

POLICY BRIEFS ON

ECONOMIC IMPACT OF HIV



7.

ECONOMIC GROWTH – OVERVIEW

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KEY POINTS

- HIV has increased mortality and slowed population growth. As a consequence, GDP is lower and will remain lower than it would have been without the impact of HIV.
- Economic modelling suggests that the short- to medium-term impacts of HIV on GDP per capita are unclear, with important effects working in opposite directions. In the longer run, the effects are likely dominated by adverse impacts on education and skills.
- The empirical evidence on the link between HIV and growth of GDP per capita is also unclear. Studies linking growth of GDP per capita and direct measures of the impact of HIV tend to find very small effects.
- The evidence is strongest with regard to the impact of HIV on the accumulation of human capital, which however affects economic growth only very gradually.

The impact of HIV on the overall capacity of an economy occurs through different channels. HIV-related mortality cumulatively reduces the size of the working-age population (see Brief 3), destroys human capital, and reduces returns to investments in education (see Brief 4). Increased morbidity or the disruptions associated with increased mortality reduce productivity (see Brief 6). The negative impacts of HIV on GDP are dominated by reduced population growth. The impact

on GDP per capita is less clear, as HIV exerts a negative effect on productivity, reducing GDP per capita; but increased mortality means that the economy's assets are shared among fewer people, thereby increasing GDP per capita. Empirical studies suggest that the impact of HIV on GDP per capita has so far been small. In the long run, the impact of HIV on the accumulation of human capital is likely to be the dominant factor that affects GDP per capita.

Lower population means lower GDP

HIV-related mortality cumulatively reduces the size of the working-age population. In countries with high HIV prevalence, the magnitude of this effect is large. For example, in Botswana, the population aged 15–64 is now 12 percent smaller than it would have been without the impact of HIV (UNAIDS 2019). Likewise, the size of the young population, born largely during the scaling-up of treatment, is 9 percent smaller than it would have been without the impact of HIV, suggesting that the impact of HIV on population size persists across generations.

Economic modelling suggests that a population loss results in a drop in GDP that is about one-half to two-thirds the size of the population loss (see Brief 5). This effect is magnified as the immediate loss of GDP induces lower investment, decreases the capital stock, and lowers GDP further until the total loss is proportional to the size of the underlying population loss. This effect on GDP could be mitigated somewhat in economies that rely largely on natural resource extraction if the value of resource extraction is largely independent of the availability of domestic capital and labour resources. In such cases, GDP would decline less than proportionally to the drop in population.

Ambiguous effect on GDP per capita

Economic modelling suggests that HIV has both positive and negative effects on GDP per capita. The overall effect is ambiguous, especially in the short run, when increased mortality improves employment opportunities for survivors. In the longer run, the effects are largely negative, owing to the effects of HIV on the accumulation of physical and human capital.

Productivity losses owing to HIV-related morbidity or AIDS-related mortality (increased staff turnover, attendance at funerals) reduce GDP per capita (see Brief 6). Increased mortality also destroys human capital (skills accumulated by education, training or experience, see Brief 4). The average loss in human capital across the population owing to increased mortality is ambiguous, since it depends on the distribution of HIV-related mortality across population groups, e.g., according to educational attainment, which is uneven across countries (Hajizadeh et al., 2014).

Looking further ahead, the impact of HIV on human capital is one of the most important aspects of predicting the long-term impacts of HIV on GDP per capita. In some models, economic growth depends directly on ongoing investment in human capital. In these models, the impacts of HIV on human capital accumulate over time, and HIV has a persistent impact on the growth of human capital. For example, according to Corrigan et al. (2005), an HIV prevalence (ages 15–49) of about 10 percent (which would result in an increased risk of premature AIDS-related mortality of 20 percent in the absence of treatment) would reduce GDP per capita growth by about 0.2 percent annually

through dis-investments in education. Other models of this kind predict cumulative losses in GDP per capita eventually growing to over 40 percent (Ferreira et al., 2011) or one-half (Bell et al., 2006) in high-prevalence countries.

Through investment and capital accumulation, HIV affects economic growth and GDP per capita in several ways (see Brief 5). First, owing to increased mortality, the capital stock is shared among fewer people. This opens better employment opportunities for survivors, partly reversing the negative effects of HIV (e.g., on productivity) or even increasing GDP per capita in the short run (see also Brief 3). Second, to the extent that the costs of HIV and the HIV response result in a reduced investment rate, the capital stock, and thus GDP per capita, eventually decline. Third, levels of investment and capital accumulation reinforce any direct shocks on GDP per capita. For example, if GDP per capita declines because of a productivity shock, any resulting drop in investment eventually diminishes the capital stock and thus employment opportunities.

The HIV response mitigates the direct effects of HIV on GDP per capita by improving productivity. It also reverses the effects of HIV on human capital, both in the short run, by reducing premature mortality, and in the long run, by restoring the incentives to invest in education that were eroded by perceptions of mortality risks (Baranov & Kohler, 2018). However, the HIV response may absorb considerable resources, and some of this expenditure may result in lower investment in other sectors.

Empirical evidence on the link between HIV and economic growth

The empirical evidence on the links between HIV and the HIV response on the one hand, and economic growth on the other, is weak. Some early studies followed an indirect approach, linking economic growth to a number of variables, including health indicators such as life expectancy or mortality; estimating or calibrating the impact of HIV on those health indicators; and obtaining the impacts of HIV by stacking up the two effects. For example, McDonald & Roberts (2006) linked the growth of GDP per capita to variables such as investment, school enrolment and infant mortality, of which the latter was linked to HIV prevalence. According to their findings, an HIV prevalence of 10 percent results in a gradual loss in GDP per capita amounting to 6 percent.

This research mirrors the literature on health and growth in general, in which life expectancy is one of the most robust variables that explains economic growth (Barro & Sala-i-Martin, 2003). However, such estimates tend to yield estimates of the impact of HIV that are implausibly large, when compared to actual data on economic growth during the period in which the mortality impacts of HIV were escalating and in the subsequent recovery period that saw the scaling-up of treatment (Haacker 2016). This disconnect may arise for a number of reasons. If the empirical link between health and growth reflects health conditions in early life and their contributions to acquisition of skills and education in childhood and adolescence, then such findings do not carry through to the consequences of an adult

mortality shock like HIV. More fundamentally, the correlation between growth and life expectancy could reflect third factors, such as the quality of institutions or public services (Deaton, 2006), rather than a causal link.

For these reasons, it is important to also consider evidence linking economic growth directly to measures of the health impact of HIV. For example, Papageorgiou & Stoytcheva (2009) link GDP per capita and the number of reported AIDS cases across 89 countries between 1986 and 2000, arriving at a minuscule effect of HIV and growth (e.g., a loss in GDP per capita of 0.2 percent for Botswana). Similarly, Werker et al. (2009) do not find “any measurable impact [of HIV] on economic growth or savings in African nations” through 2005. These studies primarily regard the impact of HIV per se, as the underlying data largely precede the scaling-up of treatment. In contrast, Tompsett (2020) focuses on growth

experience during the expansion of antiretroviral therapy (until the end of 2014), finding that growth in countries with high HIV prevalence accelerated relative to other countries during the scaling-up of treatment – “the estimated effect on growth in GDP per capita in the main sample is 1.40 percentage points [...] for a 1 percentage point increase in ARV therapy coverage” (where coverage means the share of the total population receiving antiretroviral therapy, not only of people living with HIV). This estimate, however, is likely mis-specified: at the high end, with up to 10 percent of the total population (in Botswana) receiving antiretroviral therapy in 2014, Tompsett’s estimates suggest an increase in the growth of GDP per capita of up to 14 percentage points, which is quite unlike anything experienced in countries facing high HIV prevalence.

Conclusions

HIV did not result in the catastrophic economic effects feared as the epidemic escalated. In part this is a result of the scaling-up of treatment, which has reversed much of the adverse health effects of the epidemic since about 2003. Careful empirical analyses focusing on the period preceding the scaling-up of treatment find an insignificant or negligible effect of HIV on growth of GDP per capita.

Perhaps the most important effect of HIV with regard to economic growth is the impact on the accumulation of human capital. A perception of high mortality risk reduces incentives to invest in education, and empirical evidence suggests that HIV has had an important impact on educational outcomes (Fortson, 2008). Conversely, following the roll-out of antiretroviral therapy, investments in education and schooling outcomes recovered (Baranov & Kohler, 2008). The human-capital factor, however, affects

economic growth only with a lag and very gradually, as cohorts whose education was affected age into and through the working-age population. For this reason, this effect is not captured in conventional empirical assessments of economic growth.

With regard to HIV policy, our review suggests that the economic returns to investments in HIV (in terms of gains in GDP or GDP per capita) play a minor role in the evaluation of HIV policies. Reduced AIDS-related mortality results in a larger population and larger GDP. However, results on the effects of HIV on GDP per capita are ambiguous. Notably, much of the empirical evidence and economic modelling focuses on the role of AIDS-related mortality (or, relatedly, life expectancy). These effects are now much diminished because the scaling-up of treatment is well advanced in most countries.

Summary table: impacts of HIV and of the HIV response on economic growth

Direct impact	Macroeconomic implications	Impact of HIV response
Loss of population owing to increased mortality. AIDS-related morbidity.	Reduced economic capacities, reduced GDP. Reduced productivity associated with morbidity and mortality-related shocks.	Reduces ongoing mortality, but demographic impacts of HIV persist.

Direct impact	Macroeconomic implications	Impact of HIV response
Reduced lifespan owing to HIV.	Loss of skills and experience owing to increased mortality. Composition of working-age population changes, depending on the socioeconomic gradient of HIV. Reduced investment in human capital, e.g., worse schooling outcomes.	Reduces ongoing mortality. Reverses effect on incentives to invest in human capital and losses in schooling outcomes.
Impact of HIV absorbs public and private resources.	Some of the resources absorbed result in lower investment, eventually reducing the capital stock. The remainder results in reduced spending on other purposes, reducing living standards.	Public health spending on HIV response highly persistent because of long-term treatment costs, but HIV-related costs to households are reduced.

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