POLICY BRIEFS ON

ECONOMIC IMPACT OF HIV

3.

HIV, POPULATION DYNAMICS AND THE LABOUR FORCE

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3.

HIV, POPULATION DYNAMICS AND THE LABOUR FORCE

KEY POINTS

- **AIDS-related mortality among working-age adults reduces GDP growth but has an ambiguous effect on GDP per capita.**
- **In the short run, population size decreases due to reduced fertility and increased child mortality owing to HIV, and GDP per capita increases, but this results in lower growth of the working-age population and of GDP in the long run.**
- **A smaller elderly cohort due to HIV-related early mortality mitigates the fiscal burden of an ageing population, but as HIV treatment is scaled up, there is higher-than-normal growth of the old population.**
- **The HIV response reverses most of the demographic impacts and results in higher growth of the working-age population, but reversals in the impact on the population structure play out over decades.**

Demographic factors – such as population growth, and the share of the population at working age – are important determinants of economic growth. HIV, through increased mortality and reduced birth rates, slows the growth of the working-age population and thus of the economy's productive capacities. As a consequence, GDP grows more slowly – as do the tax base and the government's fiscal capacities – although demand for some public services (e.g., education) also grows more slowly. The effects of demographic factors on GDP per capita are less clear. If the share of the working-age population shrinks, the dependency rate increases (each working individual funds a larger number of dependents) and GDP per capita declines. However, declining fertility and the effects of AIDS on the older population could also result in a decline in the dependency rate. Whether the demographic effects alone contribute to an increase or decline in GDP per capita, it is important to bear in mind that this is an average which masks highly uneven economic impacts across households, which are important aspects of the economic fall-out of HIV/AIDS in their own right.

Increased mortality among working-age population

The most direct demographic effect of HIV is increased mortality among the working-age population, eroding the labour supply and slowing economic growth.

HIV has had significant effects on the working-age population (here approximated by the population at ages 15-64) in many countries. As annual AIDS-related mortality among people living with HIV peaked at 7 percent across low- and middle-income countries around 2004, and HIV prevalence exceeded 5 percent of the total population in 14 countries (and 20 percent in 4 countries), HIV had a large impact on overall mortality. (Note: Unless stated otherwise, HIV-related data in this brief are from UNAIDS, 2019a.)

For example, in 2004 AIDS contributed about 0.5 percentage points to mortality of the population at ages 15-64 in Mozambique, a country with an HIV prevalence of 10 percent (Figure 3.1), corresponding to about 50% of total

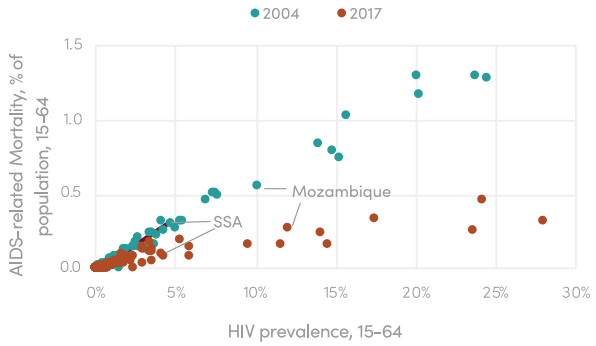
mortality in that age range. And even for a country with an HIV prevalence of 3 percent of the total population (about the average for sub-Saharan Africa), the contribution of HIV of about 0.2 percentage points (Figure 3.1) is large compared with mortality from other causes (which is typically about 0.5 percent in that age bracket across low- and middle-income countries).[1]

While AIDS-related deaths have declined owing to the scaling-up of antiretroviral treatment, HIV is still an important contributor to mortality of the working-age population. As of 2017, in a country facing an HIV prevalence of 10 percent, AIDS-related deaths still added 0.2 percentage points to mortality in the 15-64 age bracket (Figure 3.1).

The working-age population has been growing more slowly as a result of HIV – as a consequence of increased mortality among working-age adults and, with a lag, because of the impact on the young population (see next section). For example, in Botswana, by 2002 the growth of the working-age population had declined by up to 1.1 percentage points (with an HIV prevalence of 25.8 percent) compared with what it would have been without HIV (Figure 3.2). This was followed by a quick recovery during the scaling-up of treatment. Nevertheless, the working-age population as of 2018 was 12 percent smaller than it would have been without HIV. In Tanzania (where HIV prevalence peaked at 6.4 percent in 1999), the growth of the working-age population declined by 0.3 percentage points, with a slower recovery and an accumulated loss of 4 percent of the working-age population as of 2018.

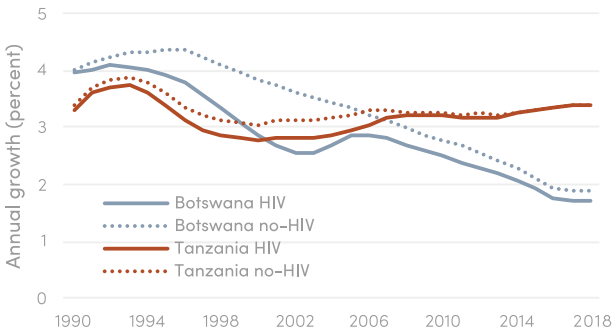
1 One important consequence of the increased mortality among the working-age population – the increased number of orphans – is addressed in brief #4 on HIV and human capital.

Figure 3.1: Contribution of AIDS to mortality, ages 15-64, against HIV prevalence



Source: Country-level estimates from UNAIDS (2019a).
Note: "SSA" = sub-Saharan Africa (population-weighted average).

Figure 3.2: Growth of working-age population, with and without HIV, Botswana and Tanzania



Source: UNAIDS (2019b) and authors' calculations.

Reduced fertility and increased child mortality

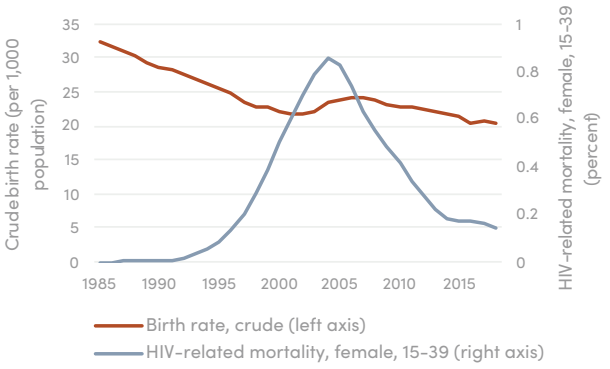
Reduced fertility among women living with HIV and increased child mortality owing to HIV lead to a smaller population below working age, making GDP per capita higher than it would otherwise be; but in the longer term they reduce population growth and the economy's productive capacities, and thus GDP.

GDP growth is linked to the rate of growth of the working-age population. HIV affects the working-age population through reduced birth rates and increased child mortality as young cohorts depleted by AIDS-related mortality eventually grow into adulthood. The effect of HIV on fertility occurs in part because of premature mortality among women living with HIV – e.g., in Zimbabwe, almost one-quarter (23 percent) of AIDS-related deaths among women occurred below age 30 as of 2018, broadly unchanged from the 21 percent estimated for 2004 (UNAIDS, 2019b). At the same time, HIV and investments in the HIV response may accelerate declines in fertility because of increased investments in family planning services and increased use of condoms. Moreover, the fertility of women living with HIV is reduced: one recent overview based on data from 49 Demographic and Health Surveys suggests that being HIV-positive reduces births per year by between 10 percent and 30 percent for most age and regional categories, and that the scaling-up of treatment has only had a small effect so far in reversing this effect (Marston et al., 2018).

Reversing the impact of HIV on children has been one of the most successful aspects of the response to HIV. The average rate of mother-to-child transmission halved across Eastern and Southern Africa between 2010 and 2018, from 18 percent to 9 percent, largely as a result of increased treatment access overall, or specifically for pregnant women. However, the much lower transmission rate of 2.4 percent as of 2018 achieved in Botswana suggests that there is great need and potential for further improvements in other countries. Nevertheless, annual AIDS-related mortality among children living with HIV in the region declined from 16 percent in 2000 to 8.7 percent in 2010, and to 4.5 percent in 2018, as coverage of treatment for children improved to 22 percent by 2010, and 62 percent in 2018 (UNAIDS, 2019b).

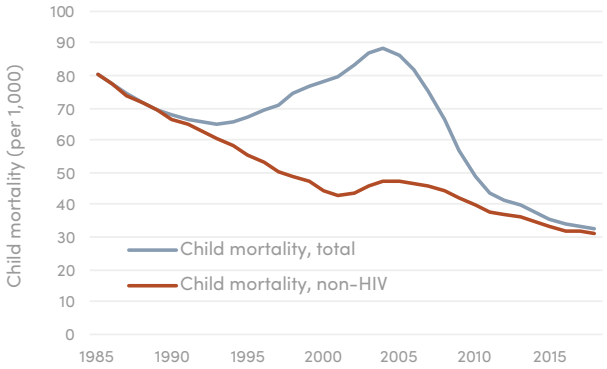
Demographic estimates for South Africa (HIV prevalence at ages 15-49: 19 percent in 2018) illustrate the implications of HIV-related changes in fertility and child mortality more specifically (Johnson & Dorrington, 2019). Between 1985 and about 2000, the impact of HIV – approximated by AIDS-related mortality among women at ages 15-39 – accelerated the long-term decline in birth rates associated with the demographic transition (Figure 3.3). The scaling-up of treatment has largely reversed this effect, with birth rates (against a downward long-term trend) increasing between 2002 and 2009. Child mortality (also against a declining long-term trend) increased steeply, from 65 per 1,000 in 1993 to 89 per 1,000 in 2003, in which year nearly half of all deaths below age 5 were AIDS-related (Figure 3.4). The steep decline in child mortality since then, by about two-thirds, reflects two factors: a decline in the rate of vertical transmission of HIV by HIV-positive mothers from 35 percent in 2000 to just 4 percent in 2018, and longer survival of HIV-positive children, for whom treatment coverage has increased from 0 percent in 2000 to 40 percent in 2010, and to over 60 percent since 2017. As a consequence of these two developments, the contribution of AIDS to child mortality has nearly disappeared, falling from 42 per 1,000 in 2004 to just 2 per 1,000 as of 2018.

Figure 3.3: South Africa, crude birth rate and HIV-related mortality among women 15-39



Source: Johnson and Dorrington, 2019.

Figure 3.4: South Africa, child mortality, total and non-HIV



Source: Johnson and Dorrington, 2019.

The demographic impacts of HIV on older adults

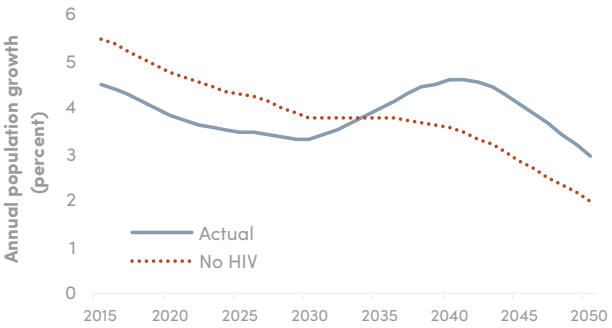
HIV can result in a smaller population share of older adults, which positively impacts GDP per capita and reduces costs associated with an elderly population, but as cohorts benefitting from treatment become older, the cohort of elderly adults grows more quickly than in the absence of HIV.

HIV affects the size of the older population in two ways: directly through AIDS-related mortality among older adults, and indirectly as the size of cohorts reaching old age is depleted by increased mortality at younger ages. This effect of HIV is significant from a macro-economic perspective because labour-force participation declines at old ages, which means that a decline in the population share of the older population is associated with an increase in GDP per capita. Additionally, fiscal and health-systems challenges associated with population ageing – such as the costs of care and old-age grants, or the increased prevalence of important non-communicable diseases at older ages – are mitigated as the older population grows more slowly.

With regard to older populations, the impact of HIV depends on the demographic context. While the countries with the

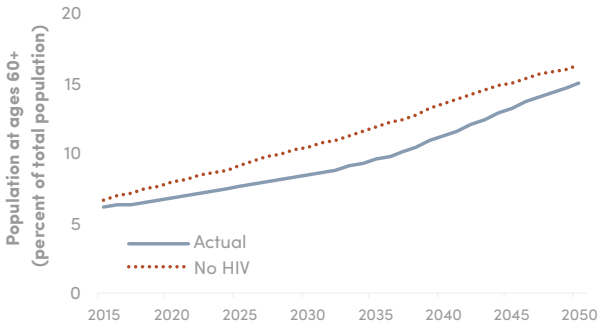
highest HIV prevalence are located in sub-Saharan Africa, the share of the population aged 60 or older in this region is relatively low, at 5 percent, compared with 12 percent in Asia, Latin America or the Caribbean, or 24 percent across high-income countries (UN Population Division, 2019). Nevertheless, HIV can have a significant impact on the growth of the older population, as illustrated by an example from Botswana (Figures 5 and 6, from Haacker et al., 2019). In this country, HIV is currently slowing the growth of the population aged 60 or older by over one percentage point, because cohorts reaching this age now were severely affected by AIDS-related mortality before treatment became accessible – about one quarter of the cohort born between 1959 and 1964 (who are at ages 55-59 as of 2018) are estimated to have died because of AIDS. As later cohorts benefitting from treatment early on reach old age, this effect is reversed, and the growth of the older population accelerates to a level that is higher than in the absence of HIV, by more than one percentage point.

Figure 3.5: Botswana, growth of population 60+, HIV and no HIV



Source: Haacker, Bärnighausen, and Atun, 2019.

Figure 3.6: Botswana, share of population 60+, HIV and no HIV



Source: Haacker, Bärnighausen, and Atun, 2019.

From demographic impacts of HIV to economic growth

HIV, through increased mortality and reduced birth rates, diminishes the growth of the working-age population and thus of the economy's productive capacities. Consequently, GDP growth declines. The implications of these demographic changes for GDP per capita are less clear. The most important effect runs through the dependency rate. If the mortality effects are concentrated among the working-age population, and each working individual has (on average) to sustain a larger number of dependents, this will have a negative effect on GDP per capita. If, however, the young population (pre-working age) shrinks more (e.g., because of fewer births or higher mortality), or the old population declines more than the working-age population, GDP per capita could increase.

Among other factors of production (see Brief 7), GDP depends on the size of the working-age population. The effect of increased mortality on the size of the working population accumulates over time and is not reversed as a result of the HIV response. The magnitude can be substantial – for countries like Botswana or Malawi, the size of the working-age population had been reduced by about 10 percent by 2018 relative to estimates excluding the impact of AIDS (Table 1).

Table 3.1: Impact of HIV on working age population, 2018

	Adult HIV prevalence (15-49)	Effect on size of working age population	Effect on share of working age population	Change in dependency rate
	(percent)	(percent)	(percentage point)	(decimal)
Botswana	20.3	-11.7	-0.7	0.010
Haiti	2.0	-2.5	-0.2	0.003
Malawi	9.2	-8.6	-0.6	0.011
Namibia	11.8	-6.5	-0.5	0.008
Uganda	5.7	-7.3	-0.7	0.014

Source: UNAIDS (2019b) and authors' calculations.
Note: Working-age population is defined as population at ages 15-64. Effects and changes are calculated relative to scenarios excluding the impact of HIV.

For GDP per capita, the most directly relevant demographic determinant is the change in the share of the working-age population. If the working-age population declines relative to the size of the young and old populations (i.e., the dependency rate increases), each income needs to sustain a larger number of people, and GDP per capita is correspondingly lower. Estimates of the impacts of HIV on the share of the working-age population are small – even for countries with high HIV prevalence, it declines by less than one percentage point by 2018 (Table 1), and dependency rates increase by about up to one percentage point. Considering that these effects have gradually developed over a period of several decades, this means that the demographic impacts of HIV alone have had a minuscule direct effect on the annual growth of GDP per capita over this period.

Summary table: Demographic impacts of HIV and their macroeconomic implications

Demographic impacts of HIV	Macroeconomic implications	Impact of HIV response
Slower growth or declines in working-age population because of increased mortality among adults (especially young ones).	Labour supply increases more slowly or declines, reducing GDP growth. Increased mortality among the working-age population lowers GDP but also the population size; the net effect on GDP per capita is therefore unclear.	The effects of HIV on population size and structure are cumulative and not directly reversed by HIV response. In the longer run (decades), a reversal of the effects of HIV on the population age structure. Growth of labour supply higher than otherwise as younger cohorts are less depleted by impacts of HIV.
Lower birth rates (because of increased mortality and reduced fertility rates among women living with HIV) and increased child mortality reduce size of young cohorts.	GDP per capita higher than otherwise in short run (smaller not-yet-productive young population). In the longer run smaller cohorts of young people contribute to lower growth of labour supply.	Reverses lower fertility rates and elevated child mortality, increases growth of labour supply in long run.

Demographic impacts of HIV	Macroeconomic implications	Impact of HIV response
Fewer adults reach old age due to AIDS-related early mortality	GDP per capita higher than otherwise (because of smaller size of old population). Mitigates fiscal and health-systems burden associated with population ageing	Following scaling-up of treatment, higher-than-normal growth of the old population, as cohorts reaching old age are increasingly less depleted by AIDS-related mortality.
The impact of HIV on the dependency rate (DR) is ambiguous and depends on the interplay of (1) reduced mortality of working-age adults (increases DR), (2) reduced birth rates and increased child mortality (reduces DR), and (3) the age profile of adult mortality (role of deaths among older adults and depleted cohorts reaching old age, reducing DR).	The dependency rate (size of old and young population, relative to size of working age population) is an important determinant of GDP per capita. The overall impact on GDP per capita is negligible.	HIV response reverses causes of changes in dependency rates, but reversals in impacts on population structure take decades.

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