(0.277)	(0.274)
Observations	30,101	17,100	23,626	27,050	29,067
		Panel C: Early marriage (before 18 years old)			
British (vs. French)	-0.06**	-0.07*	-0.06*	-0.06**	-0.07**
	(0.031)	(0.035)	(0.032)	(0.030)	(0.030)
Observations	35,410	19,868	27,110	31,087	33,975
Ethnic homeland FE	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓
Geographic controls	✓	✓	✓	✓	✓

Note: Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is denoted by the corresponding panel title. Each column controls for individual characteristics (including ancestral ethnic homeland, age, year of birth, declared religious affiliation). In columns (2)-(5) we add control for a second-order polynomial in the distance from the centroid of each pixel to the British-French border. Geographic controls include: elevation, soil suitability for agriculture, area under water, presence of natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 4: Effect of colonial population policies on fertility - Cohort analysis

	All		10 years	
	(1)	(2)	(3)	(4)
Dependent variable: Total number of children ever born				
Panel A: Impact of British family planning policies				
British (vs. French)	0.88*	0.92	0.71	0.67
	(0.508)	(0.773)	(0.474)	(0.545)
British (vs. French) × Cohort born in 1945 or after	-1.63***	-1.68*	-1.53***	-1.39**
	(0.617)	(0.906)	(0.542)	(0.606)
Observations	38,212	37,774	4,371	4,315
Panel B: Impact of Francophone family planning policies				
British (vs. French)	-0.23	-0.21	-0.14	-0.14
	(0.247)	(0.241)	(0.207)	(0.201)
British (vs. French) × Cohort born in 1968 or after	-0.09	-0.09	-0.24	-0.25
	(0.134)	(0.130)	(0.183)	(0.184)
Observations	38,212	37,774	25,644	25,352
Ethnic homeland FE	✓	✓	✓	✓
Age FE	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓
Geographic controls		✓		✓

Note: In Column (1) and (2) we consider all eligible cohorts of women born before and after the introduction of family planning policies. In columns (3) an (4) we restrict the analysis to eligible cohorts of women born 10 years before and after the introduction of family planning policies. Each column controls for a second-order polynomial in the distance from the centroid of each pixel to the British-French border and for individual characteristics (including ancestral ethnic homeland, age, year of birth, declared religious affiliation). Specifications in columns (2) and (4) control also for geographic characteristics (elevation, soil suitability for agriculture, area under water, presence of natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border). Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011) are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 5: Market access and the opportunity cost of childbearing

	External markets			Domestic markets	
	Sea coast	MA port	TT port	MA cities 50,000	TT cities 50,000
	(1)	(2)	(3)	(4)	(5)
Panel A: Log of light density					
MA	-1.40***	0.36***	-1.34***	0.27***	-1.35***
	(0.251)	(0.061)	(0.249)	(0.038)	(0.102)
Observations	1,694	1,653	1,653	1,653	1,653
Panel B: High-skilled workers					
MA	-0.01***	0.00**	-0.01**	0.00***	-0.01***
	(0.005)	(0.001)	(0.003)	(0.001)	(0.003)
Observations	37,774	36,606	36,606	36,606	36,606
Panel C: Cash earning					
MA	-0.10***	0.06***	-0.18***	0.02***	-0.09***
	(0.036)	(0.012)	(0.050)	(0.005)	(0.019)
Observations	15,028	14,231	14,231	14,231	14,231
Panel D: Asset					
MA	-0.06***	0.02***	-0.07***	0.01***	-0.08***
	(0.010)	(0.003)	(0.011)	(0.005)	(0.017)
Observations	37,473	36,314	36,314	36,314	36,314
Ethnic homeland FE	✓	✓	✓	✓	✓
Geographic controls	✓	✓	✓	✓	✓

Note: Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is denoted by the corresponding panel title. In this table, MA refers to Market Access. In column (1), MA is measured by the geodesic proximity 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. Each specification controls for ancestral ethnic homeland fixed effects and geographic characteristics (including elevation, soil suitability for agriculture, area under water, presence of natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border). In Panel A, the unit of observation is the pixel and in the remaining panels the unit of observation is the women. In Panels B, C, and D we add controls for individual characteristics including: age, year of birth, declared religious affiliation. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 6: Heterogeneity by proximity to the sea coast: colonial origins and fertility

	<60 km of bound.		<100 km of bound.		<150 km of bound.		<200 km of bound.	
	Close (1)	Far (2)	Close (3)	Far (4)	Close (5)	Far (6)	Close (7)	Far (8)
Dependent variable: Total number of children ever born								
Panel A: Baseline specification								
British (vs. French)	-0.10	-0.46***	-0.13	-0.45***	-0.21	-0.46***	-0.19	-0.48***
	(0.086)	(0.076)	(0.146)	(0.086)	(0.243)	(0.092)	(0.243)	(0.087)
Observations	9,366	12,148	12,440	16,936	13,808	19,746	14,818	21,910
Panel B: Geographic controls								
British (vs. French)	-0.06	-0.47***	-0.13	-0.43***	-0.16	-0.44***	-0.14	-0.47***
	(0.092)	(0.106)	(0.105)	(0.093)	(0.138)	(0.082)	(0.144)	(0.085)
Observations	9,129	12,148	12,002	16,936	13,370	19,746	14,380	21,910
Panel C: Natives								
British (vs. French)	0.03	-0.51***	-0.02	-0.53***	-0.11	-0.54***	-0.11	-0.58***
	(0.159)	(0.107)	(0.195)	(0.124)	(0.340)	(0.125)	(0.355)	(0.116)
Observations	3,233	5,263	4,259	7,471	4,939	8,689	5,393	9,532
Panel D: Natives + Geographic controls								
British (vs. French)	0.09	-0.54***	0.01	-0.51***	-0.02	-0.50***	-0.01	-0.56***
	(0.148)	(0.135)	(0.157)	(0.135)	(0.196)	(0.105)	(0.223)	(0.106)
Observations	3,127	5,263	4,104	7,471	4,784	8,689	5,238	9,532
Ethnic homeland FE	✓	✓	✓	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓	✓	✓	✓

Note: Each column of each panel reports coefficients from a separate regression. “Close” and “Far” refer to regressions limited to counties with below- and above-median values of the geodesic distance from the centroid of the pixel to the sea coast, respectively. The dependent variable in each regression is the number of children ever born. Each column controls for a second-order polynomial in the distance from the centroid of each pixel to the British-French border and individual characteristics (including ancestral ethnic homeland, age, year of birth, declared religious affiliation). Geographic controls in Panels B and D include: elevation, soil suitability for agriculture, area under water, presence of natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 7: Heterogeneity by market access (second specification): colonial origins and fertility

	External markets			Domestic markets	
	Sea coast	MA port	TT port	MA cities 50,000	TT cities 50,000
	(1)	(2)	(3)	(4)	(5)
Dependent variable: Total number of children ever born					
Panel A: Baseline					
British (vs. French)	-0.06	-0.13	-0.12	-0.03	0.03
	(0.100)	(0.132)	(0.119)	(0.098)	(0.072)
British (vs. French) × Medium MA	-0.25	0.29*	-0.17	-0.85***	-0.79***
	(0.177)	(0.171)	(0.157)	(0.216)	(0.162)
British (vs. French) × Low MA	-0.67***	-0.65**	-0.62***	-0.30*	-0.40***
	(0.141)	(0.254)	(0.229)	(0.178)	(0.116)
Observations	21,277	20,900	20,900	20,900	20,900
Panel B: Natives					
British (vs. French)	0.11	0.02	0.05	0.15	0.48***
	(0.086)	(0.191)	(0.157)	(0.116)	(0.063)
British (vs. French) × Medium MA	-0.37	0.40	-0.30	-1.26***	-1.44***
	(0.227)	(0.349)	(0.274)	(0.126)	(0.147)
British (vs. French) × Low MA	-0.88***	-0.95***	-0.82***	-0.61***	-1.00***
	(0.150)	(0.278)	(0.218)	(0.205)	(0.212)
Observations	8,390	8,247	8,247	8,247	8,247
Ethnic homeland FE	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓
Geographic controls	✓	✓	✓	✓	✓

Note: Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is the number of children ever born. In this table, MA refers to Market Access. In column (1), MA is measured by the geodesic proximity 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 (4), MA is measured by the minimum travel time to major cities. Each column controls for a second-order polynomial in the distance from the centroid of each pixel to the British-French border and individual characteristics (including ancestral ethnic homeland, age, year of birth, declared religious affiliation). Geographic controls include: elevation, soil suitability for agriculture, area under water, presence of natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border. Additionally, in each specification we interact each controlled variables with the Market Access index. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 8: Heterogeneity by market access: colonial origins and other reproductive outcomes

	External markets			Domestic markets	
	Sea coast	MA port	TT port	MA cities 50,000	TT cities 50,000
	(1)	(2)	(3)	(4)	(5)
Baseline specification					
Panel A: First birth before age 18					
British (vs. French)	-0.00	-0.02	-0.02	0.06***	-0.04
	(0.024)	(0.035)	(0.035)	(0.007)	(0.021)
British (vs. French) × Medium MA	-0.08***	0.02	-0.01	-0.15***	-0.06**
	(0.028)	(0.036)	(0.037)	(0.040)	(0.028)
British (vs. French) × Low MA	-0.09***	-0.09**	-0.08*	-0.11***	-0.03
	(0.034)	(0.041)	(0.044)	(0.021)	(0.037)
Observations	19,206	18,863	18,863	18,863	18,863
Panel B: Age at first sexual intercourse					
British (vs. French)	0.13	0.35*	0.37*	0.11	0.30***
	(0.114)	(0.191)	(0.213)	(0.291)	(0.087)
British (vs. French) × Medium MA	0.77***	0.43	0.44	0.25	0.16
	(0.236)	(0.501)	(0.384)	(0.276)	(0.257)
British (vs. French) × Low MA	0.44	0.32	0.07	0.59**	0.46
	(0.392)	(0.290)	(0.411)	(0.280)	(0.296)
Observations	17,100	16,763	16,763	16,763	16,763
Panel C: Early marriage (before 18 years old)					
British (vs. French)	0.01	0.01	0.01	0.12***	-0.05*
	(0.029)	(0.037)	(0.034)	(0.014)	(0.027)
British (vs. French) × Medium MA	-0.12***	-0.09*	-0.11***	-0.16***	-0.02
	(0.041)	(0.050)	(0.041)	(0.030)	(0.037)
British (vs. French) × Low MA	-0.10*	-0.14**	-0.08	-0.24***	-0.07**
	(0.057)	(0.056)	(0.056)	(0.022)	(0.033)
Observations	19,868	19,523	19,523	19,523	19,523
Ethnic homeland FE	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓
Geographic controls	✓	✓	✓	✓	✓

Note: Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is denoted by the corresponding panel title. In this table, MA refers to Market Access. In column (1), MA is measured by the geodesic proximity 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 (4), MA is measured by the minimum travel time to major cities. Each column controls for a second-order polynomial in the distance from the centroid of each pixel to the British-French border and individual characteristics (including ancestral ethnic homeland, age, year of birth, declared religious affiliation). Geographic controls include: elevation, soil suitability for agriculture, area under water, presence of natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border. Additionally, in each specification we interact each controlled variables with the Market Access index. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table 9: Colonial origins and fertility - Mechanisms

	External markets			Domestic markets	
	Sea coast (1)	MA port (2)	TT port (3)	MA cities 50,000 (4)	TT cities 50,000 (5)
Channel 1: Colonial population policies					
Panel A: Use of modern method of birth control					
British (vs. French)	0.20***	0.18***	0.19***	0.28***	0.08
	(0.031)	(0.029)	(0.028)	(0.039)	(0.058)
British (vs. French) × Medium MA	-0.00	0.31**	0.00	-0.12*	0.20***
	(0.114)	(0.126)	(0.117)	(0.063)	(0.067)
British (vs. French) × Low MA	0.41***	0.28**	0.30**	0.13	0.41***
	(0.078)	(0.123)	(0.124)	(0.122)	(0.115)
Observations	3,190	3,139	3,139	3,139	3,139
Channel 2: Female Education					
Panel B: Years of schooling					
British (vs. French)	3.01***	2.85***	2.80***	2.07**	2.55***
	(0.277)	(0.141)	(0.143)	(0.845)	(0.195)
British (vs. French) × Medium MA	-1.87***	-2.71***	-1.89***	0.07	-0.36
	(0.659)	(0.436)	(0.339)	(0.183)	(0.826)
British (vs. French) × Low MA	-2.06***	-1.94***	-2.00***	-1.20	-1.81***
	(0.572)	(0.280)	(0.441)	(0.762)	(0.357)
Observations	21,261	20,884	20,884	20,884	20,884
Channel 3: Female Labor participation					
Panel C: Currently working					
British (vs. French)	-0.00	0.00	-0.00	-0.05	0.02
	(0.012)	(0.016)	(0.008)	(0.053)	(0.026)
British (vs. French) × Medium MA	0.00	-0.03	-0.00	-0.04	-0.14***
	(0.025)	(0.052)	(0.034)	(0.023)	(0.040)
British (vs. French) × Low MA	-0.17***	-0.14***	-0.16***	-0.02	-0.07
	(0.034)	(0.042)	(0.037)	(0.045)	(0.046)
Observations	19,621	19,246	19,246	19,246	19,246
Channel 4: Child quality					
Panel D: Under-five mortality					
British (vs. French)	-0.00	0.00	0.00	0.02*	0.01
	(0.008)	(0.009)	(0.008)	(0.011)	(0.012)
British (vs. French) × Medium MA	0.02	0.02	-0.02	-0.06*	-0.03
	(0.016)	(0.023)	(0.018)	(0.033)	(0.022)
British (vs. French) × Low MA	-0.04**	-0.05	-0.06*	-0.03	-0.01
	(0.018)	(0.035)	(0.033)	(0.024)	(0.022)
Observations	62,959	61,873	61,873	61,873	61,873
Ethnic homeland FE	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓
Geographic controls	✓	✓	✓	✓	✓

Note: Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is denoted by the corresponding panel title. In this table, MA refers to Market Access. In column (1), MA is measured by the geodesic proximity 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 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 (4), MA is measured by the minimum travel time to major cities. Each column controls for a second-order polynomial in the distance from the centroid of each pixel to the British-French border and individual characteristics (including ancestral ethnic homeland, age, year of birth, declared religious affiliation). Geographic controls include: elevation, soil suitability for agriculture, area under water, presence of natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border. Specification in panel D also controls for child characteristics (year of birth and sex). Additionally, in each specification we interact each controlled variables with the Market Access index. Modern methods of contraception include pill, IUD, injections, diaphragm, condom, female sterilization, male sterilization, lactational amenorrhea, implants/norplant, female condom, and foam/jelly. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Appendix For online publication

A1 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 B1. It features two types of channels. The first and primary channel is a *direct* mechanism supported by differences in colonial population policies (presented in Section 3). The second channel is a class of *indirect* mechanisms which we view as secondary. These latter mechanisms include the protection of marital property rights, the protection of economic property rights, administrative rules, and education policies. We argue that these channels may affect proximate determinants of fertility behavior such as contraceptive use (our *direct* mechanism), and distal determinants such as household income, female education and economic empowerment, and child quality. In what follows, we first recall the theoretical literature on these determinants, and then show how they could be affected by the aforementioned colonial institutions.

A1.1 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 are delayed age of marriage and sexual activity, use of contraception, abortion, and postpartum insusceptibility (Bongaarts (2015), Canning et al. (2015)). These proximate determinants depend in turn on fertility desires which depend on child mortality (which induces replacement and insurance fertility (see for example Rossi and Godard (in press)), 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 the pioneering work of 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.[31]

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

[31] 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.

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 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)).

A1.2 Other Colonial Rules

In this section, we highlight several key aspects of colonial institutions other than colonial population policies[32] 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.

Some 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 develop-

[32]For a description of differences in colonial population policies, see Section 3.

ment 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 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 B6, 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)). Whereas 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)).

The aforementioned British-French differences have persisted to the present-day, as illustrated in the descriptive analysis of Appendix Figures B6-*e* and B6-*f*. These Figures show that former British colonies invest more in health and education than former French colonies. In addition, Appendix Figure B6-*g* shows that females in former French colonies are more likely to have no education compared to their counterparts in former British colonies. These Figures are consistent with empirical studies showing higher levels of household wealth, educational attainment, and greater provision of local public goods in former British areas (Dupraz (2017), Lee and Schultz (2012)). In addition, analyzing historical archives on colonial public investments, Dupraz (2017) attributes the advantage in educational outcomes among Anglophones to higher public investments in education in former British colonies than in former French colonies.

A2 Data Sources

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: Average elevation above sea level of each pixel. Source: National Oceanic and Atmospheric Administration (NOAA) and U.S. National Geophysical Data Center, TerrainBase, release 1.0 (CD-ROM), Boulder, Colorado. *Available at* http://nelson.wisc.edu/sage/data-and-models/atlas/data.php?incdataset=Topography

Soil suitability for agriculture: Average land quality for cultivation within each pixel. This index is based on the temperature and soil conditions of each grid cell. Source: Ramankutty, N., J.A. Foley, J. Norman, and K. McSweeney. The global distribution of cultivable lands: current patterns and sensitivity to possible climate change. *Available at* http://nelson.wisc.edu/sage/data-and-models/atlas/data.php?incdataset=Suitability%20for%20Agriculture

Water area: Total area covered by rivers or lakes in sq. km within each pixel. Constructed using the Level 3 of the Global Lakes and Wetlands Database (GLWD) which comprises lakes, reservoirs, rivers, and different wetland types in the form of a global raster map at 30-sec resolution. Source: Lehner, B. and Doell, P. (2004): Development and validation of a global database of lakes, reservoirs and wetlands. Journal of Hydrology 296/1-4: 1-22. *Available at* http://www.arcgis.com/home/item.html?id=1ac6777abcc24ab4a9fe39f27c4cb01f

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 city: 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

Diamonds: Indicator variable that equals one if there is a diamond mine in the pixel. We use the Diamonds dataset. This dataset offers a comprehensive list of all known diamond deposits throughout the world. Source: Gilmore, E., Gleditsch, N.P., Lujala, P. and Ketil Rod, J., 2005. "Conflict Diamonds: A New Dataset", Conflict Management and Peace Science 22(3): 257–292. *Available at* https://www.prio.org/Data/Geographical-and-Resource-Datasets/Diamond-Resources/

B1 Appendix Figures

Figure B1: Conceptual Framework

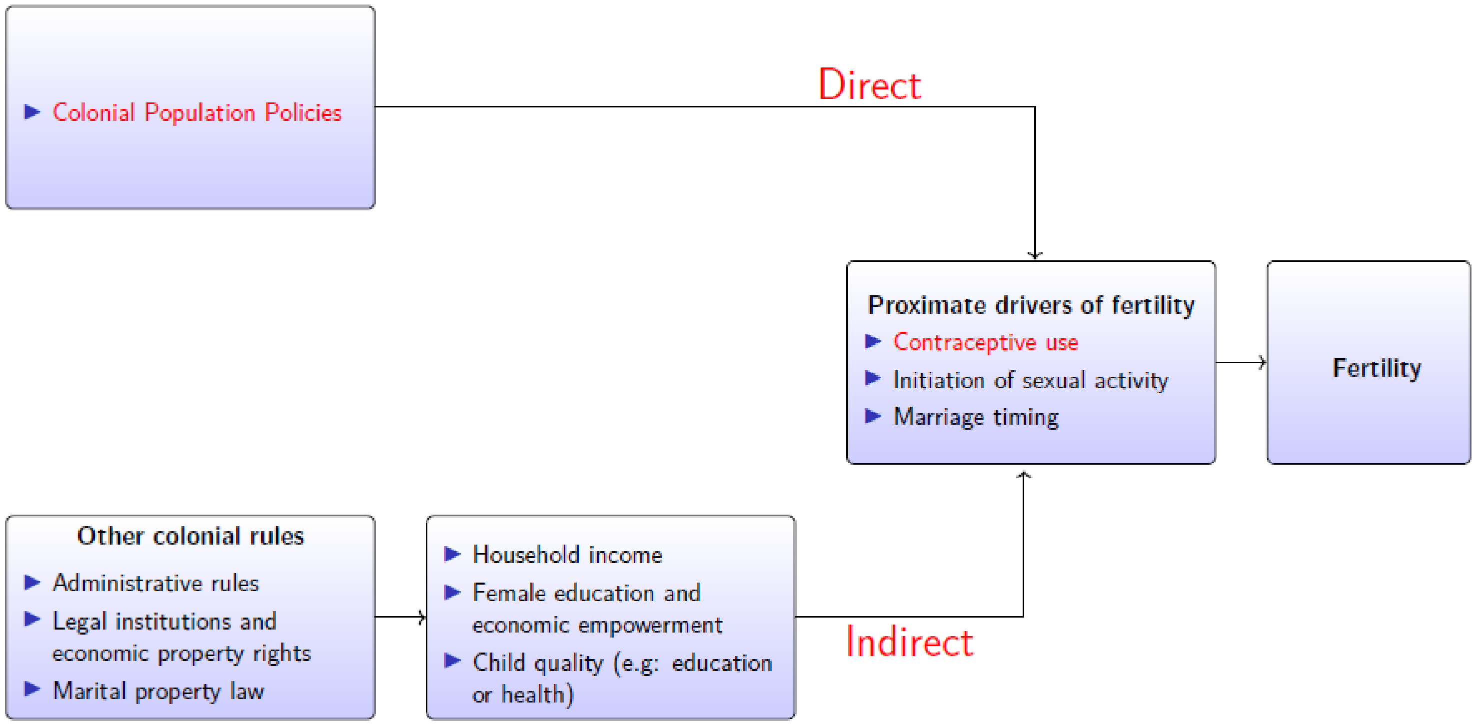


Figure B2: Colonial population laws

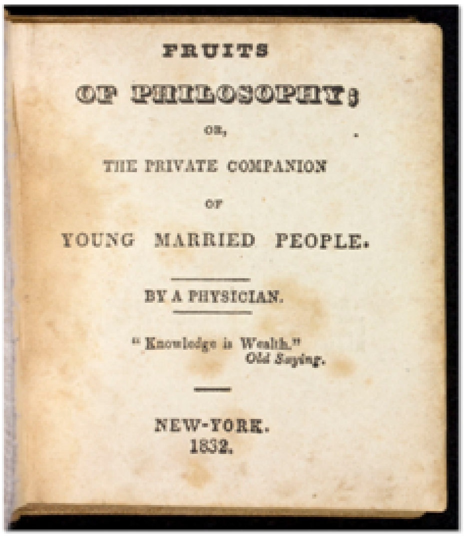
JOURNAL OFFICIEL
DE LA RÉPUBLIQUE FRANÇAISE

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

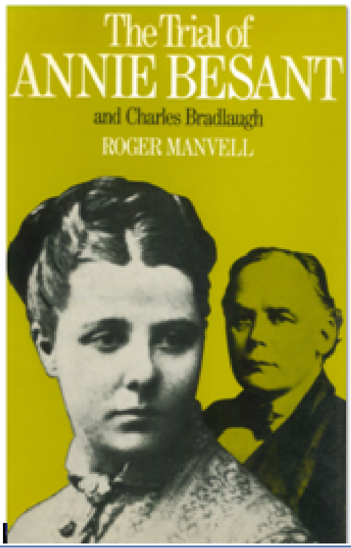


FRUITS
OF PHILOSOPHY;
OR,
THE PRIVATE COMPANION
OF
YOUNG MARRIED PEOPLE.

BY A PHYSICIAN.

"Knowledge is Wealth."
Old Saying.

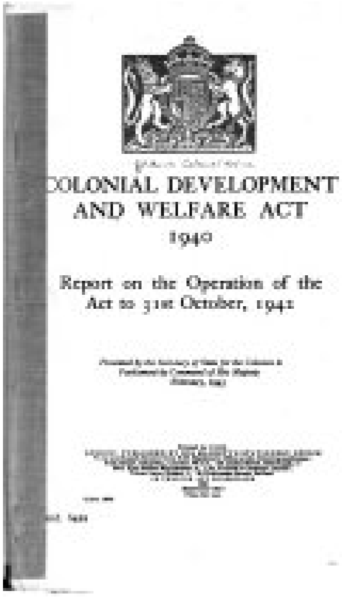
NEW-YORK.
1832.



(b) Charles Knowlton's book and the trial of Annie Besant and Charles Bradlaugh

Note: Figure B2-*a* displays selected pages of the "Journal Officiel de la République Française" published in 1920, which advertises the major legal official information for the national Government of France and the French Parliament. On the top of Figure B2-*b* is an image of the first page of the physician Charles Knowlton's book which contains information about contraception and was published by Annie Besant and Charles Bradlaugh. At the bottom of Figure B2-*b*, we display a portrait of the activists Annie Besant and Charles Bradlaugh drawn from the Internet.

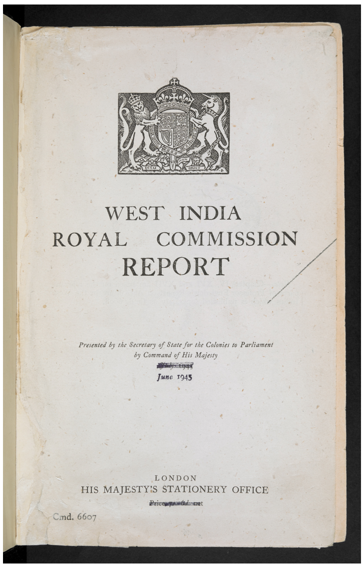
Figure B3: Colonial Development and Welfare Act 1940



COLONIAL DEVELOPMENT
AND WELFARE ACT
1940

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

Figure B4: West India Royal Commission Report



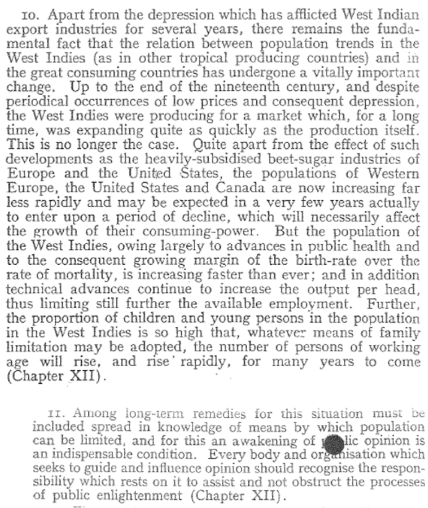
WEST INDIA
ROYAL COMMISSION
REPORT

Presented by the Secretary of State for the Colonies to Parliament
by Command of His Majesty
June 1945

LONDON
HIS MAJESTY'S STATIONERY OFFICE

Cmd. 6607

(a) The Moyne Report



10. Apart from the depression which has afflicted West Indian export industries for several years, there remains the fundamental fact that the relation between population trends in the West Indies (as in other tropical producing countries) and in the great consuming countries has undergone a vitally important change. Up to the end of the nineteenth century, and despite periodical occurrences of low prices and consequent depression, the West Indies were producing for a market which, for a long time, was expanding quite as quickly as the production itself. This is no longer the case. Quite apart from the effect of such developments as the heavily-subsidised beet-sugar industries of Europe and the United States, the populations of Western Europe, the United States and Canada are now increasing far less rapidly and may be expected in a very few years actually to enter upon a period of decline, which will necessarily affect the growth of their consuming-power. But the population of the West Indies, owing largely to advances in public health and to the consequent growing margin of the birth-rate over the rate of mortality, is increasing faster than ever; and in addition technical advances continue to increase the output per head, thus limiting still further the available employment. Further, the proportion of children and young persons in the population in the West Indies is so high that, whatever means of family limitation may be adopted, the number of persons of working age will rise, and rise rapidly, for many years to come (Chapter XII).

11. Among long-term remedies for this situation must be included spread in knowledge of means by which population can be limited, and for this an awakening of public opinion is an indispensable condition. Every body and organisation which seeks to guide and influence opinion should recognise the responsibility which rests on it to assist and not obstruct the processes of public enlightenment (Chapter XII).

(b) West India Royal Commission Conclusions and Recommendations

Figure B5: RD plots: Fertility discontinuity at the British-French border - Baseline sample

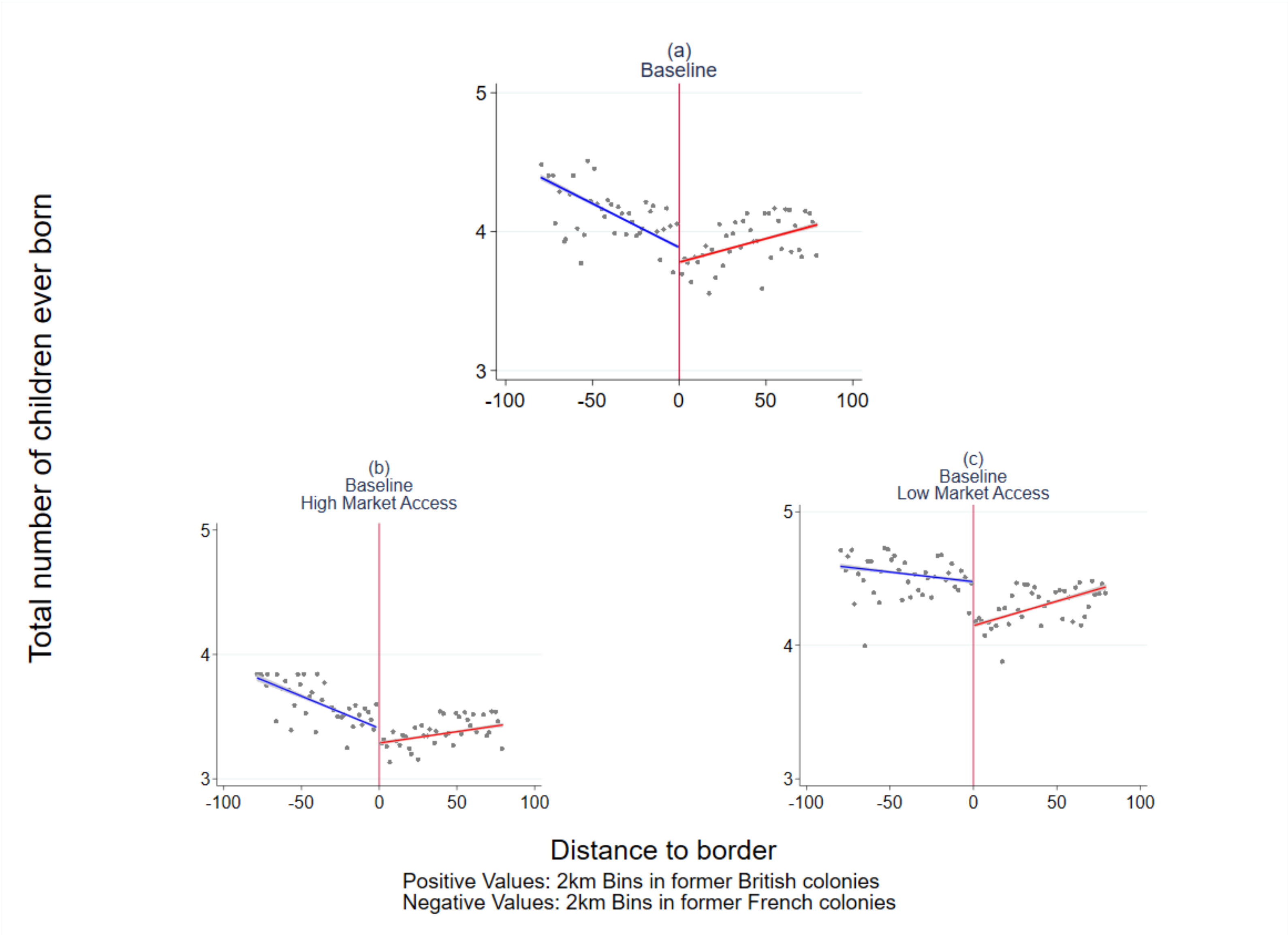
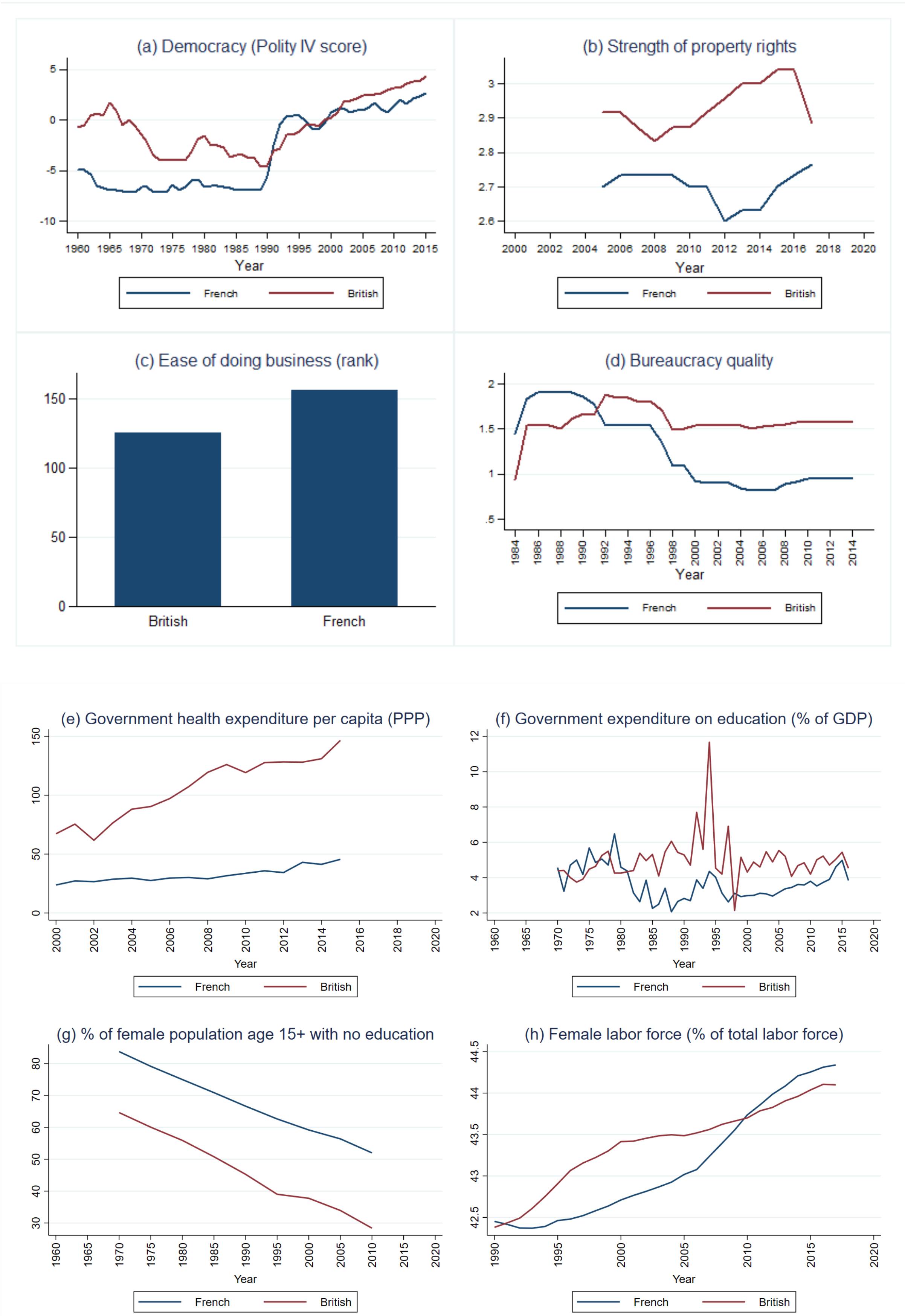


Figure B6: British-French differences in selected measures of quality of institutions and economic development



Source: Data from the World Bank Group, the Polity IV data series, and the Political Risk Services

B2 Appendix Tables

Table B1: Descriptive statistics

	Observations	Means	Sd.dev.	Min	Max
Age	38,297	31.55	8.16	20	49
Year of birth	38,297	1968.46	10.28	1938	1988
Muslim religion	38,212	0.61	0.49	0	1
Children ever born	38,297	4.06	2.89	0	18
Age at first sexual intercourse	30,562	16.08	2.94	4	37
Age at first marriage	35,868	17.21	3.87	3	47
Early marriage (before age 18)	35,868	0.61	0.49	0	1
First birth before age 18	34,505	0.36	0.48	0	1
Years of education	38,274	2.12	3.85	0	21
Currently working	36,498	0.74	0.44	0	1
High-skilled worker	38,297	0.03	0.16	0	1
Cash earning	15,274	0.54	0.50	0	1
Asset ownership	37,992	0.71	0.45	0	1
Currently using modern contraception	5,019	0.55	0.50	0	1
Child mortality	115,205	0.22	0.42	0	1
	Observations	Means	Sd.dev.	Min	Max
Pixel area	1,713	126.41	33.46	2	144
Pixel is lit	1,713	0.36	0.48	0	1
Log of light density	1,713	-2.98	2.39	-5	4
Elevation	1,713	300.32	204.10	-26	1687
Soil suitability to agriculture	1,694	0.38	0.22	0	1
Area under water	1,713	7.03	20.85	0	152
Distance to the closest British-French border	1,713	61.10	57.44	0	294
Distance to the coast	1,713	430.30	306.14	1	1094
Distance to the capital	1,628	426.94	308.74	3	1371
Distance to the national border	1,713	46.15	44.14	0	269
Natural resources	1,713	0.01	0.10	0	1
Distance to mission station	1,713	185.85	147.61	1	660

Table B2: Average effect - Colonial origins and fertility (thick border)

		RDD - Bandwidth			
	All sample (1)	<60 km of bound. (2)	<100 km of bound. (3)	<150 km of bound. (4)	<200 km of bound. (5)
Dependent variable: Total number of children ever born					
Panel A: Natives + Thick border					
British (vs. French)	-0.59***	-0.46***	-0.50***	-0.57***	-0.60***
	(0.105)	(0.117)	(0.126)	(0.113)	(0.113)
Observations	14,384	7,209	10,443	12,341	13,638
Panel B: Natives + Thick border + Geographic controls					
British (vs. French)	-0.56***	-0.51***	-0.49***	-0.54***	-0.57***
	(0.103)	(0.132)	(0.130)	(0.103)	(0.110)
Observations	14,236	7,110	10,295	12,193	13,490
Ethnic homeland FE	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓

Note: Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is the number of children ever born. Each column controls for individual characteristics (including ancestral ethnic homeland, age, year of birth, declared religious affiliation). In columns (2)-(5) we add control for a second-order polynomial in the distance from the centroid of each pixel to the British-French border. Geographic controls in Panel E include: elevation, soil suitability for agriculture, area under water, presence of natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table B3: Robustness check : Colonial origins and fertility

	No poly (1)	Linear (2)	Third order poly (3)	Lat and long poly (4)	Excluding Cameroon and Togo (5)	Controlling for mission (6)
			Baseline specification			
			Panel A: Total number of children ever born			
British (vs. French)	-0.33***	-0.33***	-0.33***	-0.32**	-0.33***	-0.30***
	(0.116)	(0.117)	(0.111)	(0.144)	(0.113)	(0.102)
Observations	21,277	21,277	21,277	21,277	21,277	21,277
			Panel B: First birth before age 18			
British (vs. French)	-0.06***	-0.06***	-0.06***	-0.06**	-0.06***	-0.06**
	(0.025)	(0.024)	(0.024)	(0.026)	(0.024)	(0.024)
Observations	19,206	19,206	19,206	19,206	19,206	19,206
			Panel C: Age at first sexual intercourse			
British (vs. French)	0.53***	0.52**	0.52***	0.61***	0.53***	0.52**
	(0.203)	(0.204)	(0.200)	(0.195)	(0.201)	(0.211)
Observations	17,100	17,100	17,100	17,100	17,100	17,100
			Panel D: Early marriage (before 18 years old)			
British (vs. French)	-0.07*	-0.07*	-0.07*	-0.07	-0.07*	-0.07*
	(0.035)	(0.036)	(0.035)	(0.042)	(0.035)	(0.036)
Observations	19,868	19,868	19,868	19,868	19,868	19,868
Ethnic homeland FE	✓	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓	✓
Mission station						✓
Geographic controls	✓	✓	✓	✓	✓	✓

Note: The analysis is restricted to observations within 60km of the British-French borders. In each specification, we control for a third-order polynomial in the distance from the centroid of each pixel to the nearest national border with a different colonial origin. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. Coefficients that are significantly different from zero are denoted by the following system: ****p<0.01, **p<0.05, *p<0.1.*

Table B4: Average effect - Colonial origins and maternal mortality

	All sample	RDD - Bandwidth			
	All sample (1)	<60 km of bound. (2)	<100 km of bound. (3)	<150 km of bound. (4)	<200 km of bound. (5)
Dependent variable: Number of death related to pregnancy					
Panel A: Baseline specification					
British (vs. French)	-0.01	0.00	0.02	-0.01	-0.00
	(0.053)	(0.032)	(0.045)	(0.053)	(0.052)
Observations	7,700	4,183	6,004	6,778	7,451
Panel B: Geographic controls					
British (vs. French)	-0.00	0.00	0.01	-0.02	-0.00
	(0.047)	(0.036)	(0.041)	(0.048)	(0.049)
Observations	7,682	4,181	5,986	6,760	7,433
Ethnic homeland FE	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓
Geographic controls	✓	✓	✓	✓	✓

Note: Each column of each panel reports coefficients from a separate regression. The dependent variable indicates for each respondent, 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 controls for individual characteristics (including ancestral ethnic homeland, age, year of birth, declared religious affiliation, and the total number of sisters). In columns (2)-(5) we add control for a second-order polynomial in the distance from the centroid of each pixel to the British-French border. Geographic controls in Panels B, D, and E include: elevation, soil suitability for agriculture, area under water, presence of natural resources, distance from the centroid of a pixel to the sea coast, and distance from the centroid of a pixel to the national border. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

Table B5: Heterogeneous effects of colonial origins on fertility by market access (Control for education and income)

	External markets			Domestic markets	
	Sea coast (1)	MA port (2)	TT port (3)	MA cities 50,000 (4)	TT cities 50,000 (5)
Baseline specification					
Panel A: Total number of children ever born					
British (vs. French)	0.28***	0.19	0.20	0.18	0.31***
	(0.069)	(0.131)	(0.122)	(0.114)	(0.093)
British (vs. French) × Medium MA	-0.45***	-0.02	-0.39**	-0.83***	-0.82***
	(0.136)	(0.155)	(0.153)	(0.215)	(0.188)
British (vs. French) × Low MA	-0.89***	-0.86***	-0.84***	-0.42***	-0.60***
	(0.156)	(0.248)	(0.251)	(0.124)	(0.115)
Observations	21,089	20,717	20,717	20,717	20,717
Panel B: First birth before age 18					
British (vs. French)	0.03	0.01	0.01	0.08***	-0.00
	(0.026)	(0.036)	(0.036)	(0.010)	(0.022)
British (vs. French) × Medium MA	-0.10***	-0.02	-0.04	-0.15***	-0.06**
	(0.029)	(0.037)	(0.038)	(0.042)	(0.025)
British (vs. French) × Low MA	-0.12***	-0.12***	-0.10**	-0.12***	-0.05
	(0.040)	(0.043)	(0.047)	(0.021)	(0.041)
Observations	19,046	18,707	18,707	18,707	18,707
Panel C: Age at first sexual intercourse					
British (vs. French)	-0.22	0.01	0.03	-0.15	0.02
	(0.142)	(0.187)	(0.209)	(0.256)	(0.106)
British (vs. French) × Medium MA	0.99***	0.77*	0.65	0.20	0.09
	(0.259)	(0.460)	(0.405)	(0.276)	(0.236)
British (vs. French) × Low MA	0.63*	0.55**	0.27	0.76***	0.66**
	(0.341)	(0.269)	(0.371)	(0.269)	(0.304)
Observations	16,929	16,596	16,596	16,596	16,596
Panel D: Early marriage (before 18 years old)					
British (vs. French)	0.07**	0.07**	0.07**	0.16***	0.00
	(0.032)	(0.036)	(0.034)	(0.012)	(0.031)
British (vs. French) × Medium MA	-0.16***	-0.15***	-0.15***	-0.15***	-0.03
	(0.049)	(0.045)	(0.042)	(0.031)	(0.032)
British (vs. French) × Low MA	-0.14***	-0.18***	-0.12**	-0.27***	-0.11***
	(0.049)	(0.052)	(0.052)	(0.029)	(0.034)
Observations	19,702	19,361	19,361	19,361	19,361
Ethnic homeland FE	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓
Year of birth FE	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓
Geographic controls	✓	✓	✓	✓	✓
Education control	✓	✓	✓	✓	✓
Asset control	✓	✓	✓	✓	✓

Note: In each specification we control for a second-order polynomial in the distance from the centroid of each pixel to the British-French border. Robust standard errors, adjusted for double-clustering at the country and the ethno-linguistic family level using the approach of Cameron et al. (2011), are in parentheses. ****p<0.01, **p<0.05, *p<0.1.*

References for the Appendix

Anderson, S. (2018, June). Legal Origins and Female HIV. *American Economic Review*, *108*(6), 1407-1439.

Beck, T., Demirguc-Kunt, A., & Levine, R. (2003). Law and finance: why does legal origin matter? *Journal of Comparative Economics*, *31*(4), 653-675.

Becker, G. (1960). An economic analysis of fertility. In *Demographic and economic change in developed countries* (p. 209-240). National Bureau of Economic Research, Inc.

Becker, G., & Lewis, H. G. (1973). On the interaction between the quantity and quality of children. *Journal of Political Economy*, *81*(2), S279-88.

Bertocchi, G., & Canova, F. (2002). Did colonization matter for growth?: An empirical exploration into the historical causes of africa's underdevelopment. *European Economic Review*, *46*(10), 1851-1871.

Bhattacharya, J., & Chakraborty, S. (2017). Contraception and the demographic transition. *The Economic Journal*, *127, Issue 606*.

Bongaarts, J. (2010). The causes of educational differences in fertility in sub-saharan africa. *Vienna Yearbook of Population Research*, *8*(1), 31-50.

Bongaarts, J. (2015). Modeling the fertility impact of the proximate determinants: Time for a tune-up. *Demographic Research*, *33*, 535–560.

Bongaarts, J., & Casterline, J. (2013). Fertility transition: Is sub-saharan africa different? *Population and Development Review*, *38*, 153-168.

Cameron, A., Gelbach, J., & Miller, D. (2011). Robust inference with multiway clustering. *Journal of Business & Economic Statistics*, *29*(2), 238-249.

Canning, D., Raja, S., & Yazbeck, A. S. (2015). *Africa's demographic transition: dividend or disaster?* The World Bank.

Crowder, M. (1964). Indirect rule: French and british style. *Africa: Journal of the International African Institute*, *34*(3), 197–205.

Debpuur, C., Phillips, J. F., Jackson, E. F., Nazzar, A., Ngom, P., & Binka, F. N. (2002). The impact of the navrongo project on contraceptive knowledge and use, reproductive preferences, and fertility. *Studies in family planning*, *33*(2), 141–164.

Dessy, S., Marchetta, F., Pongou, R., & Tiberti, L. (2021). *Can climate shocks drive up long-run fertility?*

Djankov, S., Porta, R. L., de Silanes, F. L., & Shleifer, A. (2002). The Regulation of Entry. *The Quarterly Journal of Economics*, *117*(1), 1-37.

Doepke, M., & Tertilt, M. (2018). Women's empowerment, the gender gap in desired fertility, and fertility outcomes in developing countries. In *Aea papers and proceedings* (Vol. 108, pp. 358–62).

Dupraz, Y. (2017). *French and British Colonial Legacies in Education: Evidence from the Partition of Cameroon* (CAGE Online Working Paper Series No. 333). Competitive Advantage in the Global Economy (CAGE).

Galor, O., & Moav, O. (2002). Natural selection and the origin of economic growth. *The Quarterly Journal of Economics*, *117*(4), 1133–1191.

Galor, O., & Weil, D. (1996). The gender gap, fertility, and growth. *American Economic Review*, *86*(3), 374-87.

Galor, O., & Weil, D. N. (2000, September). Population, technology, and growth: From malthusian stagnation to the demographic transition and beyond. *American Economic Review*, *90*(4), 806-828.

Glaeser, E. L., & Shleifer, A. (2002). Legal Origins. *The Quarterly Journal of Economics*, *117*(4), 1193-1229.

Iyer, L. (2010). Direct versus indirect colonial rule in india: Long-term consequences. *The Review of Economics and Statistics*, *4*, 693-713.

LaPorta, R., de Silanes, F. L., Shleifer, A., & Vishny, R. (1999). The quality of government. *Journal of Law, Economics and Organization*, *15*(1), 222-279.

La Porta, R., de Silanes, F. L., Shleifer, A., & Vishny, R. W. (1998, December). Law and Finance. *Journal of Political Economy*, *106*(6), 1113-1155.

Lee, A., & Schultz, K. A. (2012). Comparing british and french colonial legacies: A discontinuity analysis of cameroon. *Quarterly Journal of Political Science*, *7*(4), 365-410.

Mincer, J. (1963). Opportunity costs and income effects. In C. Christ (Ed.), *Measurement in economics.* Stanford University Press.

Nunn, N., Akyeampong, E., Bates, R., & Robinson, J. A. (2014). Gender and missionary influence in colonial africa. *African development in historical perspective*.

Pritchett, L. H. (1994). Desired fertility and the impact of population policies. *Population and development review*, 1–55.

Rossi, P., & Godard, M. (in press). The old-age security motive for fertility: Evidence from the extension of social pensions in namibia.

Schultz, T. P. (1981). *Investing in people : the economics of population quality* [Book]. University of California Press Berkeley, Calif.

Strulik, H. (2017, May). Contraception and development: A unified growth theory. *International Economic Review*, *58*, 561-584.