Family Planning and Fertility in South Africa under Apartheid

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Abstract

During the apartheid era, all South Africans were formally classified as white, African, coloured, or Asian. Starting in 1970, the government directly provided free family planning services to residents of townships and white-owned farms. Relative to African residents of other regions of the country, the annual share of African women that gave birth in these townships and white-owned farms declined by one-third during the 1970s. Deferral of childbearing into the 1980s partially explains this decline, but lifetime fertility fell by one child per woman. These changes were coincident with increased employment among African women and, decades later, higher income for their children in adulthood.

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1. Introduction

From 1948 until 1994, South Africa was governed by a system of apartheid. Apartheid was political, economic, and residential separation on the basis of race. White South Africans controlled the national government and major economic institutions. All other South Africans – officially, African, coloured, or Asian – could not vote and faced restrictions on their mobility and employment. This separation was particularly acute for Africans, who comprised roughly three-quarters of the population. Every African was officially a citizen of one of ten ethnic "homelands." These generally poor, rural homelands comprised 13 percent of the land area of South Africa, and by 1960 every African was required to reside in a homeland unless he or she had permission to live and work in the more prosperous "white areas." Roughly half of Africans lived in homelands, the rest in urban townships and white-owned farms in white areas.

Apartheid therefore generated separation not just between whites and non-whites but also between Africans living in white areas and Africans living in homelands. This separation included differential access to family planning services. Starting in 1970, the national government offered free contraception and family planning counseling to all residents of white areas of the country. Homeland governments only infrequently offered these family planning services.

Two demographic characteristics set South Africa apart from other countries in Sub-Saharan Africa: fewer births per woman, and longer spacing between births (Figure 1). Many studies note that these characteristics developed as the apartheid government funded family planning services (Brown 1987, De Vos 1988, Caldwell and Caldwell 1993, Kaufman 1996, Kaufman 2000, Moultrie 2001, Garenne et al. 2011). For the first time, I demonstrate that these characteristics emerged principally in white areas as African women gained access to family planning services. Beginning in the 1970s, African women in white areas gave birth less frequently than did African women in homelands. Among cohorts of women who entered their main childbearing years after 1970, lifetime fertility fell by one child per woman in white areas relative to homelands. Deferral of childbearing contributed to this fertility decline: African women in white areas first gave birth later in life, had longer intervals between births, and stopped giving birth later in life.

Public provision of family planning services in South Africa was overtly political, intended to slow the growth of the non-white population and prevent the white minority from becoming even more numerically overwhelmed, or "swamped" in the popular vocabulary of the day (Kaufman 1996). To the extent that the family planning program helped the apartheid government maintain political control, it did not last long: apartheid ended barely a generation after the government first provided family planning services. However, the apartheid government also intended for family planning to foster economic development by allowing African residents to have fewer children and plan childbearing around work and education decisions (Moultrie 2005). I demonstrate that, as family planning services became more widely available in white areas, employment among African women in white areas more than tripled relative to African women in homelands, while corresponding employment rates for African men barely budged. By the late 2000s, household income in adulthood was $500 (2012 USD) higher for African children whose mothers had access to family planning services.

2. Government provision of family planning services in South Africa

Starting with the Wittebergen Native Reserve in 1850, a series of white-controlled governments gradually partitioned South Africa into white areas and African areas (Bundy 1979). In 1913, the government of what was then the Union of South Africa formally set aside nine percent of the land for the country's African residents (Horrell 1969). Over the following five decades, white-controlled governments established pass laws mandating that African men, and later women, demonstrate proof of employment in order to remain in white areas of the country (Platsky and Walker 1985, Savage 1986, Phillips 1997, Beinart 2001). During the apartheid era, the government forcibly removed more than 3.5 million African residents from white areas (Platzky and Walker 1985). Starting in the 1960s, the apartheid government consolidated and enlarged the reserves to cover thirteen percent of the country's land area (see Figure 2) and began to consider them "homelands" (or "black states" or "Bantustans") that would eventually become independent countries. In the late 1970s and early 1980s, the government conferred nominal independence, which no other country recognized, upon four of the homelands (Transkei, Bophuthatswana, Venda, and Ciskei); the other six (Gazankulu, KaNgwane, KwaNdebele, KwaZulu, Lebowa, Qwaqwa) remained "self-governing" (Posel 1991,

Beinart 2001). Upon the end of apartheid, all homelands were reincorporated into a unified South Africa.

Expansion of family planning services accompanied the partitioning of South Africa. Since at least the start of the twentieth century, physicians in South Africa supplied contraception to white patients on an individual basis. Dedicated family planning clinics first opened in Cape Town in 1932 and, over the subsequent three decades, family planning associations founded clinics in other major cities. Aside from a single clinic in Cape Town, family planning services during the first half of the twentieth century were generally restricted to white residents and received little government funding (Caldwell 1992, Caldwell and Caldwell 1993, Klausen 2004).

By the early 1960s, a National Family Planning Association operated several dozen urban clinics that offered family planning services to members of all racial groups. In 1963, the national government first provided a small grant to the National Family Planning Association. These grants rose consistently throughout the rest of the decade and, in 1970, the government fully funded and began to assume control of the Association's clinics (Caldwell 1992, Caldwell and Caldwell 1993). In 1974, having taken control of all of the clinics, the government announced a National Family Planning Program (Brown 1987). Stand-alone clinics, mobile clinics, and door-to-door recruiters offered family planning services (Department of Health 1976). Government expenditure on family planning rose steadily during the 1970s and 1980s (Figure 3), and by 1987 the government operated 2,641 stationary family planning service points and 54,475 mobile service points (Department of Health 1987). In 1989, government expenditure on family planning stood at $60 million (roughly $2 per capita; 2012 USD) and comprised 23 percent of government expenditure on health programs and 0.2 percent of all government spending.[1]

[1] Other countries similarly expanded family planning services. In 1974, the same year that South Africa formally announced its National Family Planning Program, representatives from 136 countries attended the World Population Conference in Bucharest, which advocated for family planning as a means of curbing population growth and promoting economic development (Finkle and Crane 1975, United Nations 2014). In the years that followed, many countries relaxed restrictions on the distribution of contraceptives and increased subsidies to encourage their use (Finlay et al. 2012). Unlike in several other countries, until 1997 abortion remained illegal in South Africa unless the pregnancy resulted from rape or incest, the child was expected to suffer from a serious handicap, continuing the pregnancy would endanger the mother's health, or the mother was mentally handicapped (Klugman 1993). The most widely used forms of contraception among African women were injectables (particularly Depo Provera), intrauterine devices (IUDs), and birth control pills. Condoms gained popularity alongside widespread public awareness of HIV in the 1990s. HIV was not yet a primary focus of public awareness during most of the apartheid era.

Maintenance of white political control motivated both the partitioning of South Africa and the provision of family planning services to non-white residents of white areas. Soon after the formal start of apartheid in 1948, government officials worried that the growing non-white share of the population would imperil the white minority's political power. While speaking before Parliament in 1962, Prime Minister H. F. Verwoerd asserted that, "If the one multiracial state were to become a federally constituted state or a unitary state (on the basis of the Liberal Party's proposition of 'one man, one vote') and at the same time be truly democratic and in harmony with the spirit of the times, it would inexorably lead to Bantu domination" (cited in Chimere-Dan 1993). Other government officials expressed concerns about social stability in the face of rising numbers of underemployed African residents (Brown 1987). In response, the government encouraged immigration from Europe, urged white families to have additional children, designated the homelands as self-governing and eventually independent countries, and provided family planning services to Africans living in white areas (Brown 1987, Caldwell and Caldwell 1993). Although particularly overt, the politicization of family planning was not unique to South Africa. Many governments have targeted family planning to particular demographic groups, from rural residents in Mexico to members of lower castes in India and poor residents of the United States (Vicziany 1982, Browner 1986, Potter 1999, Bailey et al. 2014).

African leaders generally advocated against family planning, and few homeland governments funded family planning services. Ferreira (1984, page 7) states that, "For a large number of Blacks, family planning and the political apparatus of the White government are still perceived as indivisible with the result that the motives of the [National Family Planning Programme] remain suspect." The African Communist newspaper summarized the suspicion: "The so-called national family planning program is being used to perpetuate White domination and the oppression and exploitation of the Black majority" (Unsigned 1982, page 87). Concerns about cancer-causing effects of the injectable contraceptive Depo Provera further generated suspicion. The United States prohibited its domestic sale until 1992 due to concerns that it might cause cancer and neighboring Zimbabwe banned it in 1981, but the South African government consistently offered the drug at family planning clinics (Kaler 1998). As nominally independent or self-governing territories, the homelands assumed full financial and administrative responsibilities for their health services and declined to establish extensive family planning

programs (Department of Health 1973, Mostert et al. 1988). Per-capita expenditure on family planning in the homelands never exceeded 7 percent of that in the white areas (Figure 4).

3. Use of contraception and access to family planning counseling among African women

Despite black leaders' concern about the political objectives of family planning, use of contraception among African women rose substantially in the 1970s and 1980s. In 1974, 24 percent of African women in white areas and 11 percent of African women in homelands were currently using artificial contraception (Figure 5). By the late 1980s, these rates had risen to 50 percent and 40 percent. The share of African women that had ever used contraception rose similarly, from 32 percent to 70 percent in white areas and 16 percent to 55 percent in homelands. These rates indicate that, in both white areas and homelands, the share of African women that currently used contraception rose by nearly 30 percentage points and the share that had ever used artificial contraception rose by nearly 40 percentage points. Although family planning clinics were relative rare in the homelands, some women traveled across homeland boundaries into white areas to obtain contraception (Kaufman 1997).

While this increase in the use of contraception between the early 1970s and late 1980s was of similar magnitude in both white areas and homelands, it likely occurred earlier in white areas. A 1982 survey conducted only in white areas demonstrates that the share of African women currently using contraception had plateaued in white areas by the early 1980s (Figure 5). The 1987-89 survey recorded duration of use among women that were currently using contraception. African women in white areas had been using contraception for 44 months on average, 3 months longer than women in homelands.

Although rates of use of artificial contraception rose by similar magnitudes in white areas and homelands in the 1970s and 1980s, women in white areas were much more likely to receive visits at their homes by family planning advisors. This advising allowed women to easily access free contraception by removing transportation costs. Among women living in white areas in 1974, 9 percent reported that a family planning advisor visited their house in the past year. Among women living in homelands, only 2 percent reported having been visited by a family planning advisor in the past year. By the late 1980s, 16 percent of women living in white areas received contraception from a mobile clinic or family planning advisor but only 6 percent of women in homelands did so.

4. Changes in African fertility as family planning services became available

4.1 Birth history data

Contemporary demographic measurement of African residents was incomplete during the apartheid era. The national government maintained vital registries of births among white, coloured, and Asian but not African residents. Census coverage was incomplete in the homelands and did not consistently count the number of births to African residents each year. The most comprehensive record of African childbearing during the apartheid era comes from several nationally-representative household surveys conducted at and after the end of apartheid. These surveys asked women to report the timing of each of their births. However, these birth histories do not record the location of each birth. Because internal migration was substantial during and after the apartheid era (Reed 2013), I mark births as occurring in white areas or homelands based on whether the mother was herself born in a white area or homeland. Only three birth history surveys, the 1994 and 1995 October Household Surveys (OHS) and the National Income Dynamics Study (NIDS) that began in 2008, record place of birth for all women, not just married women.[2] The OHS records magisterial district of birth and the NIDS records district council of birth. There are nearly 400 magisterial districts in South Africa but only 53 district councils, and magisterial district boundaries correspond much more closely to historical white area/homeland boundaries than do district council boundaries (Giraut and Vacchiani-Marcuzzo 2009, Municipal Demarcation Board 2014). I mark as a white area any district with at least 90 percent of its land area within a former white area boundary. I use 1994 and 1995 OHS records for the main fertility results and supplement them with 2008 NIDS records to measure longer-term outcomes.

Birth histories suffer from three limitations. First, they do not record births to women who have died. The apartheid government maintained vital records of deaths only for non-African residents, so it is not possible to adjust later birth histories for differential maternal mortality in white areas and homelands. Second, mothers may underreport births of children that died long ago (Potter 1977, Beckett et al. 2001). African women observed by the OHS report that, among all of their children reported born between 1953 and 1992, 21.5 percent were born in

[2] Sources: Central Statistical Service. 1994 and 1995. "October Household Survey." Available at <http://www.datafirst.uct.ac.za/>, accessed August 6, 2013. Southern Africa Labour and Development Research Unit. 2008. "National Income Dynamics Study." Available at <http://www.datafirst.uct.ac.za/>, accessed January 14, 2013.

years ending in 0 or 5. This birth year heaping suggests some misreporting of children's dates of birth, but is of similar magnitude in white areas and homelands (21.7 percent and 21.3 percent), suggesting similar ability to remember and report previous births. Third, the 1994 and 1995 OHS collect birth histories only from women ages 12–54, so births recorded in the 1950s and 1960s are to only younger women. Despite these limitations, birth histories remain the best record of childbearing in white areas and homelands during apartheid.

4.2 Fertility declined in white areas as family planning services became available

Fertility rates in the white areas and homelands diverged in the early 1970s. Through the 1960s, the annual share of African woman born in white areas that gave birth was the same as the share of African women born in homelands gave birth (Figure 6). As the government first provided family planning services in white areas, African fertility in white areas fell relative to the homelands. For example, in 1960 about 3 percent of women born in white areas and homelands gave birth; in 1980, 11 percent of women born in white areas gave birth while nearly 14 percent of women born in homelands gave birth. (Again, the share of women giving birth appears to rise in the 1950s and 1960s in both white areas and homelands because of sample censoring: the OHS records only women who were teenagers in the 1950s, but by the 1970s a wide age range of mothers are recorded.)

The decline in fertility in white areas was substantial. The following event study difference-in-differences, or interrupted time series, calculates the difference in fertility among African women born in white areas and homelands in each year minus the difference in 1969, the year before the government first directly provided family planning services:

$$b_{it} = \alpha L_i + \sum_{y \neq 1969} \beta_y 1(t = y) + \sum_{y \neq 1969} \delta_y L_i \times 1(t = y) + \varepsilon_{it}, \quad (1)$$

where each woman has a separate observation for each year she was between the ages of 12 and 54, b_{it} equals one if woman i gave birth in year t, L_i equals one if woman i was born in a white area, and $1(t = y)$ equals one if $t = y$ for years $y \neq 1969$. The δ_y coefficients presented in Figure 7 provide the difference-in-differences estimates of the likelihood of giving birth in white areas minus homelands in year y relative to the difference in 1969. At its nadir in 1977, the difference in the share of women born in white areas that gave birth minus the share of women born in homelands that gave birth was nearly 4 percentage points lower than in 1969. Given that less

than 13 percent of African women born in homelands gave birth in 1977, this difference stood at more than one-third of African fertility in the homelands in 1977. Fertility rates in white areas and homelands converged again in the 1980s, consistent with later diffusion of contraception into the homelands.

The decline in fertility in white areas in the 1970s holds across various cohorts of women. Calculated as follows, Figure 8 presents five year averages of δ_y (y = 1955-59, 1960-64, …, 1990-94) for different cohorts of women:

$$b_{it} = \alpha L_i + \sum_{y \neq 1965\text{-}69} \beta_y 1(t = y) + \sum_{y \neq 1965\text{-}69} \delta_y L_i \times 1(t = y) + \varepsilon_{it}. \quad (2)$$

Panel (a) of Figure 8 demonstrates that, among women born in the early 1940s, the likelihood of giving birth in white areas minus homelands was four percentage points lower in the late 1970s than in the late 1960s. As given in panels (b) through (d) of Figure 8, later cohorts of women exhibited similar declines in fertility in white areas relative to homelands.

The decline in fertility varied by other demographic characteristics. African women in white areas who provided birth histories for the 1994 and 1995 OHS were more likely to live in an urban area, more educated, and more likely to have ever been married than women born in homelands. As given in Figure 9, the fall in fertility in white areas relative to homelands in the 1970s was greater among African women living in urban areas than rural areas, and the rebound in the 1980s occurred only in rural areas. The decline in fertility varied little by mother's level of education, but was greater among women who had ever been married than among women who had never been married. However, these demographic characteristics were measured only in 1994 and 1994, after women had made the childbearing decisions depicted in Figure 9. Available data do not permit measuring changes in fertility by contemporary urban/rural residence, education level, or marriage status.

4.3 Deferral of childbearing and decline in lifetime fertility

Deferral of childbearing contributed to the fall in fertility in white areas in the 1970s and rebound in the 1980s. Panel (a) of Figure 10 demonstrates that, relative to women born in homelands, women born in white areas were less likely to have any children. By the early 1990s, 92 percent of African women born in homelands and 89 percent of African women born in white areas in the 1940s had any children. Similarly, among cohorts of women born in the

1940s, women born in white areas gave birth earlier in life (panel b), had longer spacing between births (panel c), and had their most recent birth later in life (panel d). However, Figure 11 demonstrates that these differences changed for later cohorts. Relative to women born in the 1940s, women born in white areas in the 1950s and 1960s spent greater portions of their childbearing careers with access to family planning services and increasingly deferred childbearing: they waited to give birth for the first time (panel b), had longer intervals between births (panel c), and had their most recent birth later in life (panel d). Longer spacing between births improves each child's likelihood of survival, and South African women's use of contraception to postpone and spread out births is consistent with use of contraception for similar purposes in many other parts of Sub-Saharan Africa (Lesthaeghe et al. 1981, Cohen 1998, Westoff 2006).

Deferral of childbearing alone does not fully explain the changes in fertility after 1970; lifetime fertility dropped as well. Among women born in homelands and surveyed at the end of their childbearing careers (age 40 and older), lifetime fertility fell from 5.5 children per woman born in the early 1930s to 4 children per woman born in the late 1960s (Figure 12). Women born in white areas exhibited a much greater drop in lifetime fertility, from 5.5 to 3 children per woman. Figure 12 demonstrates that lifetime fertility fell in white areas relative to homelands for cohorts of women born starting in the 1950s – the first cohort of women to enter their childbearing years as the government first provided family planning services. Figure 13 presents the difference between the two plots in Figure 12 and demonstrates that African women born in white areas in the 1950s and 1960s had one fewer child in their lifetimes than did African women born in the homelands. Given that women born in the homelands in the 1960s had four children each on average, this difference in lifetime fertility of one child per woman in white areas relative to homelands suggests that government provision of family planning services accounted for up to a 25 percent drop in fertility among African residents of white areas.

4.4 Determining causality: Did free family planning services influence fertility?

As the national government first directly provided family planning services in white areas in the 1970s, African fertility dropped sharply in white areas relative to homelands (Figure 7). No other large-scale public policies can plausibly explain the timing of this decline in fertility. However, concurrent economic and social conditions may have contributed to the difference in

childbearing between white areas and homelands. Crucially, African residents of white areas were by regulation employed. African women living in white areas, many of whom worked as domestic workers and could have lost their jobs upon becoming pregnant, had strong incentive to postpone childbearing. Additionally, due to labor migration of African men from homelands into white areas, there were 55 adult men for every 100 adult women in the homelands at the end of the 1950s. This distorted sex ratio eased over the subsequent decades as the apartheid government enforced pass laws and forcibly removed millions of African residents from the white areas. By the 1980s there were 69 men for every 100 women in the homelands (Wilson 1972; Simkins 1983; Moultrie 2001). This easing of the distorted sex ratio may have made family formation in the homelands easier over time.

5. Changes for women and children as family planning services became available

As the apartheid government increased its provision of family planning services in the 1970s and 1980s, employment rates for African women rose substantially in white areas relative to homelands. Censuses in 1970, 1980, and 1991 recorded the share of African women that were working. Panel (a) of Figure 14 presents employment rates for African women in white areas divided by employment rates for African women in homelands. These rates are presented separately by women's birth cohort. For example, among African women born in the early 1930s, the employment rate in 1970 in the white areas was 2.2 times that in the homelands, and rose to 2.8 in 1980 and 4.4 in 1991. Among later cohorts of women, relative employment in white areas rose similarly. For example, among women born in the late 1940s, employment rates in the white areas divided by the homelands rose from 1.1 in 1970 to 2.3 in 1980 and 2.4 in 1991.

Employment rates in white areas relative to homelands did not rise as much for African men as for African women. African men's employment rates in the white areas grew slightly relative to the homelands, but only among men born in the early 1930s did employment rates in white areas double employment rates in the homelands. Gains in employment as family planning became available were predominantly concentrated among the African women that had easiest access to the family planning services.

Access to free family planning services is associated with higher income in adulthood for a mother's children. Figure 15 presents household income per household member in 2008 for African residents born in white areas minus African residents born in homelands. Starting with

cohorts of children born in the early 1970s, income in adulthood rose for children born in white areas minus children born in homelands, and was $500 higher (2012 USD) for cohorts born in the 1980s. Compared to average per capital household income in the homelands of $1,100, this difference indicates that per-capita household income was up to 45 percent higher for children born in white areas. Economic conditions remain generally better in the white areas, which could account for some or most of the difference in income, but the timing of the rise coincident with government provision of family planning services in the early 1970s suggests that family planning had long-run benefits for children.

6. Family planning, fertility, and a legacy of apartheid

Over the last half of the twentieth century, the total fertility rate nearly halved among African residents of South Africa but barely declined in the rest of Sub-Saharan Africa (Figure 16). This remarkable decline in fertility occurred during the formation, entrenchment, decay, and ultimate dissolution of the apartheid state in South Africa. Starting in 1970, African residents of white areas of the country gained access to free family planning services through government-run clinics. Although many African leaders expressed apprehension, over the following two decades rates use of contraception among African women doubled and birth rates fell by four percentage points. Despite a rebound in childbearing in the 1980s, lifetime fertility fell by one child per woman in white areas relative to homelands during the last half of the apartheid era.

Available fertility records do not permit calculation of the number of births that the family planning program may have averted. The apartheid government did not maintain vital records of African residents, census did not fully cover all homelands, and later household surveys collected birth histories only from women who were young during the early years of the family planning program. However, the total drop in fertility in the country serves as an extreme upper bound on the number of births averted. In 1969, the year before the apartheid government first provided free family planning services, South Africa's crude birth rate was 38.047 births per 1,000 women. Over the following two decades, the crude birth rate fell (Table 1). With a population of 22.502 million people and a crude birth rate of 37.883 births per 1,000 residents in 1970, there were approximately 852,460 births (22.502 million × 0.037883) in 1970. At 1969's crude birth rate, there would have been approximately 856,150 births in 1970. The difference

between these two figures suggests that family planning averted at most 3,690 births in 1970. Similar calculations for the remainder of the 1970s and 1980s suggest that at most 2.09 million additional births would have occurred had 1969's crude birth rate persisted through the 1980s. This estimate is an extreme upper bound on the number of averted births because it does not account for changing age composition of women in their childbearing years, urbanization, economic changes, and other factors that contributed to the fertility decline.

Between 1970 and 1989, the apartheid government spent $482 million (2012 USD) on family planning and population development, yielding an estimated cost per averted birth between 1970 and 1989 of at least $231 ($480 million ÷ 2.09 million). While the drop in fertility was of similar magnitude in South Africa as in some other countries (Table 2), the cost per averted birth in South Africa may have matched or exceeded that in the Matlab region of Bangladesh. As in Bangladesh, South Africa's family planning program involved intense family planning outreach over many years and was effective but expensive (Joshi and Schultz 2007). Given that use of contraception in white areas plateaued by the early 1980s even as expenditure on family planning continued to rise, the marginal effectiveness of this additional expenditure appears to have been quite low. This conclusion confirms Caldwell and Caldwell's (1993) assertion that South Africa's fertility decline was not as large as might have been expected given the government's substantial attention to family planning.

The full consequences of family planning in South Africa extend beyond a tally of averted births. Family planning was central to the apartheid state's population control objectives: slower population growth among African residents in white areas would permit the government to maintain power. Family planning effectively lowered fertility but did not achieve its political objective, at least not for long. In 1990, just twenty years after the government first provided family planning services, the government entered into negotiations with Nelson Mandela and the African National Congress to formally end apartheid. On the other hand, family planning may have had substantial intergenerational benefits: African women living in white areas with access to family planning services were employed more consistently in the 1970s and 1980s, and their children had higher income in adulthood. Family planning deepened differences between African residents of white areas and African residents of the homelands.

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Source: Municipal Demarcation Board. 2014. "Districts." Downloaded from <http://www.demarcation.org.za>, accessed August 18, 2014.

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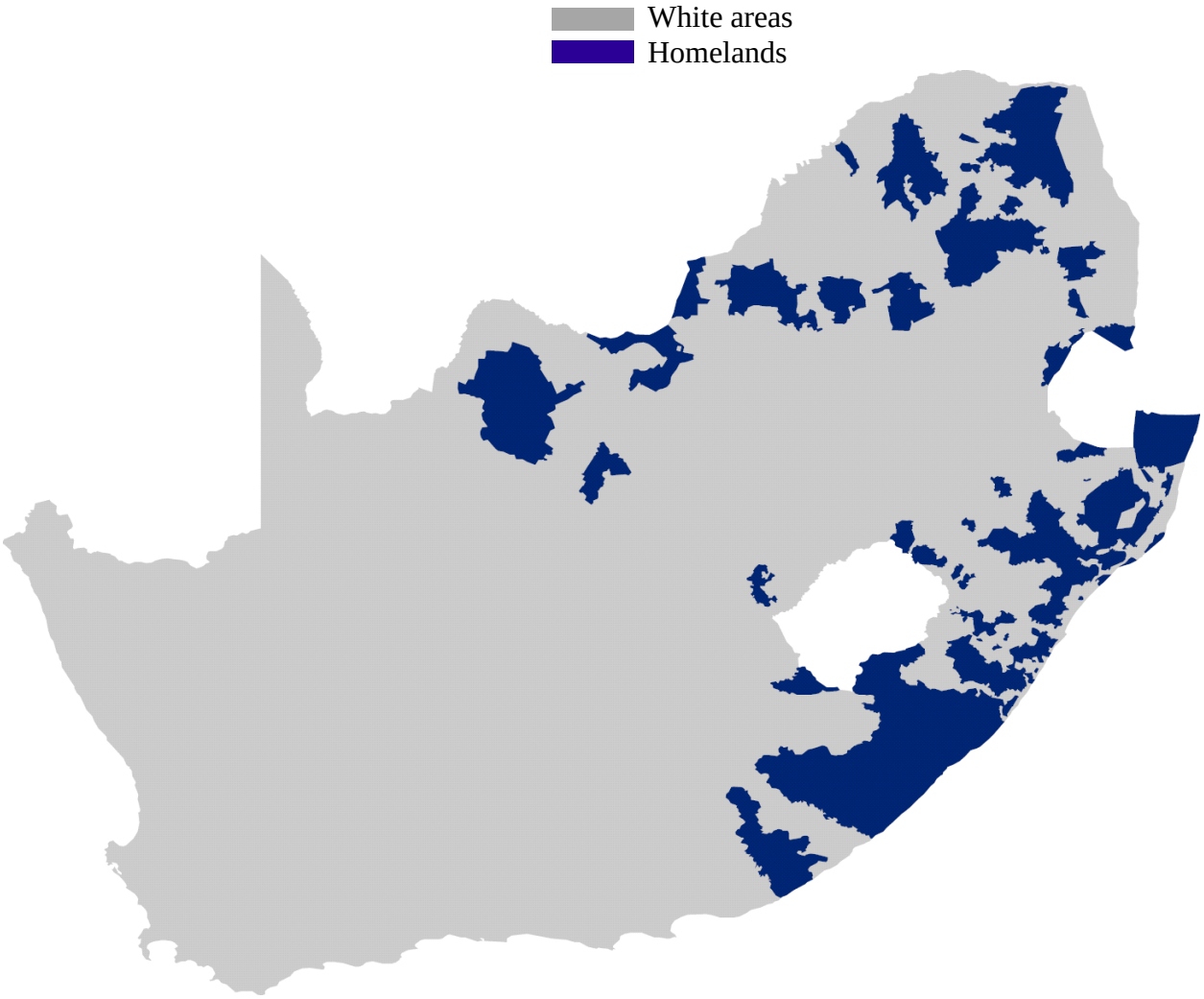
Figure 1: Characteristics of childbearing in Sub-Saharan Africa

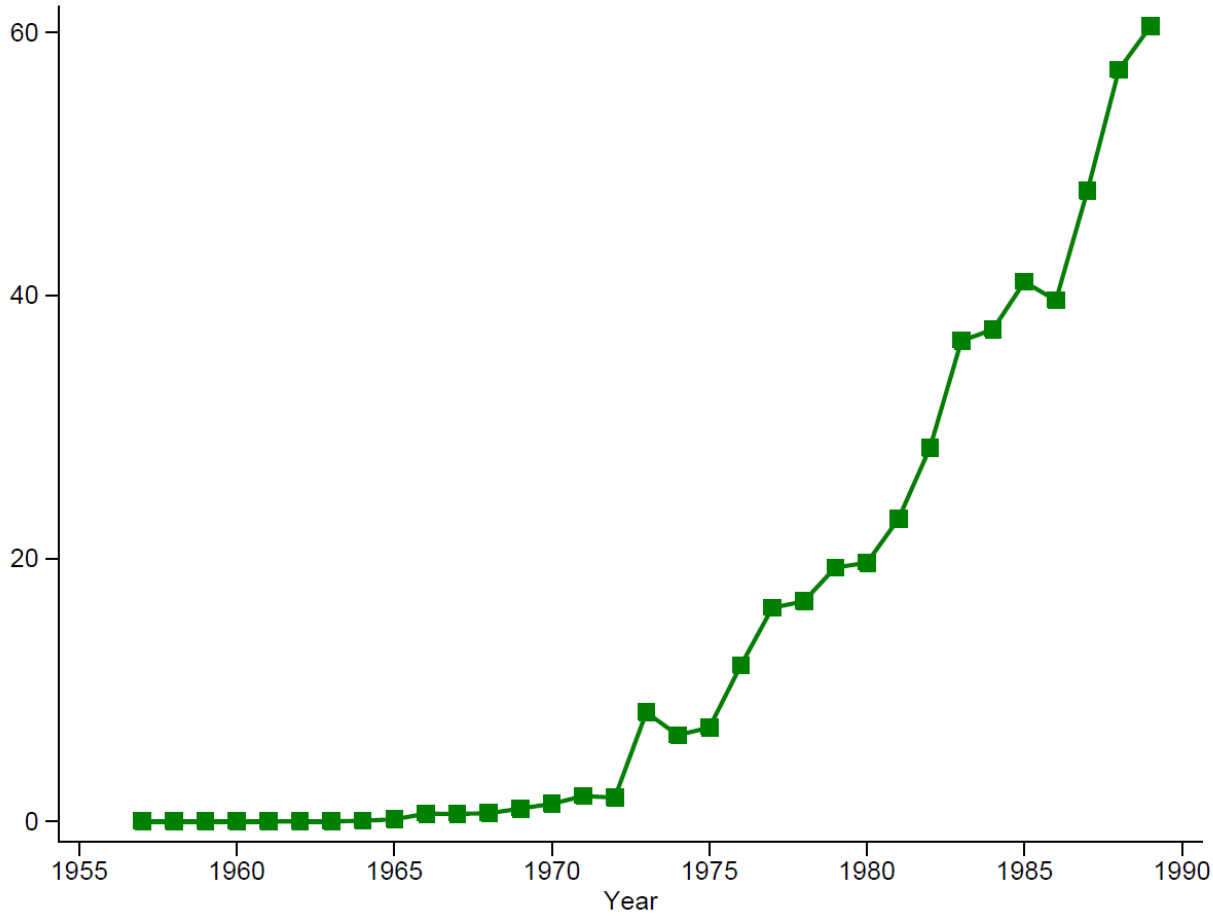
Notes: Total fertility rate in 2013 from: World Bank. 2015. "World Bank Open Data." Downloaded from <http://data.worldbank.org/indicator/SP.DYN.TFRT.IN>, accessed July 3, 2015. Median birth interval in months, as recorded in most recent Demographic and Health Survey, from: Rustein, Shea O. 2011. "Trends in Birth Spacing." DHS Comparative Reports No. 28. Calverton, Maryland: ICF Macro.

Figure 2: Homelands of South Africa



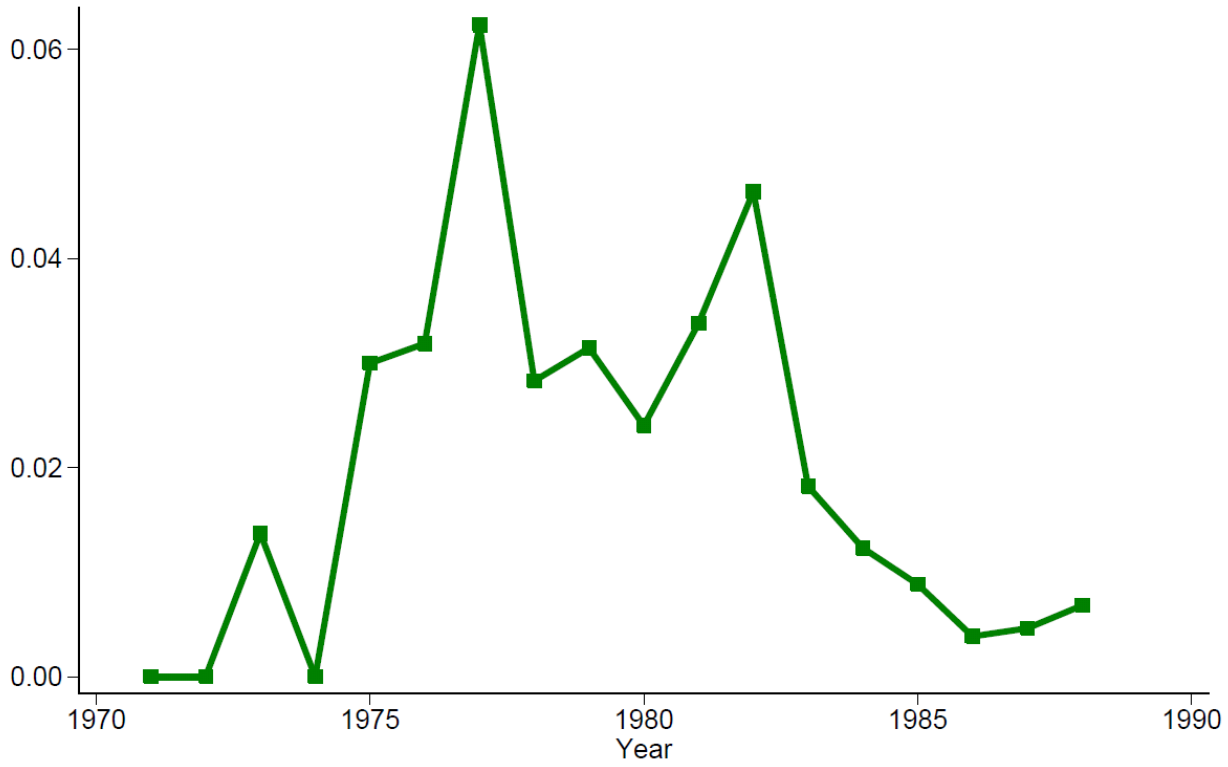
Source: Municipal Demarcation Board. 2014. "Districts." Downloaded from <http://www.demarcation.org.za>, accessed August 18, 2014.

Figure 3: South Africa national government expenditure on family planning (millions of 2012 US Dollars)



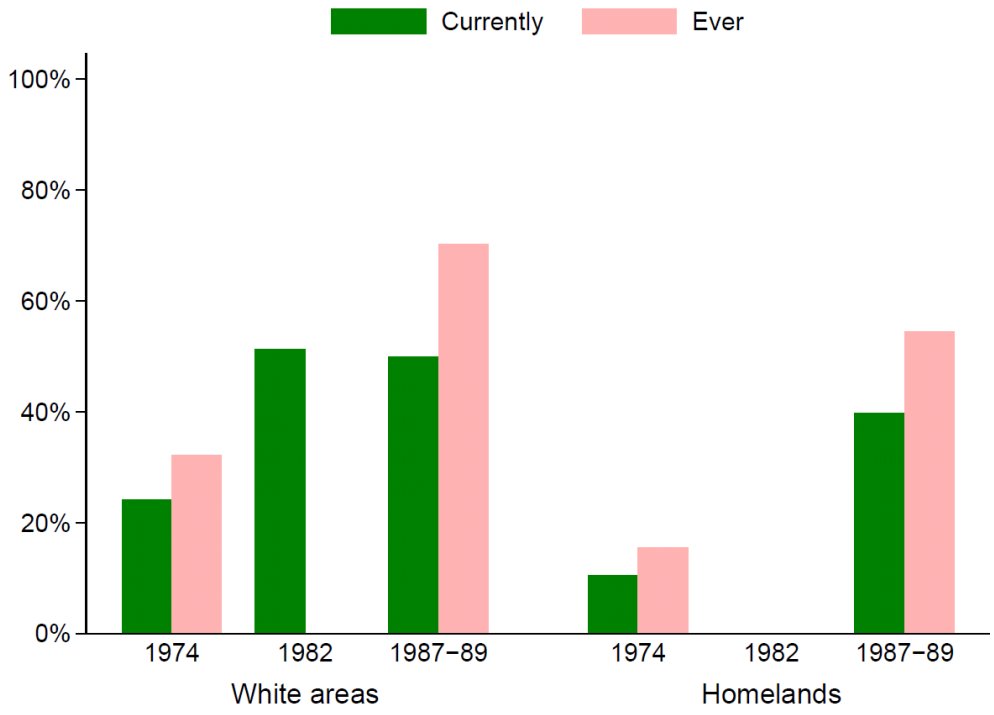
Notes: Expenditure amounts from annual reports *Estimates of the Expenditure to be Defrayed from Revenue Account during the Year Ending 31st March, YYYY*. Values adjusted to 2012 Rand using consumer price index from: Organization for Economic Co-operation and Development. 2013. "Stat Extracts." <http://www.stats.oecd.org>, Accessed March 4, 2013. Exchange rate of 8.0396 Rand per 1 USD on January 1, 2012 taken from <http://www.oanda.com/currency/historical-rates/>, accessed September 8, 2014.

Figure 4: Homeland government per-capita expenditure on family planning as share of national government per-capita expenditure on family planning



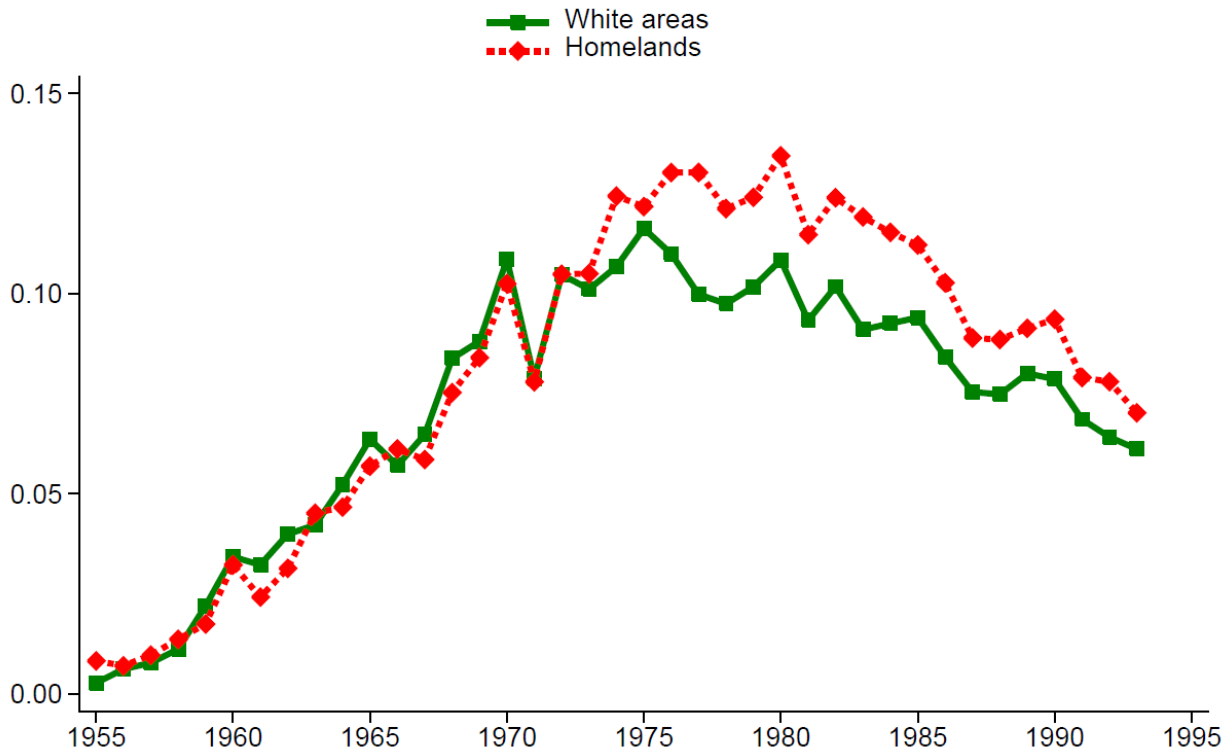
Notes: For each year, this plot includes only those homelands for which I have been able to locate expenditure reports that itemize health department spending. For many homelands, family planning expenditure is sometimes not provided. Most years' reports provide detail on dozens or hundreds of categories of health spending and rarely list expenditure of zero for any category. Omission of family planning from a report likely suggests that the homeland did not fund family planning, not that family planning spending is lumped in with another category of spending. I therefore treat missing family planning expenditures as zero. Excluding these missing values shifts the plot up by roughly two percentage points and does not substantially change the conclusion that the national government provided much greater funding for family planning than did homeland governments. Only in Venda in 1979 and 1982 did a single homeland's per-capita expenditure on family planning approach half that of the national government. Population figures from the following three sources: [1] National population: Organization for Economic Co-operation and Development. 2014. "Stat Extracts." <http://www.stats.oecd.org>, Accessed August 25, 2014. [2] 1970, for all homelands except Lebowa, *Economic Revues* published by BENBO in 1975 or 1976 for all homelands; for Lebowa, Table B.15.1 of a 1976 publication by BENBO, *Black Development in South Africa*. [3] 1985: Table 2 of: Mostert, W. P., van Tonder,, J. L., and Hofmeyr, B. E. 1988. "Demographic Trends in South Africa." Chapter 4 of *South Africa: Perspectives on the Future*, edited by H. C. Marais. Pretoria: Owen Burgess-Publishers.

Figure 5: Rates of use of artificial contraception among African women



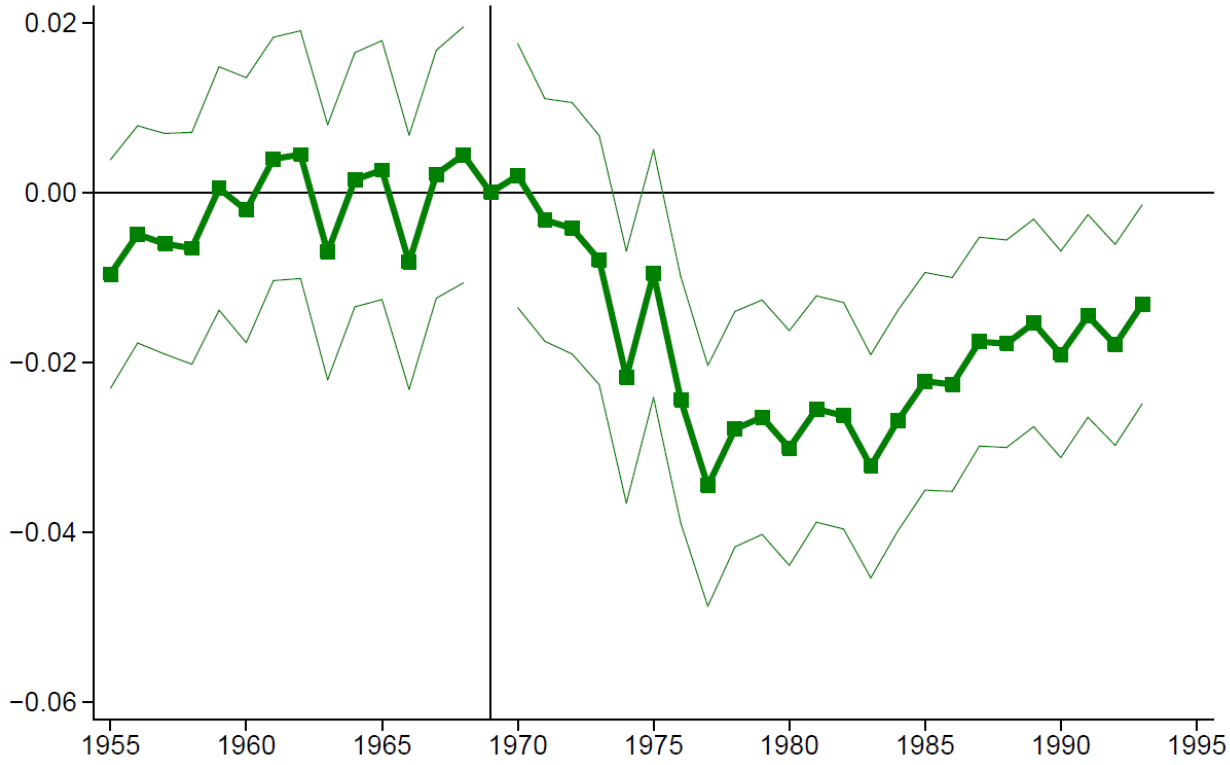
Notes: This figure demonstrates that rates of use of artificial contraception were higher in white areas than in homelands, but increases in use were of similar magnitude in the two areas. For example, in 1974, 24 percent of African women living in white areas and 11 percent of African women living in homelands were currently using artificial contraception. By the late 1980s, these figures had risen to 50 percent and 40 percent. Sources and sample are as follows: [1974] *Sample*: Black women ages 15-44 who have had at least one child and are married or living with a man. Author's own calculations using the remaining 5,792 cases out of the 6,000 that were originally collected. *Source*: Human Sciences Research Council. 1974. *Fertility Survey*. [1982] *Sample*: Exposed black women ages 15-49 ("exposed" is undefined but includes women with zero living children). *Source*: Van Tonder, J. L. 1985. *Fertility Survey 1982: Data Concerning the Black Population of South Africa*. Pretoria: Human Sciences Research Council. [1987-89] *Sample*: Black women ages 12-49 who have given birth, have ever been in a union, or are pregnant. Author's own calculations using weights that accompany the survey. *Source*: Human Sciences Research Council. 1987. *Demographic and Health Survey, 1987*. Available at <http://sada.nrf.ac.za/ahdetails.asp?catalognumber=0115>, accessed June 10, 2013.

Figure 6: Share of African women that gave birth



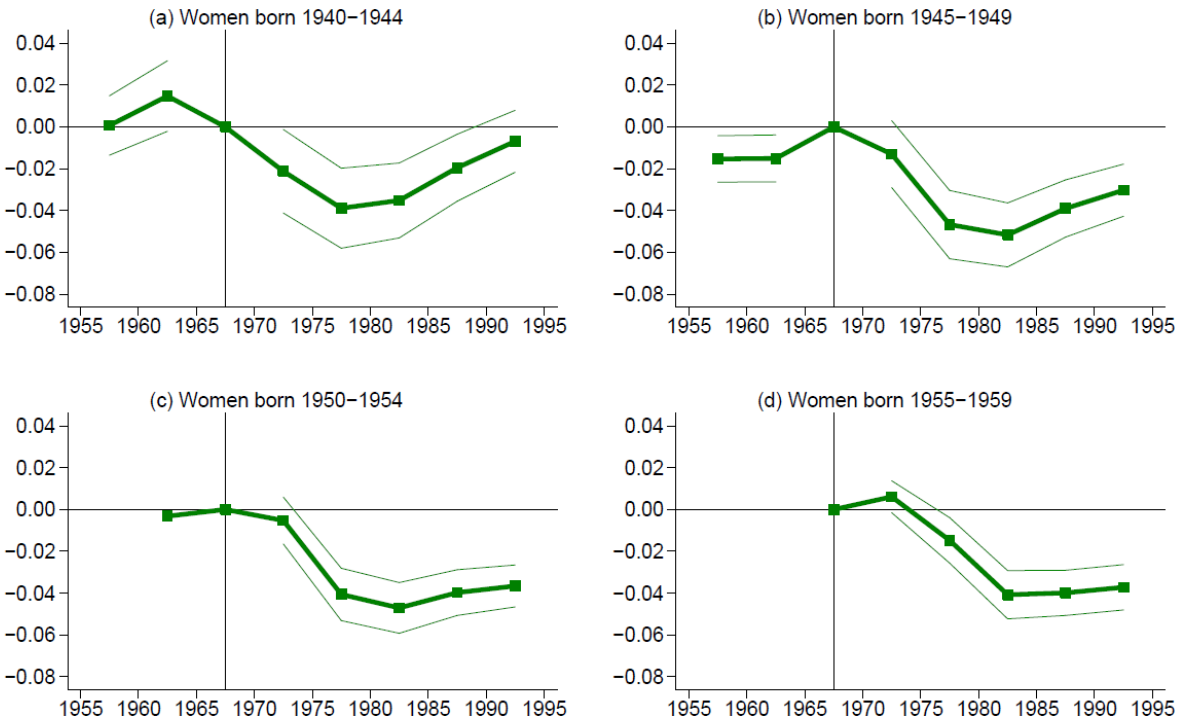
Notes: Sample consists of all black women ages 12-54 in 1994 or 1995 who were born in a white area or born in a homeland. Data reshaped to consist of one observation per woman per year for each year the woman was age 12-54. *Source*: 1994 and 1995 October Household Surveys.

Figure 7: Share of African women that gave birth in white areas minus homelands, in each year minus the difference in 1969



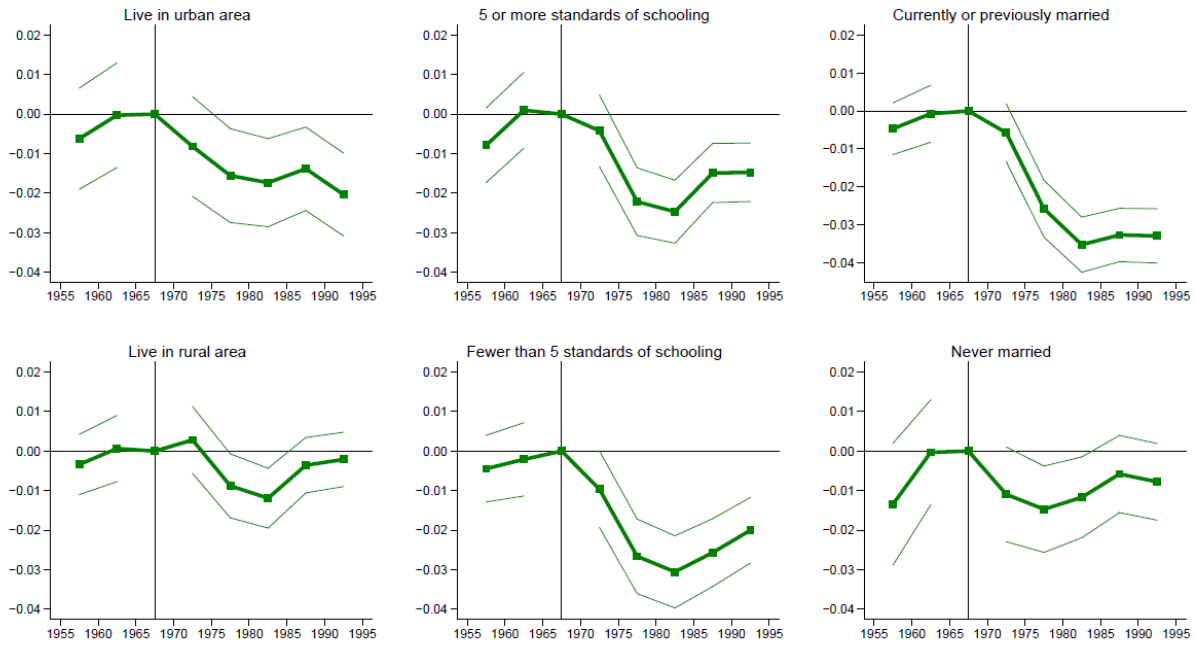
Notes: Sample and data as given in Figure 6. Calculations performed according to specification 1 using weights that accompany each survey, where the main plot is δ_y and the thin lines are 95 percent confidence intervals. The omitted year is 1969, the year before the government first directly provided family planning services.

Figure 8: Likelihood of giving birth in white areas minus homelands in each five-year group minus the difference in 1965-69, by woman's birth cohort



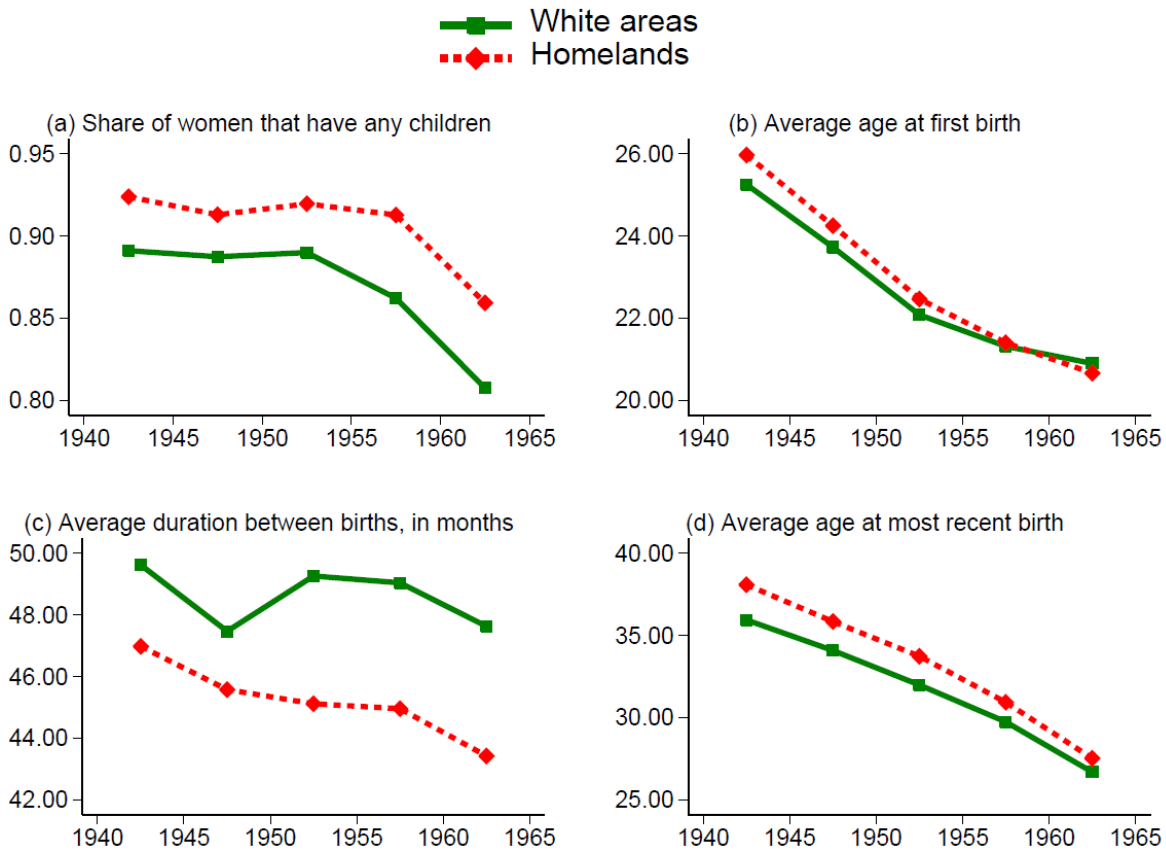
Notes: Sample and data as given in Figure 6. Calculations performed according to specification 2 using weights that accompany each survey, where the main plot is δ_y and the thin lines are 95 percent confidence intervals.

Figure 9: Likelihood of giving birth in white areas minus homelands in each five-year group minus the difference in 1965-69, by woman's characteristic at time of survey



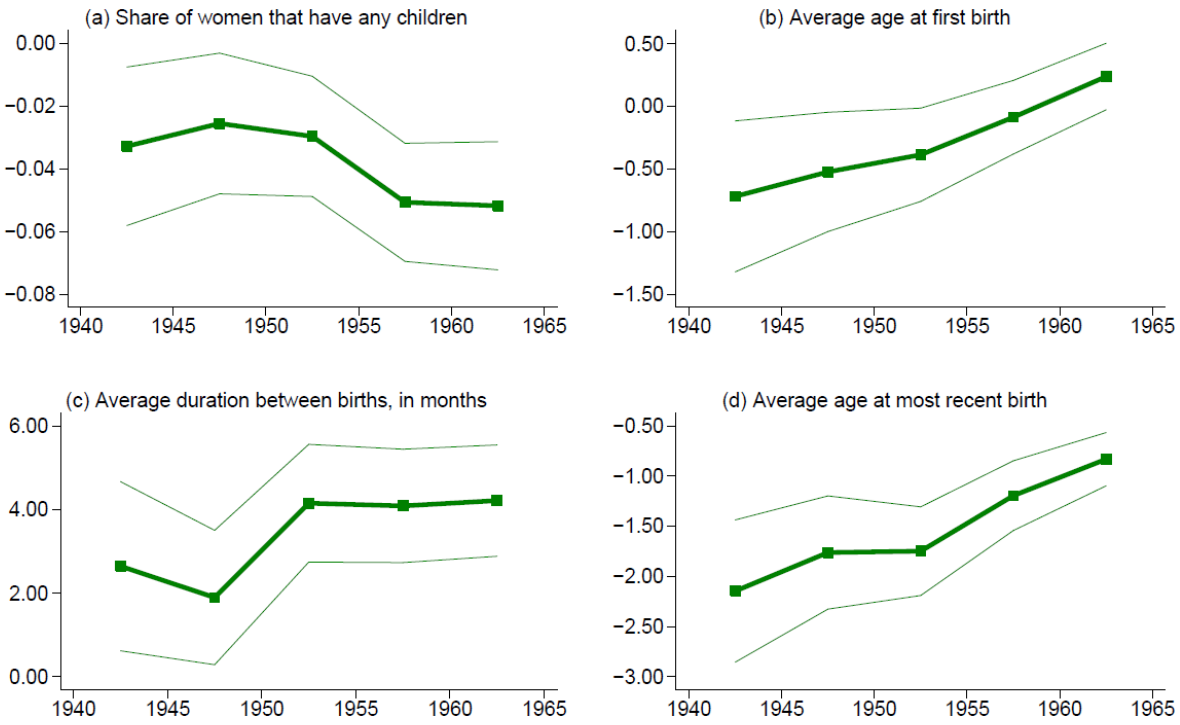
Notes: Sample and data as given in Figure 6. Calculations performed according to specification 2 using weights that accompany each survey, where the main plot is δ_y and the thin lines are 95 percent confidence intervals.

Figure 10: Timing of childbearing, by woman's year of birth



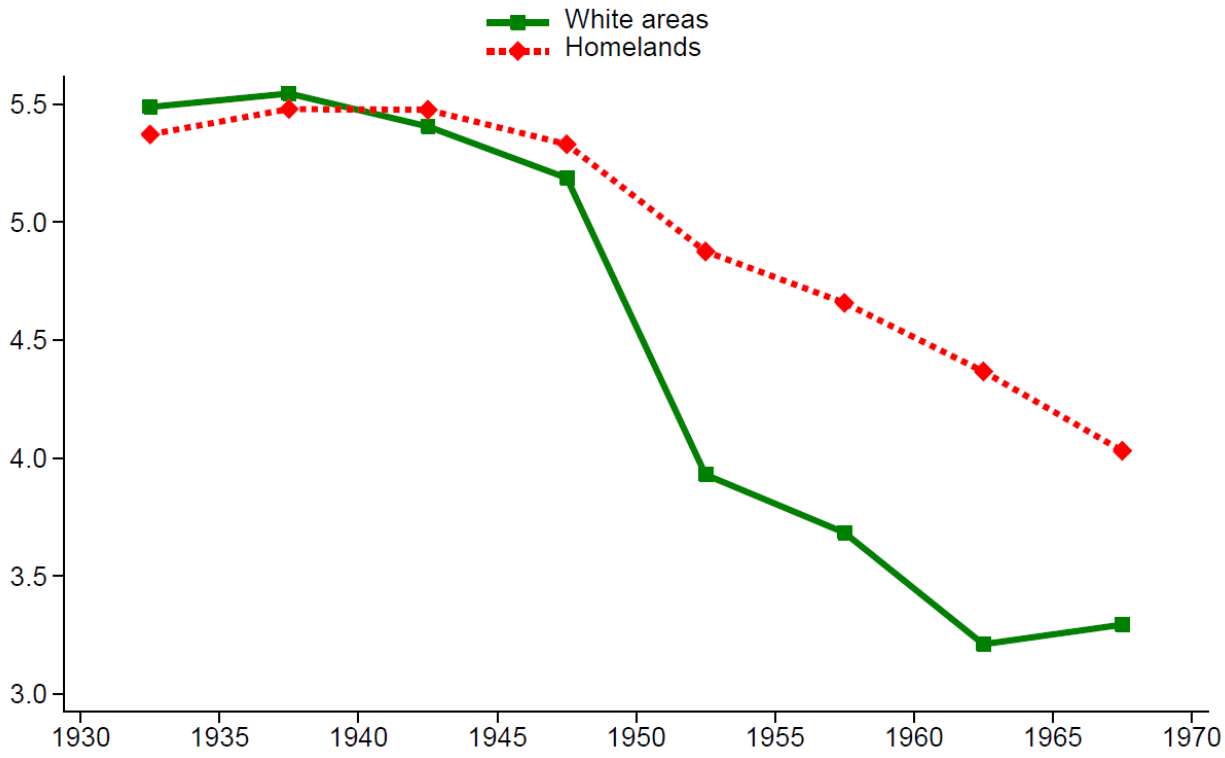
Notes: X-axis in each figure tracks women's year of birth. Sample and data as given in Figure 6.

Figure 11: Timing of childbearing by woman's year of birth, women born in white areas minus women born in homelands



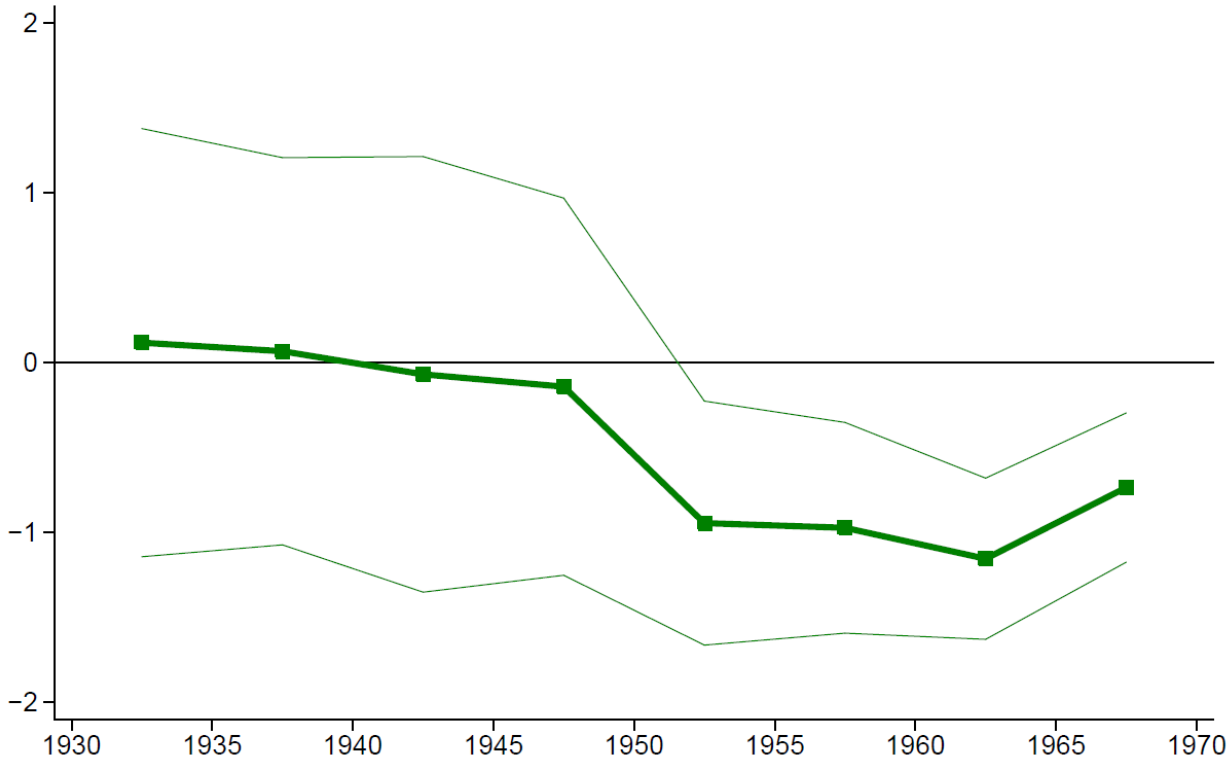
Notes: X-axis in each figure tracks women's year of birth. Sample and data as given in Figure 6. Main plot is the value in white areas minus the value in homelands and the thin lines are 95 percent confidence intervals.

Figure 12: Total number of children, by woman's year of birth



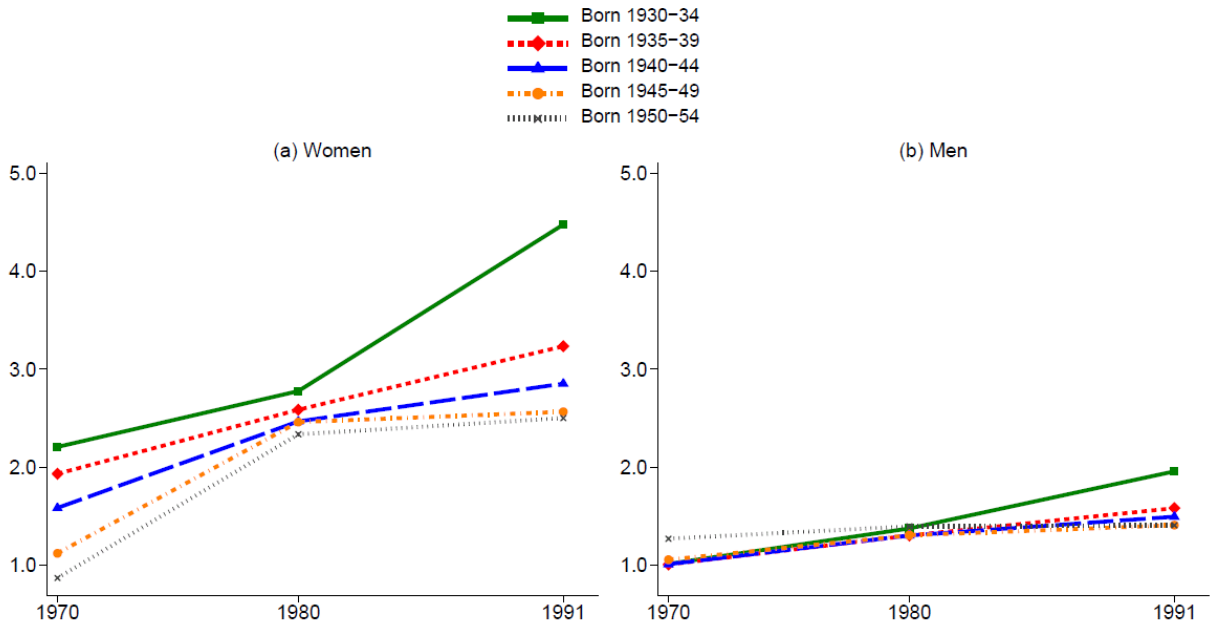
Notes: Sample and data as given in Figure 6, restricted to women ages 40 and above who have plausibly completed childbearing.

Figure 13: Total number of children, by woman's year of birth, among women born in white areas minus women born in homelands



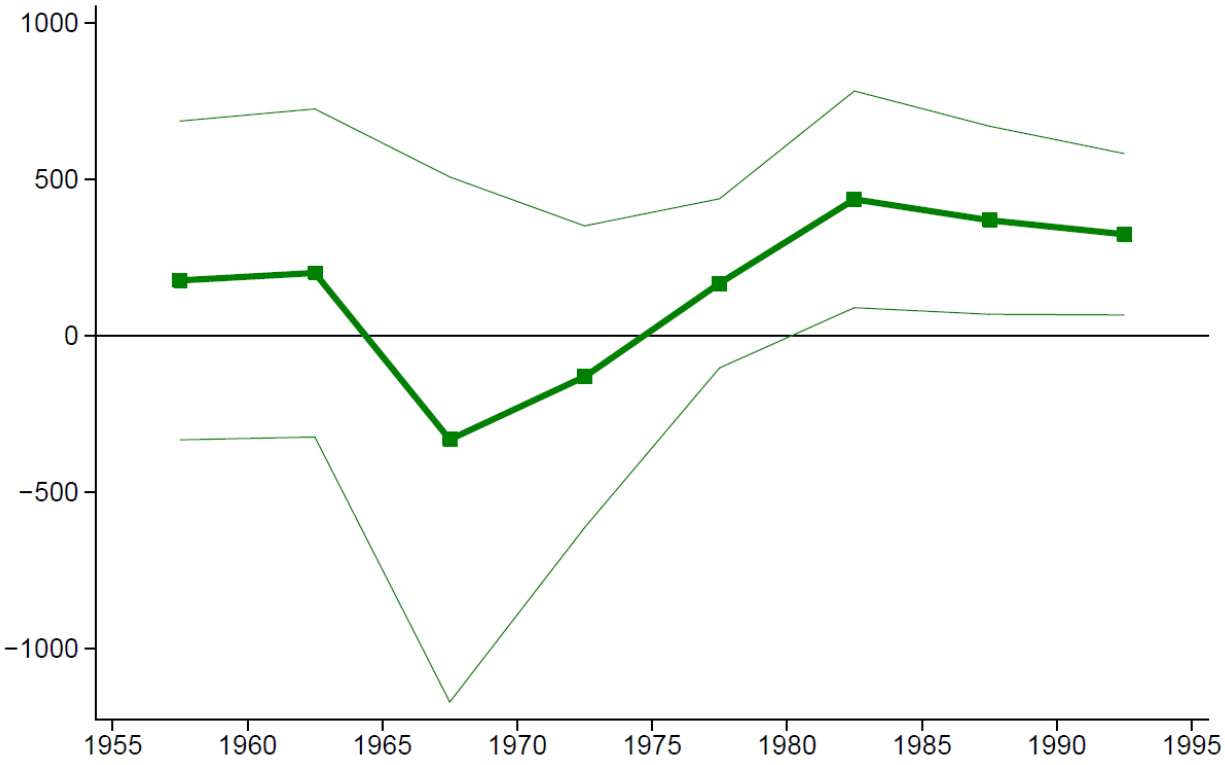
Notes: Sample and data as given in Figure 14. Main plot is the value in white areas minus the value in homelands and the thin lines are 95 percent confidence intervals.

Figure 14: Share of African residents of white areas that are working, divided by share of of African residents of homelands that are working



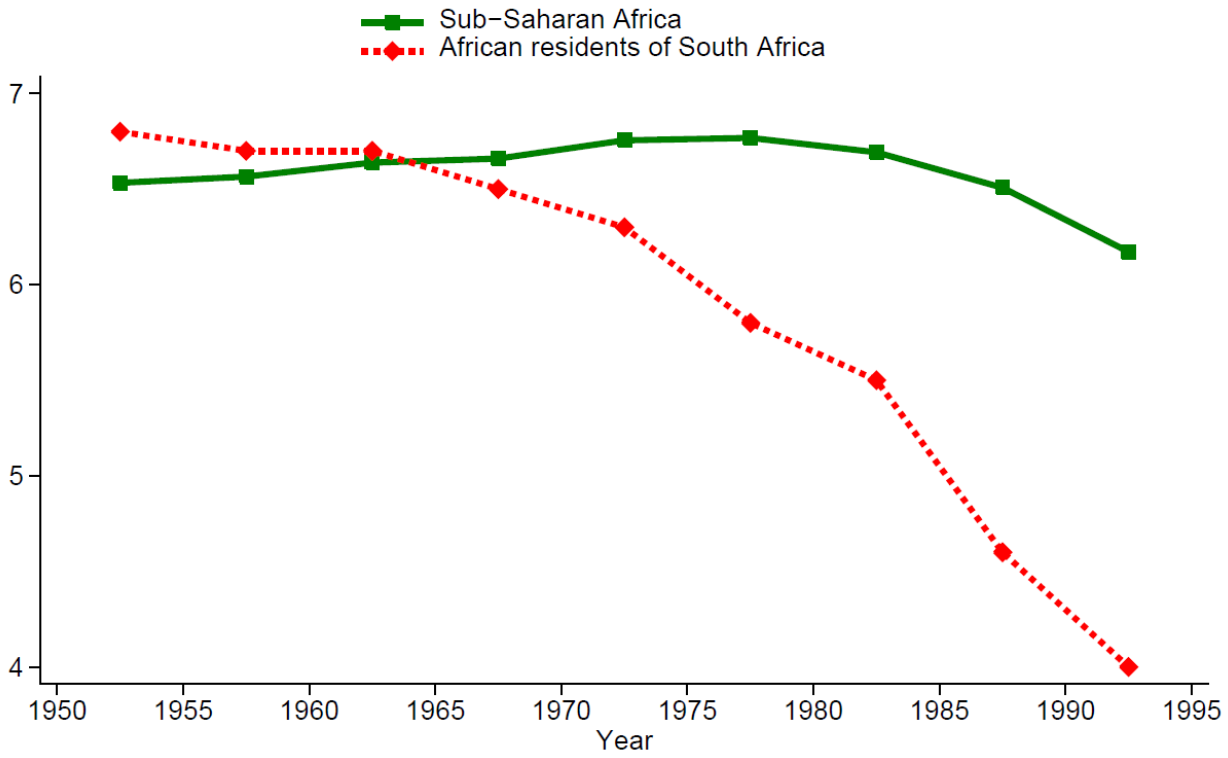
Notes: Sample consists of all African residents observed in the 1970, 1980, and 1991 censuses. Three homelands (KwaNdebele, Transkei, and Venda) were not covered in all three censuses and are omitted. Source: South Africa Census. 1970, 1980, and 1991. Downloaded from <http://www.datafirst.uct.ac.za/> on January 18, 2013.

Figure 15: Household income per household member in 2008, for African residents born in white areas minus African residents born in homelands, by year of birth



Notes: Sample consists of all African residents by place of birth (white area or homeland). Main plot is the value in white areas minus the value in homelands and the thin lines are 95 percent confidence intervals. *Source*: 2008 National Income Dynamics Study.

Figure 16: Total fertility rate



Notes: Source for Sub-Saharan Africa and South Africa, all residents: United Nations. 2014. World Development Indicators. Available at <http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=world-development-indicators>, accessed September 22, 2013. Source for South Africa, black residents: Moultrie, Tom A., and Ian M. Timaeus. 2003. "The South African Fertility Decline: Evidence from Two Censuses and a Demographic and Health Survey." *Population Studies*, 57(3): 265-283.

Table 1: Upper bound on fertility decline in South Africa, 1970-1989

	(1)	(2)	(3)	(4)	(5)
	Population	Crude birth rate (CBR)	Births	Births using 1969's CBR	Upper bound on births averted
			$= \frac{(1) \times (2)}{1{,}000}$	$= \frac{(1) \times 38.047}{1{,}000}$	$= (4) - (3)$
1969		38.047			
1970	22,502,430	37.883	852,460	856,150	3,690
1971	23,101,920	37.755	872,213	878,959	6,746
1972	23,728,830	37.615	892,560	902,811	10,251
1973	24,376,530	37.422	912,219	927,454	15,235
1974	25,035,350	37.164	930,414	952,520	22,106
1975	25,698,800	36.842	946,795	977,762	30,967
1976	26,349,530	36.471	960,994	1,002,521	41,527
1977	27,002,360	36.081	974,272	1,027,359	53,087
1978	27,666,570	35.691	987,448	1,052,630	65,182
1979	28,355,280	35.306	1,001,112	1,078,833	77,722
1980	29,077,100	34.923	1,015,460	1,106,296	90,837
1981	29,824,580	34.533	1,029,932	1,134,736	104,804
1982	30,604,610	34.121	1,044,260	1,164,414	120,154
1983	31,403,120	33.675	1,057,500	1,194,795	137,294
1984	32,200,220	33.190	1,068,725	1,225,122	156,396
1985	32,982,980	32.655	1,077,059	1,254,903	177,844
1986	33,728,930	32.064	1,081,484	1,283,285	201,800
1987	34,455,550	31.420	1,082,593	1,310,930	228,337
1988	35,187,520	30.735	1,081,488	1,338,780	257,291
1989	35,959,450	30.020	1,079,503	1,368,149	288,647
Total					2,089,917

Notes: Crude birth rate is births per 1,000 women. *Source for population*: Organization for Economic Co-operation and Development. 2014. "Stat Extracts." <http://www.stats.oecd.org>, Accessed August 25, 2014. *Source for CBR*: World Bank. 2015. "Crude birth rate." Downloaded from <http://data.worldbank.org/> on July 4, 2015.

Table 2: Reductions in fertility attributable to family planning programs

	Dates	Absolute reduction in children born per woman	Percent reduction in children born per woman	Cost per birth averted (2012 USD)
South Africa	1970 – 1989	≤1	≤25	≥$231
Bangladesh (Matlab)[A]	1978 – 1985		21	$384
Colombia[B]	1964 – 1993	0.25 – 0.33	5	$124 – $167
Ethiopia[C]	1990 – 2004	1	20	
Ghana (Navrongo)[D]	1993 – 1999	1	15	
Indonesia[E]	1982 – 1987	0.04 – 0.08	1 – 2	
Iran[F]	1967 – 2006		18 – 28	
Peru[G]	1985 – 1991	0.93 – 1.30	25 – 35	
Tanzania[H]	1970 – 1991		10.9 – 21.0	
United States[I]	1988 – 2003		1.7 – 8.9	$6,800

Sources: [A] Simmons, George B, Deborah Balk, and Khodezatul K. Faiz. 1991. "Cost-Effectiveness Analysis of Family Planning Programs in Rural Bangladesh: Evidence from Matlab." *Studies in Family Planning*, 22(2): 83-101. [B] Miller, Grant. 2009. "Contraception as Development? New Evidence from Family Planning in Colombia." *Economic Journal*, 120(545): 709-736. [C] Portner, Claus, Kathleen Beegle, and Luc Christiaensen. 2011. "Family Planning and Fertility: Estimating Program Effects Using Cross-Sectional Data." World Bank, Policy Research Working Paper No. 5812. [D] Phillips, James F., Ayaga A. Bawah, and Fred N. Binka. 2006. "Accelerating Reproductive and Child Health Programme Impact with Community-based Services: The Navrongo Experiment in Ghana." *Bulletin of the World Health Organization*, 84(12): 949-955. [E] Gertler, Paul J., and John Molyneaux. 1994. "How Economic Development and Family Planning Programs Combined to Reduce Indonesian Fertiltiy." *Demography*, 31(1): 33-63. [F] Modrek, Sepideh, and Negar Ghobadi. 2011. "The Expansion of Health Houses and Fertility Outcomes in Rural Iran." *Studies in Family Planning*, 42(3): 137-146. [G] Angeles, Gustavo, David K. Guilkey, and Thomas A. Mroz. 2005. "The Determinants of Fertility in Rural Peru: Program Effects in the Early Years of the National Family Planning Program." *Journal of Population Economics*, 18(2): 367-389. [H] Angeles, Gustavo, David K. Guilkey, and Thomas A. Mroz. 1998. "Purposive Program Placement and the Estimation of Family Planning Program Effects in Tanzania." *Journal of the American Statistical Association*, 93(443): 884-899. [I] Kearney, Melissa S., and Phillip B. Levine. 2009. "Subsidized Contraception, Fertility, and Sexual Behavior." *Review of Economics and Statistics*, 91(1): 137-151.