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The impact of HIV and AIDS on Africa's economic development

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The macroeconomic effects of HIV/AIDS in Africa are substantial, and policies for dealing with them may be controversial—one is whether expensive antiretroviral drugs should be targeted at economically productive groups of people. The authors review the evidence and consider how economic theory can contribute to our response to the pandemic

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Three million people died from AIDS in 2001, making it the world's fourth biggest cause of death, after heart disease, stroke, and acute lower respiratory infection.¹ Over 70% of the world's 40 million people living with HIV/AIDS are in Africa (table 1). Besides the human cost, HIV/AIDS is having profound effects on Africa's economic development and hence its ability to cope with the pandemic. While the impact of HIV/AIDS on people has been well documented, it has been much more difficult to observe the pandemic's effects on the African economy as a whole or to assess how it might affect Africa's future development. Nevertheless we need to understand these broader economic effects to form effective policy responses.

Methods

We used economic theory to predict what happens to economies faced with rapidly increasing mortality and morbidity. We reviewed empirical studies that have attempted to quantify the macroeconomic effects of the HIV/AIDS pandemic. We found these studies by searching EconLit, Medline, PubMed, Embase, science and social science citation indexes, and key websites (International AIDS Economic Network, UNAIDS, the World Bank, and the World Health Organization). We also contacted key researchers, and we did a secondary search of the bibliographies of all the studies we found. Unfortunately there have been few studies of the macroeconomic implications of the HIV pandemic

Summary points

Economic research helps to estimate the effects of HIV/AIDS on the African economy and the cost effectiveness of prevention and treatment programmes

Economic theory predicts that HIV/AIDS reduces labour supply and productivity, reduces exports, and increases imports

The pandemic has already reduced average national economic growth rates by 2-4% a year across Africa

Prevention and treatment programmes and economic measures such as targeted training in skills needed in key industries will limit the economic effects of HIV/AIDS

and few economic evaluations of interventions to combat the disease.

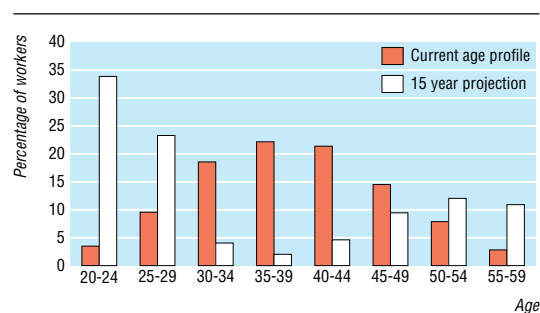
Economic effects

Reduced labour supply

The HIV/AIDS pandemic has an impact on labour supply, through increased mortality and morbidity. This is compounded by loss of skills in key sectors of the labour market. In South Africa, for example, around 60% of the mining workforce is aged between 30 and 44 years; in 15 years this is predicted to fall to 10% (R Elias, University of Botswana, personal communication, 2000) (figure). In the South African healthcare sector 20% of student nurses are HIV positive.²

Table 1 Numbers of people (millions) worldwide living with HIV or AIDS in 2001¹

Region	Adults and children living with HIV/AIDS	Adults and children infected with HIV in past 12 months	Prevalence (%) among adults
Sub-Saharan Africa	28.1	3.4	8.4
North Africa and Middle East	0.4	0.1	0.2
Rest of the world	11.5	1.5	0.4
Total	40.0	5.0	1.2



Current and projected age profiles of workers in a typical South African mine

Reduced labour productivity

The long period of illness associated with AIDS reduces labour productivity. One review reported that the annual costs associated with sickness and reduced productivity as a result of HIV/AIDS ranged from \$17 (£12; €19) per employee in a Kenyan car manufacturing firm to \$300 in the Ugandan Railway Corporation.³ These costs reduce competitiveness and profits. Government incomes also decline, as tax revenues fall, and governments are pressured to increase their spending, to deal with the rising prevalence of AIDS, thereby creating the potential for fiscal crises.

Reduced exports and increased imports

Lower domestic productivity reduces exports, while imports of expensive healthcare goods may increase. The decline in export earnings will be severe if strategic sectors of the economy are affected, such as mining in South Africa. Consequently the balance of payments (between export earnings and import expenditure) will come under pressure at the same time that government budgets come under pressure. This could cause defaults on debt repayments and require economic assistance from the international community.

Quantifying the impact

Estimating the combined impact of these various interdependent effects on the performance of an economy

is a complex task. To simplify the measurement of “economic performance,” economists have tended to focus on one measure: average income, or gross domestic product (GDP), per capita. Our literature search identified 11 studies that attempted to quantify the effect of HIV/AIDS on GDP per capita (table 2). In general these studies used regression analysis to estimate the impact of the prevalence of HIV on the rate of growth of GDP per capita, while controlling for other factors that might also affect growth (for example, levels of nutrition). The consensus from these studies is that the net effect on the growth of GDP per capita will be negative and substantial. The more recent studies show greater effects; and the most recent estimates indicate that the pandemic has reduced average national growth rates by 2-4% a year across Africa.⁴

While these models do highlight the economic impact of the pandemic, they are based on a simplified version of economic relationships. Specifically, they generally assume that people can move easily from one type of job to another. This assumption is likely to underestimate the impact of the pandemic on production, because the replacement of skilled labour is a slow and expensive task, and labour cannot be shifted simply from one sector to another (agriculture to health care, for example) in response to shortages in skills.

Another class of models—termed computable general equilibrium models—allow the differential effects of the pandemic across sectors to be estimated. Our literature search found three applications of computable general equilibrium modelling to HIV/AIDS and African economies. These studies predicted greater economic effects of the pandemic than did regression analysis, and they also found significant variation across industrial sectors. In 1992 Kambou et al assessed the impact on Cameroon’s economy of changes in the skill composition of the labour force resulting from the HIV/AIDS epidemic.⁵ They concluded that reduced availability of skilled labour would reduce growth rates by about 50% and investment by 75%, that imports of food and other basic products would increase, and that exports of manufactured and other products would decline. More

Table 2 Summary of studies of the macroeconomic impact of HIV/AIDS in Africa

Study	Countries (period of economic data)	Period of most recently used HIV/AIDS data	Results (comparison with non-HIV/AIDS scenario)
Dixon et al (2001) ⁵	41 countries (1960-98)	Late '90s	Growth rates reduced by 2-4%; large variation across countries, in line with prevalence of HIV
World Bank (2001) ¹⁰	Swaziland	Early '90s	Average rate of growth of GDP in 1991-2015 will be 1.5% lower a year
World Bank (2001) ¹¹	Namibia	Early '90s	Average rate of growth of GDP in 1991-2015 will be 1.1% lower a year
World Bank (2000) ¹²	Lesotho	Late '80s	Average rate of growth of GDP in 1986-2015 will be 0.8% lower a year
Bonnel (2000) ¹³	About 50 countries (1990-7)	Mid-'90s	Rate of growth of GDP per capita reduced by 0.7% a year in the 1990s
Quattek et al (2000) ¹⁴	South Africa	Mid-'90s	Average rate of GDP growth over next 15 years will be 0.3-0.4% lower a year
BIDPA (2000) ¹⁵	Botswana	Late '90s	Average rate of growth of GDP in 2000-2010 reduced by 1.5% a year
Bloom et al (1995) ¹⁶	51 countries (1980-92)	Early '90s	Insignificant effect on income growth
Cuddington et al (1994) ¹⁷	Malawi	Early '90s	Average rate of growth of GDP in 1985-2010 reduced by up to 0.3%
Cuddington (1993) ^{18, 19}	Tanzania	Early '90s	Per capita GDP in 1985-2010 up to 10% smaller
Over (1992) ²⁰	30 sub-Saharan countries	Early '90s	Rate of growth of GDP per capita in 1990-2025 reduced by 0.15% (0.6% in 10 worst affected countries)

recently Arndt and Lewis estimated that by 2010 South Africa's GDP per capita will be some 8% lower and consumption per capita will be about 12% lower than would have been the case without the HIV/AIDS pandemic.^{6 7}

The value of economic models

Economic models show that the AIDS pandemic in sub-Saharan Africa will have long term economic consequences that may be resolved only by international economic assistance. An important step in limiting the economic effects of the pandemic is to develop comprehensive policies tailored to the needs of the economies of individual countries. These policies will inevitably include the introduction of treatment and prevention programmes but may also include economic measures, such as targeted training of skills needed in key industries.

Although estimates of the cost of national programmes have been published for some time, only now are estimates of clinical effectiveness being produced.⁸ A recent study modelled the effects of national programmes on the prevalence of HIV/AIDS in India and Botswana.⁹ In these countries the most clinically effective interventions are aimed at prevention, while treatment with antiretroviral drugs has only a transient effect on prevalence. To assess which programmes in poor countries give the best value for money, future research needs to combine data on cost and on clinical effectiveness.

Taking into account the macroeconomic effects of interventions may provoke a number of ethically and politically sensitive dilemmas. For example, to maintain economic stability it may be necessary to target expensive antiretroviral drugs at highly productive socioeconomic groups in specific industries on the basis of their contribution to economic output rather than their healthcare needs. Such a strategy would generate greater economic prosperity and government funds, allow time for replacement labour to be trained, and thereby reduce the overall impact of the pandemic.

The AIDS pandemic is much more than a medical problem, and thus requires more than medical interventions. Economic models help us develop and maintain the economic environments within which sustainable medical programmes can be implemented.

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