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THE FISCAL DIMENSION OF HIV/AIDS IN BOTSWANA, SOUTH AFRICA, SWAZILAND, AND UGANDA

ELIZABETH LULE AND MARKUS HAACKER

THE WORLD BANK

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Elizabeth Lule and Markus Haacker

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Foreword

HIV/AIDS imposes enormous economic, social, health, and human costs and will continue to do so for the foreseeable future. The challenge is particularly acute in Sub-Saharan Africa, home to two-thirds (22.5 million) of the people living with HIV/AIDS globally, and where HIV/AIDS has become the leading cause of premature death.

But now, after decades of misery and frustration with the disease, there are signs of hope. HIV prevalence rates in Africa are stabilizing. Between 2001 and 2009, global funding for HIV/AIDS increased tenfold from US$1.6 billion to US$15.9 billion. And more than 5 million people in developing countries are receiving treatment.

These encouraging developments bring with them a new set of concerns. Who will pay for the treatment? Is it sustainable? Is it affordable? In many countries, the response to HIV/AIDS has attained a scale that is significant from a macroeconomic or fiscal perspective—not just in countries facing very high HIV prevalence, but also in a number of low-income countries relying heavily on external support to finance their HIV/AIDS programs. For the latter, with an increasingly volatile global economy, the challenges of financing national HIV/AIDS programs may become more acute.

This book sheds light on these concerns by analyzing the fiscal implications of HIV/AIDS in Southern Africa, the epicenter of the epidemic. It uses the toolbox of public finance to assess the sustainability of HIV/AIDS programs. Importantly, it highlights the long-term nature of the fiscal commitments implied by HIV/AIDS programs, and explicitly discusses the link between HIV infections and the resulting commitments of fiscal resources.

The analysis shows that, absent adjustments to policies, treatment is not sustainable. But it also shows that, by accompanying treatment with prevention, and making existing programs more cost-effective, these countries can manage both treatment and fiscal sustainability. Even in countries where HIV/AIDS-related spending is high or increasing (as past infections translate into an increasing demand for treatment), the fiscal space absorbed by the costs of HIV/AIDS-related services will decline if progress in containing and rolling back the number of new infections can be sustained. However, in some of the countries covered, the quasi-liability implied by

the cost of the HIV/AIDS program are in a neighborhood that would be considered unsustainable using standard tools of debt-sustainability analysis.

Given the limited analysis on the fiscal dimension of HIV/AIDS in Africa, this book, as well as the underlying tools, will be useful to policy makers in National AIDS commissions, Ministries of Health, and Ministries of Finance, in assessing the financial sustainability and allocative efficiency of the national HIV/AIDS program, and in formulating effective national HIV/AIDS strategies to stem new infections and treat and provide care and support for those affected. At the same time, it will inform the global policy dialogue regarding the financing of HIV/AIDS programs, including the roles of domestic public and private resources and of external assistance. Just as with the epidemic itself, solving the fiscal problem requires a coalition of all actors—government, donors, private sector, and most important, the poor people who are vulnerable to HIV/AIDS. This book will help bring us together.

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Abbreviations

AIDS	Acquired immunodeficiency syndrome
ANC	Antenatal clinic
ART	Antiretroviral therapy
ARV	Antiretroviral
ASSA	Actuarial Society of South Africa
BIDPA	Botswana Institute for Development Policy Analysis
CARe	Center for Actuarial Research
CPI	Consumer price index
CSO	Central Statistical Office
DOH	Department of Health
GDP	Gross domestic product
GEPF	Government Employees Pension Fund
GFATM	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GoS	Government of Swaziland
HAART	Highly Active Antiretroviral Treatment
HDI	Human Development Index
HIPC	Heavily Indebted Poor Countries Initiative
HIV	Human immunodefieciency virus
IDA	International Development Association
IMF	International Monetary Fund
MASA	National antiretroviral treatment program (Botswana)
MDRI	Multilateral Debt Relief Initiative
MOH	Ministry of Health
NACA	National AIDS Coordination Agency
NDP	National Development Plan
NERCHA	National Emergency Response Council on HIV/AIDS
NGO	Nongovernmental organization
NHA	National health account
NSF	National Strategic Framework on HIV/AIDS
NSP	National Strategic Plan
OECD	Organisation for Economic Co-operation and Development
OVC	Orphans and vulnerable children

P	Pula
PDV	Present discounted value
PEPFAR	President's Emergency Plan for AIDS Relief (U.S.)
PMTCT	Prevention of mother-to-child transmission
PSPF	Public Sector Pension Fund
R	Rand
SACU	Southern African Customs Union
SANAC	South Africa National AIDS Council
STD	Sexually transmitted disease
STI	Sexually transmitted infection
TB	Tuberculosis
UAC	Uganda AIDS Commission
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNGASS	United Nations General Assembly Special Session
UNICEF	United Nations Children's Fund
USh	Uganda shilling
WEFA	Wharton Econometric Forecasting Associates
WHO	World Health Organization
ZAR	South African rand

Overview

HIV/AIDS continues to take a tremendous toll on the populations of many countries, especially in Sub-Saharan Africa. In some countries with high HIV prevalence rates, life expectancy has declined by more than a decade and in a few cases by more than two decades. Even in countries with HIV prevalence of around 5 percent (close to the average for Sub-Saharan Africa), the epidemic can reverse gains in life expectancy and other health outcomes achieved over the last one or two decades.

Recognizing that HIV/AIDS is a serious health and development threat, the international response to the disease has been unparalleled, with worldwide funding rising from only US$260 million in 1996 to US$15.9 billion by 2009 and the creation of an international agency, the Joint United Nations Programme on HIV/AIDS (UNAIDS), which is dedicated to coordinating the international HIV/AIDS response (UNAIDS 2010). Additionally, the impact of and the challenges represented by HIV/AIDS provided much of the impetus behind the creation of the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM). Furthermore, most of the funding provided by the GFATM (about 60 percent) underwrites HIV/AIDS-related programs in addition to increased financing from bilateral donors, in particular, the U.S. government and philanthropic support.

The increase in funding has been mirrored by a rapid scaling-up of the HIV/AIDS response in low- and lower-middle-income countries, where external grants are the dominant financing source of HIV/AIDS-related expenditures. However, significant financing gaps must be filled to achieve universal access to treatment, prevention, and mitigation interventions.

The scale-up of efforts and the commitment of major industrial countries to combat the epidemic and provide universal access to treatment are

appropriate and welcome. At the same time, these efforts carry implications for macroeconomic and fiscal management in aid-recipient countries and for the effectiveness of public policy initiatives in different sectors. In addition, HIV/AIDS has significant consequences for the public and private sectors in the affected economies, which can reduce national governments' abilities to effectively respond to the epidemic.

The purpose of this study is to refine the analysis of the *fiscal burden* of HIV/AIDS on national governments and assess the *fiscal risks* associated with scaling-up national HIV/AIDS responses. The study complements and contributes to the agenda on identifying and creating fiscal space for HIV/AIDS and other development expenditures. The findings from this study, and the analytical tools developed in it, could help governments in defining policy objectives, improving fiscal planning, and conducting their dialogue with donor agencies. Study findings could also contribute to the World Bank's policy advice on implementing the HIV/AIDS response, notably in the area of fiscal management and fiscal sustainability.

The study is primarily directed toward professionals involved in planning and implementing national and international HIV/AIDS responses. This could include, for example, government officials in ministries of finance; staff from international organizations such as UNAIDS or GFATM who are directly involved in supporting HIV/AIDS-related programs; staff from other international organizations who are implementing or have an interest in aspects of the HIV/AIDS response; and the broader development community.

This synthesis report highlights work conducted under the umbrella of a World Bank work program on "The Fiscal Dimension of HIV/AIDS," including country studies on Botswana, South Africa, Swaziland, and Uganda. It starts out from and builds on three observations. First, in a number of countries, the fiscal costs of HIV/AIDS are large. This means that the impact of and the response to HIV/AIDS are relevant factors in medium- and long-term fiscal planning, and that the fiscal context (and external context, in light of the role played by external financing) is relevant for planning the sustainable financing of HIV/AIDS programs. Second, the impact of and the response to HIV/AIDS are long-term events that will affect public finance for many years to come. For this reason, current spending is an incomplete and potentially misleading indicator of the fiscal burden of HIV/AIDS. Third, most of the fiscal costs of HIV/AIDS are ultimately caused by new infections and this analysis further estimates the fiscal

resources committed (or saved) by an additional (or prevented) HIV infection. Specifically, this study covers four aspects of the fiscal dimension of HIV/AIDS. First, it aims for a comprehensive analysis of the fiscal costs of HIV/AIDS, with a wider scope than a costing analysis focusing on only the policy response to HIV/AIDS. Second, it embeds the analysis of HIV/AIDS costs in a discussion of the fiscal context, and interprets these costs as a quasi-liability, not a debt *de jure*, but a political and fiscal commitment that binds fiscal resources in the future and cannot easily be changed, and very similar to a pension obligation or certain social grants or services. Third, it develops tools to assess the (fiscal dimension of) trade-offs between HIV/AIDS policies and measures that take into account the persistence of these spending commitments. Fourth, most of the fiscal costs of HIV/AIDS are ultimately caused by new infections, and this study estimates the fiscal resources committed (or saved) by an additional (or prevented) HIV infection. Building on these estimates, the analysis here is able to assess the evolving fiscal burden of HIV/AIDS over time.

In addition, this study provides a cross-section of HIV/AIDS spending and financing, focusing on 15 countries in southern and eastern Africa. While some of these countries are among those with the highest HIV prevalence rates worldwide, the intention is to provide a snapshot of the costs of HIV/AIDS across the region, including countries with low HIV prevalence, and countries with very different levels of economic development (GDP per capita between US$300 to US$7,600). The discussion highlights the large scale of HIV/AIDS spending (between 1.0 and 3.6 percent of GDP in 10 of these 15 countries). This review of HIV/AIDS spending and financing across countries is complemented by a discussion of the impact of the global economic crisis for HIV/AIDS financing. In addition to the immediate impact of the global crisis on the region, countries are also vulnerable to a slowdown in availability of external financing for HIV/AIDS programs, which ranges from around 30 to 98 percent of HIV/AIDS spending across countries for the years sampled.

The four country studies analyze HIV/AIDS as a highly persistent fiscal shock. While most HIV/AIDS-related services ultimately are caused by HIV infections, new infections translate into increased demand for public services only with a very long lag. This also implies that policy measures to reduce HIV incidence do affect the costs of HIV/AIDS in other program areas (care and treatment and mitigation) only very slowly. Much of the analysis is geared to assess and quantify the link between the fiscal burden

of HIV/AIDS and HIV incidence, including by quantifying the fiscal quasi-liabilities incurred by new infections under the commitments made under the HIV/AIDS program. The findings from this study, and the analytical tools developed in it, could help governments define policy options, improve fiscal planning, and conduct dialogues with donor agencies.

Methodology

The analytical framework rests on three pillars—a demographic and epidemiological module, a set of tools to assess the fiscal costs of HIV/AIDS, and a macroeconomic model. The demographic and epidemiological module translates assumptions regarding the scale and the effectiveness of national HIV/AIDS responses, notably regarding changes in HIV incidence and scaling-up of access to antiretroviral treatment, into projections of demographic variables and variables describing the state of the epidemic, such as the number of people living with HIV/AIDS and the number of people requiring and receiving treatment.

In line with the fiscal focus of this analysis, the most substantial component of the framework regards the fiscal repercussions of HIV/AIDS. The analysis proceeds in three steps. First, it builds projections of the fiscal costs of HIV/AIDS, based on the targets of national policies on HIV/AIDS, available estimates of the costs of HIV/AIDS programs, and other information. Unlike an analysis with a more narrow operational focus, it also aims to capture fiscal costs of HIV/AIDS that are not included in a costing study of an HIV/AIDS program, such as the impacts of HIV/AIDS on government employees and certain social expenditures.

Second, the analysis estimates the costs incurred by a single infection. This analysis starts from the objectives of the national HIV/AIDS program (for example, a treatment coverage rate of x percent), and calculates the expected fiscal costs caused by one additional infection under these targets. The analysis interprets these costs as a quasi-liability—under the objectives of the HIV/AIDS program, an additional infection binds future fiscal resources—and then calculates the value of this liability (that is, the amount that would need to be put aside now to cover the costs of this infection) as the present discounted value of the expected costs incurred by an HIV infection.

Third, estimates of the fiscal costs and of the costs incurred by a single HIV infection are combined to analyze the evolving fiscal burden of

HIV/AIDS. Current costs of HIV/AIDS largely reflect HIV infections that have occurred in the past, and current policies affect the demand for HIV/AIDS-related services over many years, even decades; because of these two aspects, current spending is not a good indicator of the fiscal burden of HIV/AIDS. This study's estimate of the evolving fiscal HIV/AIDS burden is based on its quasi-liability, which, under a country's HIV/AIDS policies, is incurred as a consequence of past and current HIV infections, or equivalently, the costs of providing HIV/AIDS-related services and coping with the impact of HIV/AIDS for all people currently living with HIV/AIDS. Costs incurred by new infections add to this liability, while the liability declines as the anticipated HIV/AIDS services necessitated by past infections are delivered. This analysis yields indicators to assess the fiscal consequences of alternative HIV/AIDS policies (based on the quasi-liability associated with respective policies) and allows an analysis of the fiscal sustainability of HIV/AIDS programs, drawing on tools normally applied to analysis of the sustainability of public debt.

Because this analysis relates the fiscal costs of HIV/AIDS to fiscal capacities or the size of the economy, it is important for the fiscal analysis to capture the consequences of HIV/AIDS on the scale of economic activity. The framework therefore includes a macroeconomic model. Building on a neoclassical growth framework, it tracks the implications of the reduced rate of population growth and of the costs of the impact of and response to HIV/AIDS for GDP and government revenues.

Country Summaries

Botswana

Botswana is among the countries with the highest level of HIV prevalence in the world. According to UNAIDS (2010b), prevalence among the population aged 15–49 was 24.8 percent, and 320,000 people were living with HIV. As a result of HIV/AIDS, key health indicators have deteriorated catastrophically—life expectancy at birth has declined from 66 years in 1990 to 50 years in 2002, recovering only partially to 54 years by 2008 (World Bank 2010a). In addition, the probability of reaching age 50 has dropped to 55 percent (compared to 88 percent without AIDS) for the 2005–10 period (United Nations Population Division 2009). Because of the decline in life

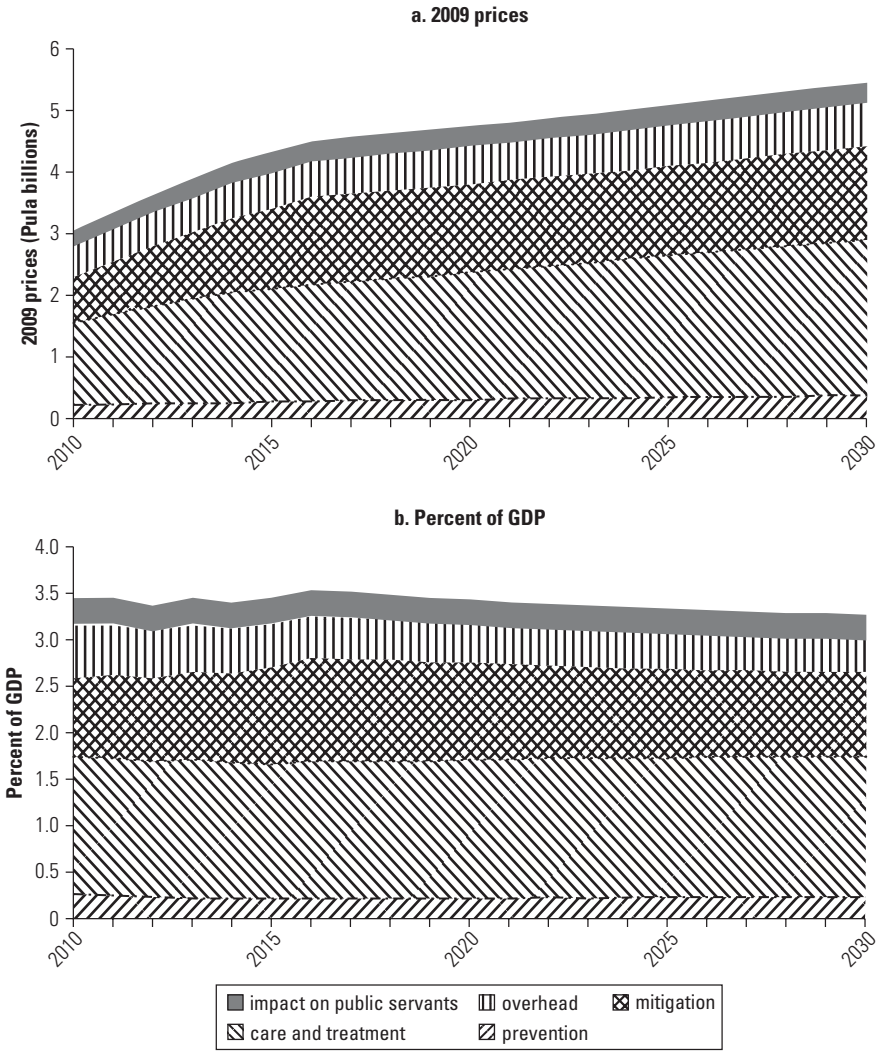
expectancy, the Botswana Human Development Index ranking slipped from 71 in 1996 to 125 as of 2007 (UNDP 2009).

The scale of the epidemic in Botswana brings extraordinary policy challenges for planning, managing, and financing the response to the epidemic. The objectives of this study are to assess fiscal policy challenges arising from the HIV/AIDS response, develop tools to better understand the links between the HIV/AIDS program and the fiscal costs of HIV/AIDS, and thus inform the planning of the national response and fiscal planning in general. This study complements the ongoing Public Expenditure Review, which focuses on the broader fiscal picture.

Regarding the scale of the HIV/AIDS impact, this study's estimates and projections suggest that the fiscal costs of HIV/AIDS will rise from Pula (P) 3 billion (2010) to P 5.5 billion by 2030 (figure O.1). Relative to gross domestic product (GDP), the fiscal costs peak at 3.5 percent of GDP around 2016, and slowly decline to 3.3 percent of GDP by 2030. The biggest components of the fiscal costs of HIV/AIDS are care and treatment, increasing from P 1.3 billion (43 percent of total) to P 2.5 billion (46 percent of total), reflecting the increasing number of people receiving treatment, as well as the increasing use of second-line treatment over this period. Mitigation expenses, largely in support of the increasing number of orphans, increase from P 0.8 billion to P 1.5 billion (25 and 28 percent of total costs, respectively), whereas the costs of prevention programs increase from P 0.2 billion in 2010 to P 0.4 billion in 2030 (remaining at 7 percent of total). The HIV/AIDS impact on public servants, excluding treatment and other costs already counted in the other cost categories, amounts to about P 0.3 billion throughout the projection period, and declines from 0.3 percent of GDP in 2010 to 0.2 percent of GDP in 2030. Unlike, for example, in South Africa, social expenditures other than orphan care do not appear to play a large role in the fiscal costs of HIV/AIDS in Botswana.

The 20 years covered by this study's projections are also a challenging period for public finance in Botswana in general—as discussed in detail in the National Development Plan 10 (NDP 10; Botswana 2010) and the World Bank Public Expenditure Review (World Bank 2010b). Between 2010 and 2014, the economy and fiscal revenues are expected to rebound from the global economic crisis, and this explains why HIV/AIDS spending remains flat relative to GDP over these years while increasing sharply in absolute terms. However, the role of the mineral

Figure O.1: Botswana: Fiscal Costs of HIV/AIDS (2010–30)



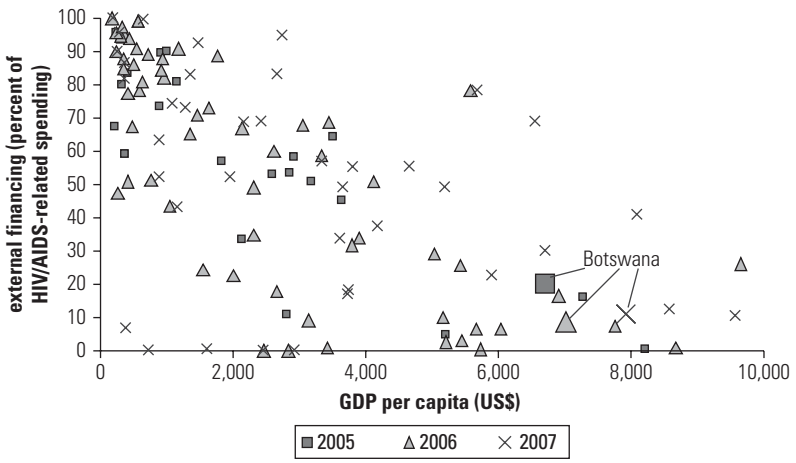
Source: Authors' estimates and projections.

sector and the corresponding fiscal revenues are expected to decline over the later years covered by this study. This study therefore projects that government revenues slow down relative to GDP, and the fiscal costs of HIV/AIDS rise from 10.8 percent of government revenues in 2013 to 12.2 percent by 2021.

One of the crucial aspects of the fiscal dimension of HIV/AIDS is the persistence of the costs incurred by the impact of and the response to HIV/AIDS. In this regard, the commitments under the HIV/AIDS program can be considered a quasi-liability that absorbs fiscal space and needs to be paid off over a long period. Overall, the value of this liability (measured by the present discounted value) amounts to 192 percent of GDP, if the costs of projected infections are included, or 94 percent of GDP if only the costs committed for past infections are included. Even taking into account that the HIV/AIDS response in Botswana has been financed partially through external support, and that its fiscal context is relatively benign (though with difficult challenges lying ahead), these estimates indicate that the impacts of and the response to HIV/AIDS represent an extraordinary fiscal challenge.

External support to Botswana's HIV/AIDS program, on a per capita basis, is among the highest received by any country in the world. This, however, reflects the extraordinarily high costs of HIV/AIDS in the country. When measured against the costs of the HIV/AIDS program, the rate of external support (usually 10–20 percent of total program costs) appears in line with international norms regarding support to HIV/AIDS programs across countries (figure O.2). However, even taking into account the level of external support, the HIV/AIDS cost burden for public

Figure O.2: External Financing of HIV/AIDS Programs across Countries



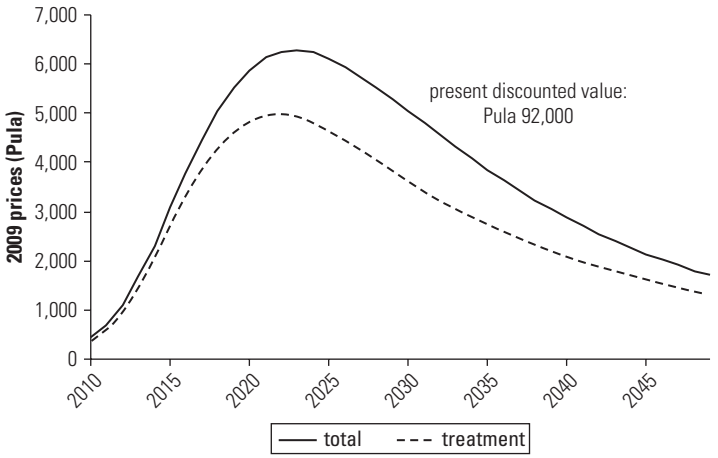
Source: Authors' calculations, based on UNAIDS (2008) and IMF (2010).

finance remains very high. For example, if donor support continues to account for 20 percent of the fiscal costs of HIV/AIDS, the costs would still be equivalent to 156 percent of GDP, compared to 192 percent without external support.

One of the challenges in assessing the fiscal dimension of HIV/AIDS and HIV/AIDS programs is the extremely long time lag between cause (an infection or a policy action) and effect (for example, demand for treatment or certain social mitigation services), which can span several decades. To inform policy choices, however, the prospect of incremental changes in public expenditures over such a long time period is not a very tangible concept. Instead, HIV/AIDS can be interpreted as a quasi-liability. In this interpretation, an additional HIV infection, under the coverage rates of HIV/AIDS-related services targeted under the HIV/AIDS program, corresponds to a liability equivalent to the present discounted value of the additional spending triggered by the infection. Costs incurred by an additional infection are estimated as equivalent to P 92,000 (measured by the PDV, applying a discount rate of 3 percent), corresponding to about two times GDP per capita, largely reflecting the costs of treatment (figure O.3).

Combining the macroeconomic and microeconomic strands of the analysis, current spending is compared to the costs incurred by new infections. While the former remains well over 3 percent of GDP throughout

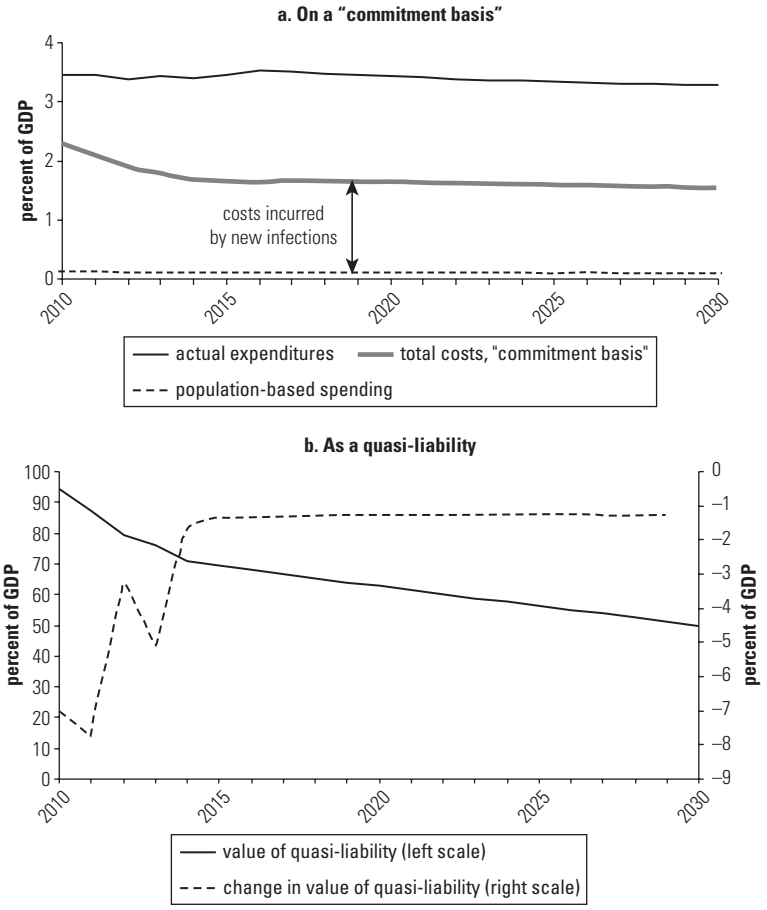
Figure O.3: Botswana: Costs of One Additional Infection



Source: Authors' calculations.

the projection period, the latter declines from 2.3 percent of GDP in 2010 to 1.5 percent of GDP by 2030. This reflects that almost all of current HIV/AIDS spending is a result of past infections, while reduced HIV incidence over the last years translates into lower spending commitments. Consequently, the quasi-liability implied by the costs committed under the HIV/AIDS program declines from 94 percent of GDP as of 2010 to 50 percent of GDP as of 2030 (figure O.4).

Figure O.4: Botswana: Fiscal Costs of HIV/AIDS, 2010–30



Source: Authors' estimates and projections.

South Africa

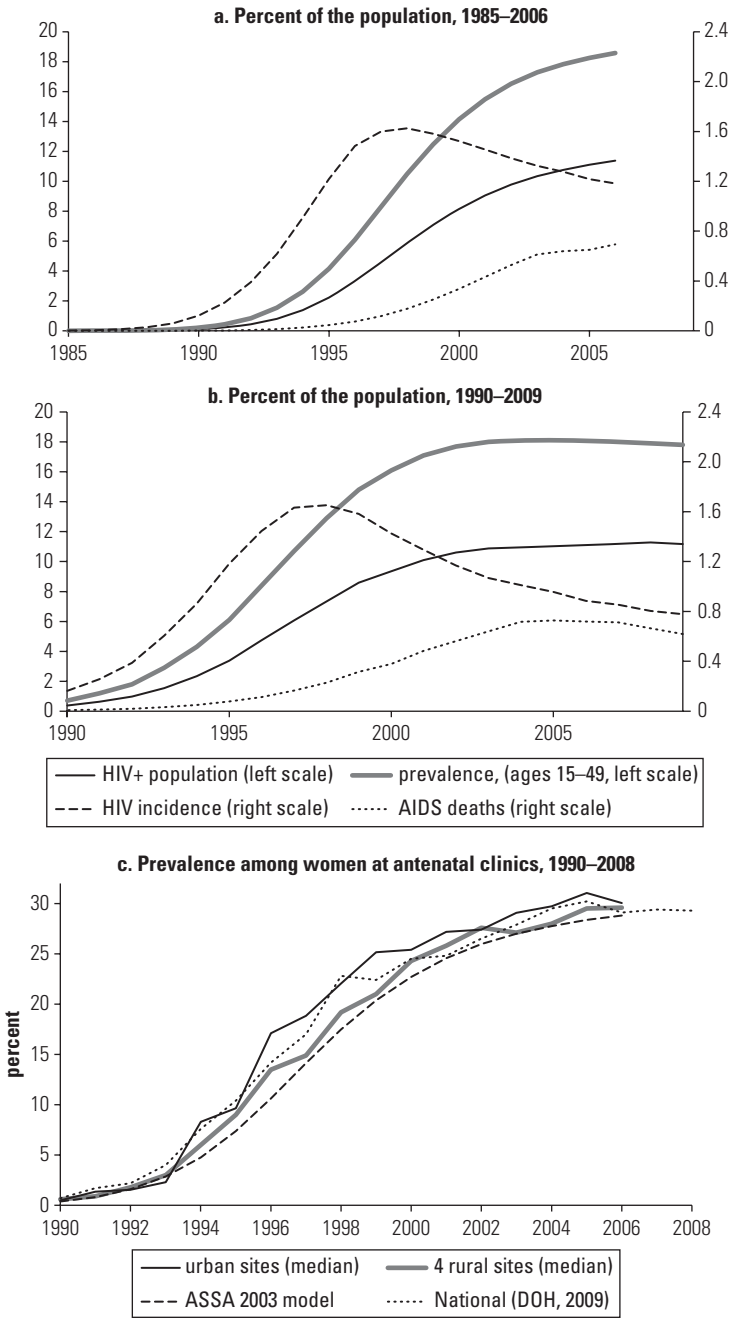
This study addresses HIV/AIDS as a complex challenge to public policy, with significant fiscal implications as well as impacts on the government's ability to attain its key policy objectives (notably in the areas of health and social policy). Unlike a costing study of an HIV/AIDS program, this analysis is embedded in a review of the state of public finance and covers a range of fiscal consequences of HIV/AIDS beyond the costs of the policy response, such as payroll-related costs and the impact on social grants. In light of the persistence of the fiscal costs incurred by HIV/AIDS, this study adapted tools initially developed for the analysis of the level of long-term liabilities and the sustainability of public debt to assess the fiscal burden of HIV/AIDS.

According to the Actuarial Society of South Africa (ASSA 2006),[1] HIV prevalence exceeded 1 percent of the population aged 15–49 only in 1993. From that level, it escalated rapidly, reaching 10 percent just five years later (1998), and increased further to just under 17.8 percent by 2009. UNAIDS (2010a, 2010b) estimates that 5.6 million people were living with HIV/AIDS in South Africa at end-2009. Data from antenatal clinics suggest that HIV prevalence has stabilized in recent years (DOH 2009). During 2005–10, crude mortality increased to a level last observed in the early 1960s. Life expectancy (52 years) has fallen back to the level observed in the mid-1960s and currently is 20 years lower than in Brazil, although the level of GDP per capita is about the same in both countries (Figure O.5).

Unlike the impact of HIV/AIDS on key health outcomes, the most comprehensive studies available find that the macroeconomic impact of HIV/AIDS has been moderate so far. Ellis, Laubscher, and Smit (2006), adapting the macroeconomic model maintained by the Bureau for Economic Research at the University of Stellenbosch, estimated that HIV/AIDS reduces GDP growth by 0.4 percent annually through 2020. In addition to aggregate impacts, HIV/AIDS also has distributional implications. For example, HIV prevalence may differ across socioeconomic groups. Moreover, access to health insurance is very limited outside the top three income deciles, and poorer households are less able to self-insure against health shocks.

In 2006/7 and 2007/8, government revenues accounted for about 30 percent of GDP, and the budget returned a surplus (1.2 percent and 1.7 percent

Figure 0.5: South Africa: Evolution of the HIV Epidemic



Sources: a. ASSA 2006. b. UNAIDS 2010b; United Nations Population Division 2009. c.WHO, UNAIDS, and UNICEF 2008, ASSA 2006; and Department of Health 2009.

of GDP, respectively). However, the global crisis has caused a deterioration of the fiscal situation and outlook. GDP growth declined from over 5 percent in 2006 and 2007 to 2 percent in 2009, and is expected to recover only slowly. Meanwhile, government revenues have dropped by about 3 percent of GDP, and expenditures have increased by over 5 percent of GDP, so that the fiscal balance deteriorated to –7 percent of GDP by 2009/10. For the financing of the national HIV/AIDS program—as for other categories of public spending—this means that the available fiscal resources are tighter than what was expected two years ago, and will remain so over the coming years. GDP is expected to recover only slowly, and the government expects that by 2012/13 it will have accumulated additional public debt (compared to 2008/9) equivalent to 15 percent of GDP (National Treasury 2010).

The national HIV/AIDS response is guided by the HIV & AIDS and STI Strategic Plan for South Africa, 2007–2011 (SANAC 2007) and organized around the goals of (i) reducing the rate of new HIV infections by 50 percent by 2011 and (ii) reducing the impact of HIV and AIDS on individuals, families, communities, and society by expanding access to appropriate treatment, care, and support to 80 percent of all HIV-positive people and their families by 2011.

In the national budget, HIV/AIDS-related line items appear in the budgets of the Department of Health, the Department of Education, and the Department of Social Development. HIV/AIDS line items increased from R234 million in 2000/2001 to R5.9 billion in 2009/10 (or from US$32 million to US$750 million) and are expected to rise to R9.3 billion by 2012/2013. The bulk of HIV/AIDS-related spending (R5.1 billion, or 86 percent of total HIV/AIDS-related line items in fiscal year 2009/10) is administered through the health budget. The structure of HIV/AIDS-related health expenditures changed over this period, many health services are now administered through provincial budgets. As HIV/AIDS-related health services expanded, an increasing share of HIV/AIDS-related allocations under the Department of Health have been accounted for by specific allocations to provinces (“conditional grants”).

In addition to the costs of the national HIV/AIDS response, an important aspect of the fiscal dimension of HIV/AIDS is the impact on social expenditures. South Africa has established a fairly extensive public social security system, accounting for 12 percent of total government expenditures (3.5 percent of GDP) in 2009/10 (National Treasury 2010). HIV/AIDS affects the incidence of the conditions targeted by social grants, such as

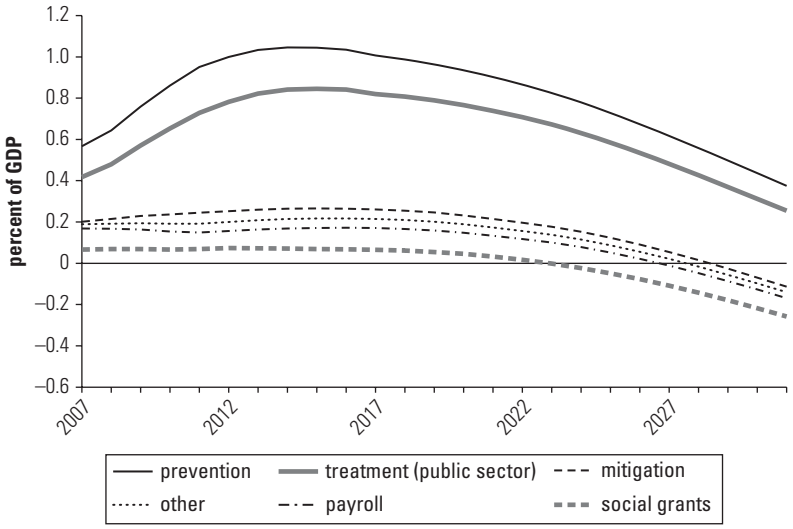
orphanhood or disability, and arguably has contributed to the increase in the number of recipients of foster care grants (from 276,000 in 2000/2001 to 569,000 in 2009/10) and disability grants (from 613,000 in 2000/2001 to 1,423,000 in 2006/7). Conversely, certain categories of social grants (for example, old-age pensions and child support grants) are likely to decline as a result of increased early mortality or reduced fertility due to HIV/AIDS-related illnesses.

This analysis has been conducted in tandem with the ongoing "2031" study of "The Long-Run Costs and Financing of HIV/AIDS in South Africa" (Guthrie and others 2010), builds on the costing developed in this context, and is organized along three scenarios:

- A "narrow NSP" scenario based on the National Strategic Plan 2007–11 that applies 2011 coverage rates for projections (excludes male circumcision and includes antiretroviral treatment with CD4 count eligibility of 200 cells/mm^3 with old World Health Organization [WHO] treatment regimen).
- An "expanded NSP" scenario that takes a comprehensive approach including all the NSP goals, using the new WHO treatment regimen and increased CD4 eligibility threshold (350 cells/mm^3) attained by 2015, but reallocates funds to prevention measures such as male circumcision, increasing voluntary counseling and testing, condom distribution, reducing violence against women and working with sex workers, and includes poverty alleviation and a scaling-up of certain interventions through 2021.
- A "hard choices" scenario to 2015 that assumes difficult choices between interventions due to constrained resources, with focus on the most cost-effective prevention interventions, treatment interventions remain under the narrow NSP scenario, and reduced social mitigation and orphan support.

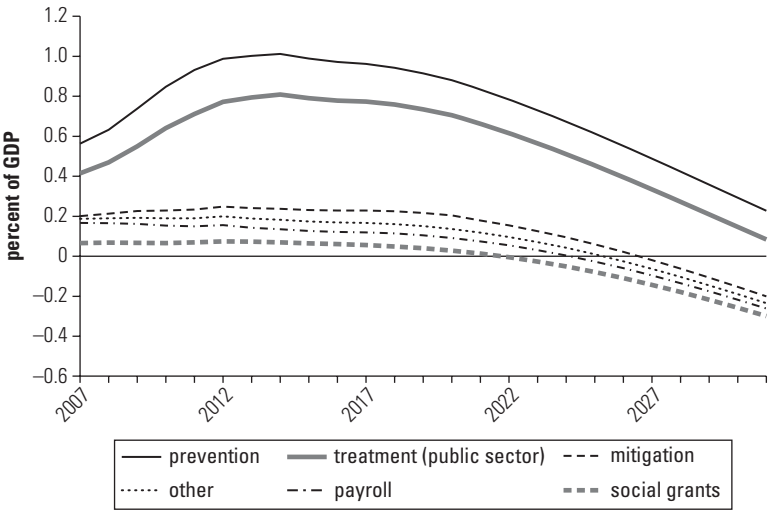
Under the narrow NSP scenario (figure O.6), the fiscal costs almost double from R18.4 billion in 2009 to R32.8 billion in 2016, but subsequently decline to R19.1 billion by the end of the projection period. Relative to GDP, the costs peak at over 1 percent of GDP in 2012–16, and decline to about 0.4 percent of GDP by 2031. Under the expanded NSP scenario (figure O.7), the build-up in costs is faster, but costs substantially decline over the last decade of the projection period as a result of more

Figure O.6: South Africa: Fiscal Costs of HIV/AIDS, "Narrow NSP" Scenario, 2007–31



Source: Guthrie and others (2010), and authors' calculations.

Figure O.7: South Africa: Fiscal Costs of HIV/AIDS, "Expanded NSP" Scenario, 2007–31



Sources: Guthrie and others (2010), and authors' calculations.

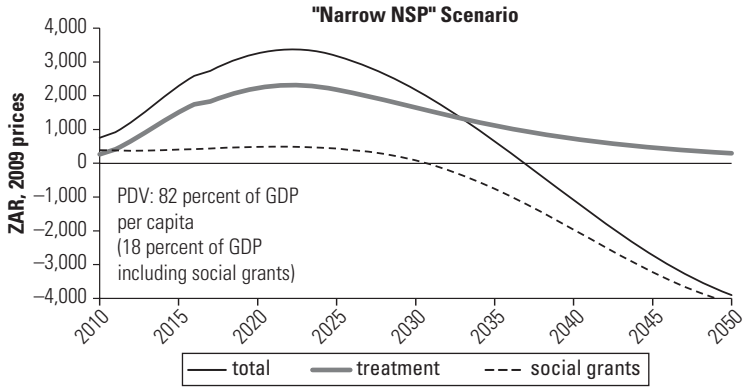
aggressive prevention measures early on, and by 2031—at R14.9 billion—are lower than in the narrow NSP scenario.

In some regards, these projections resemble estimates available for other countries—treatment costs are the most important drivers of the fiscal costs over the next decade, and enhanced prevention efforts in the expanded NSP scenario reduce the fiscal costs later on. A unique feature of the fiscal costs of HIV/AIDS in South Africa is the impact of HIV/AIDS on social grants. While HIV/AIDS results in an increase in the incidence of conditions targeted by disability grants and foster care grants, the number of children who could qualify for child support (with some delay) and the number of people reaching age 60 who may qualify for old-age grants declines. While HIV/AIDS increases the costs of social grants initially, the accumulating effect of mortality from HIV/AIDS on the size of the population reaching old age eventually results in a slowdown in the costs of social grants.

One of the factors complicating the assessment of the fiscal costs of HIV/AIDS is that the costs occur over very long periods of time—on the microeconomic level (as infections result in costs over several decades) and on the macroeconomic level (the commitments under an HIV/AIDS program translate into persistent fiscal costs). For one additional infection, the fiscal costs are dominated by increased treatment need over 20 years following an infection, and reduced costs of social (that is, old-age) grants later on. Using a discount rate of 3 percent, the cost of one additional infection total R16,400 (about one-third of GDP per capita) for the narrow NSP, and R20,900 for the expanded NSP (figures O.8 and O.9). The most important aspect of the costs incurred by an infection are the costs of treatment (for example, R31,900 for the expanded NSP). Because few people living with HIV/AIDS reach retirement age, fiscal costs are partially offset by a reduced incidence of old-age grants.

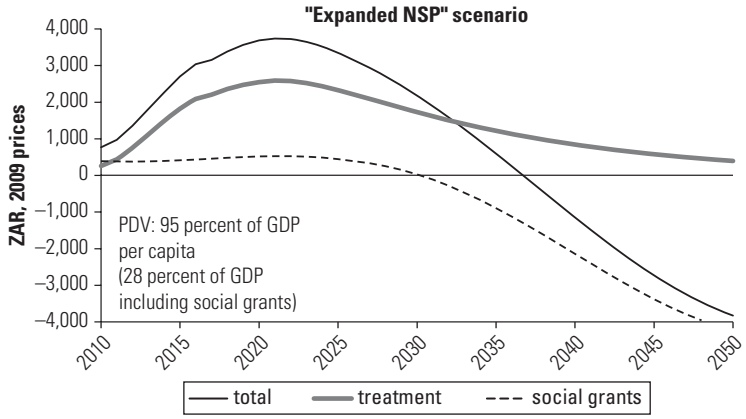
On the macroeconomic level, in light of the persistence of fiscal costs, the study used the present discounted value (PDV)—that is, the amount that would need to be put aside now to cover all future costs discounted by the applicable interest rate—of the projected costs as a summary measure of the fiscal costs of HIV/AIDS. For the narrow NSP, the cost of the HIV/AIDS program comes to 36.6 percent of GDP (or 18.1 percent of GDP including other cost and offsetting items, notably arising from reduced demand for old-age grants). While the "expanded NSP" program is more expensive initially, the overall program costs (37 percent of GDP) are very close to those of the narrow NSP—while the coverage rates of HIV/AIDS-related services

Figure O.8: South Africa: Costs of Additional Infection Occurring in 2010, "Narrow NSP" Scenario



Source: Authors' calculations.

Figure O.9: South Africa: Costs of Additional Infection Occurring in 2010, "Expanded NSP" Scenario



Source: Authors' calculations.

are higher in the expanded NSP scenario, this is offset by savings from increased prevention efforts and reduced HIV infections.

Beyond the costs of the HIV/AIDS program, the decline in the costs of social grants, mainly reflecting a decline in the number of people reaching the age of eligibility for old-age grants, is a significant aspect of the fiscal costs of HIV/AIDS. This decline brings down the overall fiscal costs to

18.1 percent of GDP for the narrow NSP and 16.6 percent of GDP for the expanded NSP. However, these fiscal savings represent a slowdown in what would otherwise be a steep increase in the costs of social grants (reflecting increased life expectancy excluding the impact of HIV/AIDS), and cannot be mobilized for financing the HIV/AIDS response.

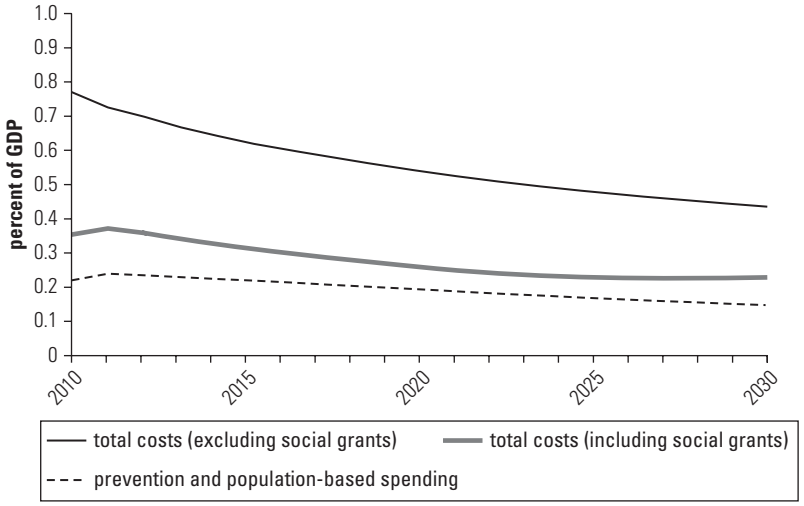
An alternative way of assessing the fiscal burden of HIV/AIDS is based on the fact that most of the future HIV/AIDS-related costs are ultimately incurred as a consequence of new infections, whereas current expenditures predominantly serve needs caused by past infections. In terms of adding to the fiscal burden of HIV/AIDS, the costs incurred by new infections, that is, the costs "committed" under the targets of the HIV/AIDS program as a consequence of the new infections, therefore provide a more accurate measure. This study estimated the costs of HIV/AIDS on a "commitment basis" at about 0.5 percent of GDP initially, and declining over the projection period (figures O.10 and O.11). Thus, while expenditures continue to increase over the coming years, the underlying fiscal burden, in terms of the amount that would need to be put aside now to cover the future costs incurred as a consequence of new HIV infections, is declining.

This analysis has implications for the design of HIV/AIDS-related policies in several areas. The analysis shows that the impact of and the response to HIV/AIDS are significant from an overall fiscal perspective, not only because they intersect with many of the government's key policy objectives, but also because the HIV/AIDS response absorbs significant fiscal resources over a long period of time.

However, in contrast to the large fiscal costs of HIV/AIDS, the availability of data on the costs of HIV/AIDS and related services, the coverage of services, and cost-effectiveness of interventions is limited. Investments in improving evidence on the drivers and course of the epidemic in South Africa and the costs and effectiveness of alternative HIV/AIDS-related interventions are likely to yield high returns—both in terms of improving the effectiveness of the national HIV/AIDS response and for achieving improved health outcomes.

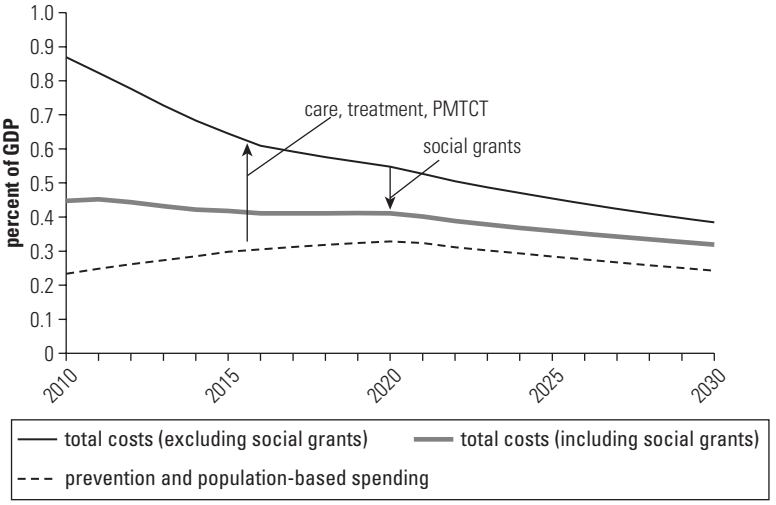
However, in addition to providing a framework for analyzing and projecting the fiscal costs of HIV/AIDS, and thus assisting in planning for financing the national HIV/AIDS response, this analysis provides tools to inform policy choices both on the microeconomic level and for assessing broad alternative HIV/AIDS policies. To enable concrete policy choices on the microeconomic level, this analysis translates the costs incurred by one

Figure O.10: South Africa: Fiscal Costs of HIV/AIDS, "Commitment" Basis, "Narrow NSP" Scenario, 2010–31



Source: Authors' calculations.

Figure O.11: South Africa: Fiscal Costs of HIV/AIDS, "Commitment" Basis, "Expanded NSP" Scenario, 2010–31



Source: Authors' calculations.
Note: PMTCT = Prevention of mother-to-child transmissions.

HIV infection over time under an HIV/AIDS program into a cost (a "quasi-liability") that is incurred at the moment an infection occurs. These estimated costs of an additional infection provide a straightforward tool to assess the (cost) effectiveness of prevention measures.

Alternatively, this analysis can be used to compare the fiscal consequences of alternative HIV/AIDS policies by integrating the fiscal savings from reduced HIV incidence, along with current outlays, into an assessment of the fiscal costs of an HIV/AIDS program. For example, the costs of the HIV/AIDS programs under the expanded NSP scenario and the narrow NSP scenario are approximately the same, because higher outlays early on under the expanded NSP are offset by the fiscal savings from reduced HIV incidence (even without taking into account direct health outcomes, which are clearly superior under the expanded NSP).

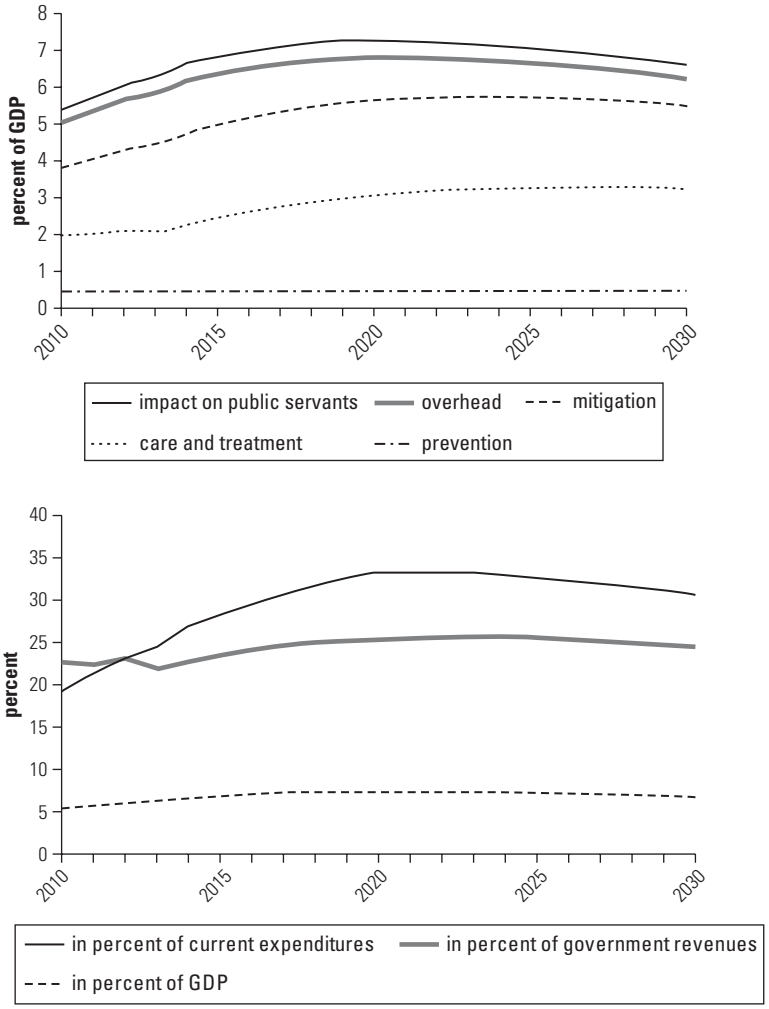
Swaziland

Swaziland has the highest estimated HIV prevalence in the world; 26 percent of the working-age population is estimated to be HIV positive (UNAIDS 2010a, 2010b). As a result of HIV/AIDS, crude mortality in Swaziland has risen from 0.9 percent in 1990–95 to 1.6 percent in 2005–10 (United Nations Population Division 2009), and the probability of a newborn reaching age 50 has dropped from around 80 percent to just over 40 percent. The World Bank (2010a) estimates that life expectancy has dropped from 59 years in 1991 to 45 years in 2005. The Swaziland Central Statistical Office (CSO) and Macro International (2008) report that 20 percent of young Swazis aged 10–14 had lost at least one parent, and 7.5 percent had lost both parents.

The pervasiveness of the epidemic in Swaziland poses extraordinary policy challenges in terms of planning, implementing, and financing the response to the epidemic. Moreover, these challenges will persist over many years or even decades—even if HIV incidence is rapidly reduced, the number of people requiring treatment will continue to rise for many years, and a large number of young people will continue to grow up in households affected by illness or death.

Overall, this analysis estimates that the costs of HIV/AIDS and the HIV/AIDS program are 5.5 percent of gross domestic product (GDP) in 2010, and that costs will rise to 7.3 percent of GDP by 2020, slowly declining to 6.6 percent of GDP by 2030 (figures O.12a and O.12b). The most important components of HIV/AIDS costs are: care and treatment,

Figure 0.12: Swaziland: The Fiscal Costs of HIV/AIDS, 2010–30



Source: Authors' estimates and projections.

which are estimated to almost double from 1.5 percent of GDP in 2010 to 2.7 percent of GDP in 2020; mitigation, rising from 1.8 percent of GDP in 2010 to 2.6 percent of GDP by 2020; and the overhead of the HIV/AIDS program, rising from 1.2 percent of GDP in 2010 to 1.4 percent of GDP by 2015.

These costs will be occurring during a period in which government revenues are expected to slow down as a result of declining receipts from the Southern African Customs Union (SACU). Consequently, this study estimates that the projected costs of HIV/AIDS and the HIV/AIDS program will rise from 18 percent of current expenditures and 22 percent of government revenues in 2010 to 31 percent of current expenditures and 23 percent of government revenues by 2020.

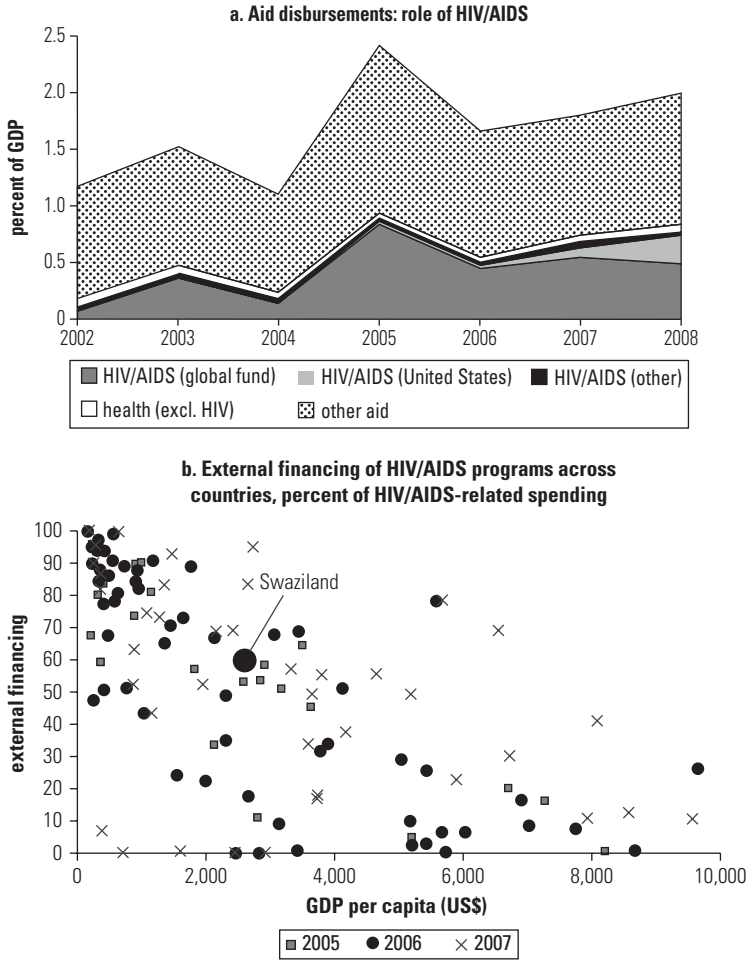
Even if current levels of external financing can be maintained, these estimates present an extraordinary fiscal challenge. In the past, Swaziland was able to finance about 60 percent of the cost of its HIV/AIDS program from external sources, a level of support that appears consistent with donor practice across countries (figures O.13a and O.13b). However, just to sustain this share in the face of increasing HIV/AIDS costs, external support would need to rise substantially. Meanwhile, the high level of projected fiscal costs leaves Swaziland highly vulnerable to a slowdown in external support.

Because the fiscal costs of HIV/AIDS are highly persistent, and most represent firm policy commitments, they can be interpreted as a quasi-liability and analyzed using methods similar to debt analysis. The study estimates that the present discounted value (PDV) of fiscal commitments under the HIV/AIDS program and other fiscal costs of HIV/AIDS correspond to 293 percent of GDP, of which fiscal costs equivalent to 151 percent of GDP have already been incurred as a result of HIV infections that have occurred through 2010, and the balance covers the costs of projected future infections.

This analysis on the fiscal costs of HIV/AIDS over time also provides some tools for assessing fiscal trade-offs inherent in HIV/AIDS program choices. Similar to the analysis of the extent to which HIV/AIDS and the HIV/AIDS response absorb fiscal space (using the PDV of the costs of HIV/AIDS), the implications of policy choices or outcomes can also be assessed in terms of changes in the PDV. For example, this analysis estimates that one additional infection absorbs fiscal resources equivalent to almost four times GDP per capita (figure O.14).

Because of the long lags between "cause" (new infections) and "effect" (demand for services and fiscal costs), current spending is not a good indicator for the evolving fiscal burden of HIV/AIDS. To provide a more accurate measure, this study combines the macroeconomic and microeconomic strands of the analysis by comparing current spending with the costs incurred by new infections (figures O.15a and O.15b). While overall

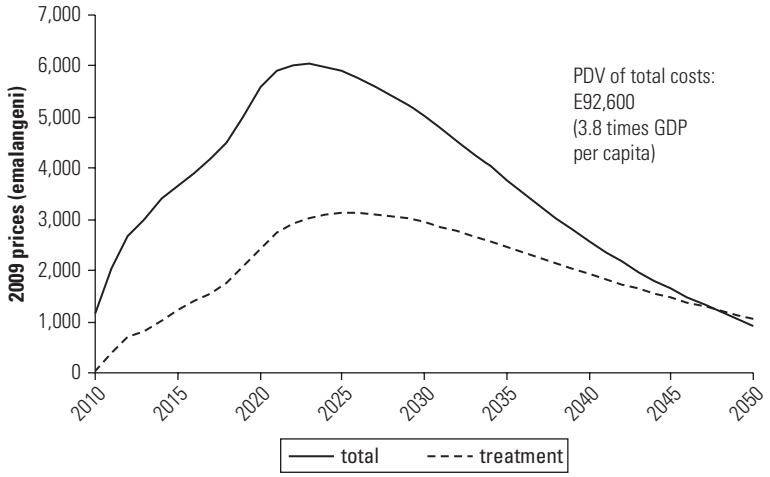
Figure O.13: Swaziland: External HIV/AIDS Support



Sources: a.OECD (2010); b. Authors' calculations, based on UNAIDS (2008) and IMF (2010).

spending (mostly paying off the fiscal costs of past infections) hovers between 6 and 7 percent of GDP for most of the projection period, the costs incurred by new infections decline to 3 percent of GDP by the end of the projection period (in addition to annual costs of about 1 percent of GDP, which cannot be directly attributed to new infections). The quasi-liability of the fiscal costs committed under the HIV/AIDS program as a result of HIV infections declines from 151 percent of GDP in 2010 to 109 percent of GDP by 2030.

Figure O.14: Swaziland: Costs of Additional Infection Occurring in 2010

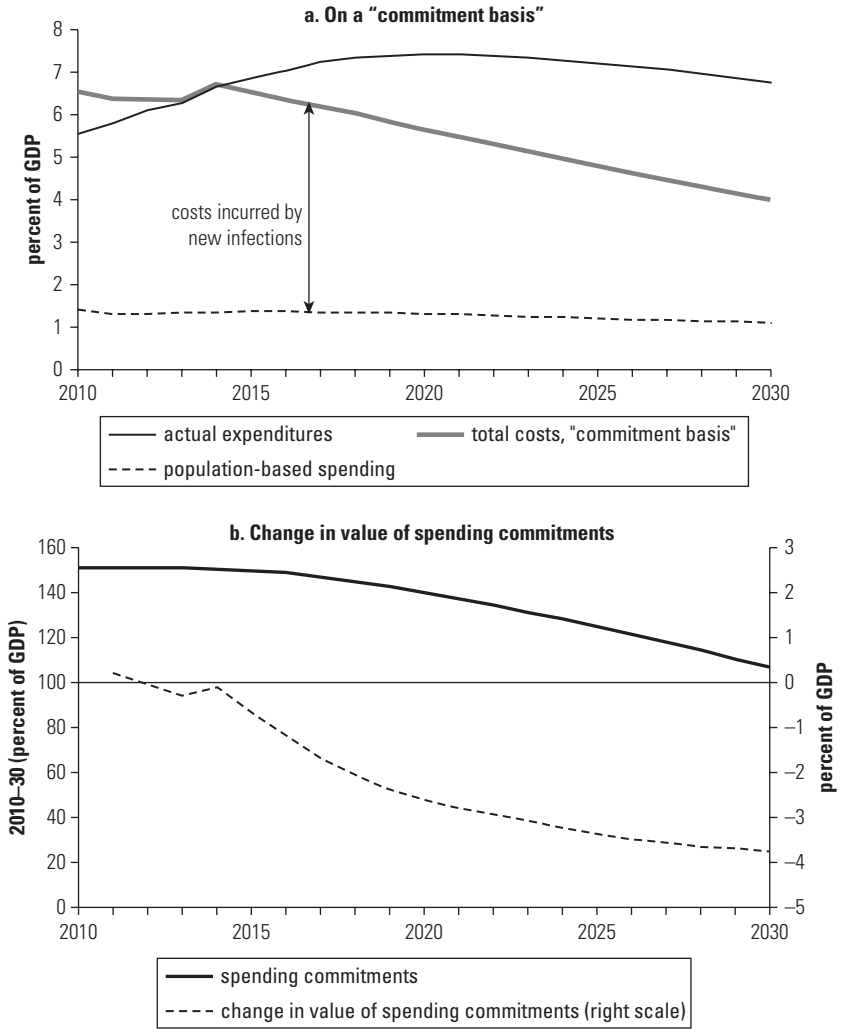


Source: Authors' estimates and projections.
Note: E = emalangeni.

In summary, the impacts of and the response to HIV/AIDS present an extraordinary policy challenge for the government of Swaziland. The purpose of this study is to highlight the fiscal dimension of this policy challenge. Specifically, this study spells out the fiscal costs of HIV/AIDS and the HIV/AIDS program, based on and projecting forward from the National Strategic Framework. On this level, the study informs the fiscal planning of the national HIV/AIDS response, and fiscal planning in general.

The fiscal costs of HIV/AIDS, however, are policy dependent; they rely on both the supply and cost-effectiveness of HIV/AIDS-related services, as well as the demand for these services, which also reflects the effectiveness of HIV/AIDS policies. This macroeconomic analysis highlights the stakes in getting the HIV/AIDS response right and ensuring that it is cost-effectively delivered from a specific (fiscal) perspective. Additionally, this analysis provides tools to inform specific policy choices that would also draw on data, for example, on the state of the epidemic, the transmission pattern, and specific interventions, which are beyond the scope of this analysis. In this regard, the study focuses on the link between HIV incidence and the fiscal costs of HIV/AIDS, translating the long-term consequences of an HIV infection into a specific cost that can be used to evaluate HIV policies from a fiscal angle.

Figure O.15: Swaziland: Fiscal Costs of HIV/AIDS



Source: Authors' estimates and projections.

Uganda

Uganda was one of the first countries to face an escalating HIV epidemic. While the level of HIV prevalence in Uganda is much lower now than at its peak, and is currently lower than some other countries in the region, the national HIV/AIDS response poses considerable fiscal challenges.

In particular, even though costs are lower in absolute terms, the cost of treatment relative to GDP per capita is higher in Uganda than in (middle-income) countries with the highest rates of HIV prevalence. As a result, the projected cost of the national HIV/AIDS program, which exceeds 3 percent of GDP for most of the projection period, is large from a macroeconomic or fiscal perspective.

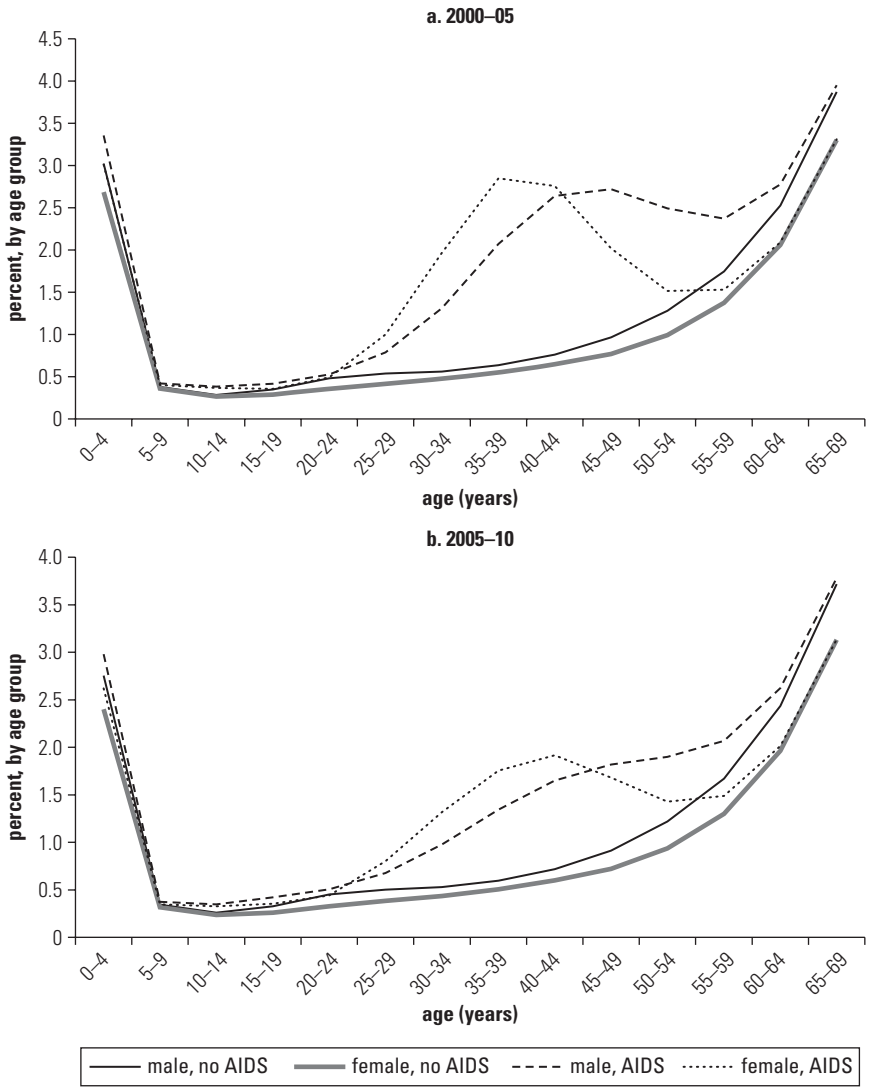
This study aims to further the analysis of the fiscal dimension of HIV/AIDS to inform both medium-term fiscal planning and the planning and management of the national HIV/AIDS response. Specifically, this paper addresses three aspects of the fiscal dimension of HIV/AIDS in Uganda:

- The costs of meeting the demand for HIV/AIDS-related services under the national HIV/AIDS policy, as embodied in the National Strategic Plan (NSP).
- The large role of external support in financing Uganda's HIV/AIDS program.
- Because of the long duration of commitments under the HIV/AIDS program, and the long time lag between HIV infections and the resulting demand for public services, the fiscal costs of HIV/AIDS can be regarded as a fiscal quasi-liability (similar to pension obligations and other social entitlements), and can be analyzed by adapting tools typically used to assess the level and course of a public debt.

Uganda was one of the first countries to experience the rapid spread of HIV/AIDS. HIV incidence peaked in 1988–1990, with around 200,000 new infections every year. The number of people living with HIV/AIDS grew rapidly and peaked at just over 1 million, corresponding to an adult HIV prevalence rate of 12 percent in the first half of the 1990s. According to the most recent data, there were 1.2 million people living with HIV/AIDS in Uganda at end-2009, of whom 440,000 were male adults, 610,000 were female adults, and 150,000 were children (UNAIDS 2010b). In addition, 120,000 new HIV infections and 64,000 HIV/AIDS-related deaths occurred in 2009 (UNAIDS 2010b). However, because population growth in Uganda is very high,[2] HIV prevalence has been declining even though the absolute number of people living with HIV/AIDS has not, and prevalence is estimated at 6.5 percent of the population aged 15–49 as of 2009 (UNAIDS 2010a, 2010b).

HIV/AIDS has resulted in a steep increase in mortality, especially among young adults (figures O.16a and O.16b). According to estimates by the United Nations Population Division (2009), HIV/AIDS-related mortality peaks for women (in 2000–2005) in the 35–39 age group at 2.9 percent annually (compared to 0.6 percent in a no-AIDS scenario), and subsequently

Figure O.16: Uganda: Mortality by Sex and Age

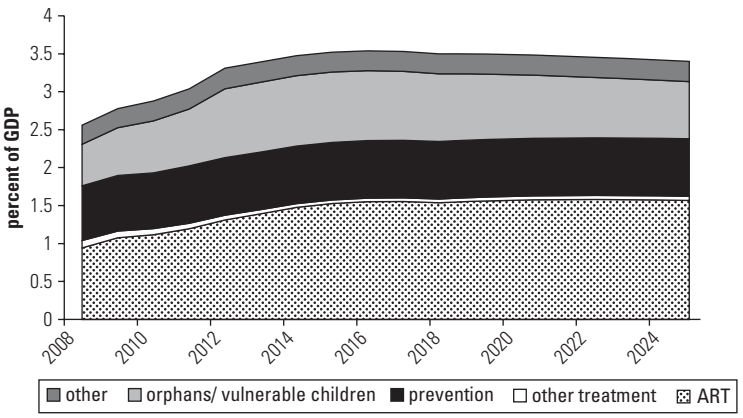


Source: Authors' calculations, based on United Nations Population Division (2009).

declines until mortality increases again because of advanced age. For men (in 2000–2005), HIV/AIDS-related mortality peaks later, between ages 40 and 49, at about 2.5 percent (compared to 0.9 percent in a no-AIDS scenario). Largely as a result of increased access to antiretroviral treatment, the United Nations Population Division (2009) estimates that excess mortality (the difference between the baseline and the no-AIDS scenario) for ages 25–49 decreased from 1.4 percent to 0.9 percent for women, and from 1.0 percent to 0.5 percent for men. Similarly, life expectancy increased from 48.1 years in 2000–2005 (which compares to 57.2 years without AIDS) to 52.4 years between and 2005–10.

In this paper, the estimates of the fiscal dimension of HIV/AIDS are organized around the NSP for HIV/AIDS, covering the period 2007/8–2011/12 (UAC 2007). The model combines an epidemiological module used to project the number of people living with HIV/AIDS, those needing treatment, and other factors determining the demand for HIV/AIDS-related services. This provides projections regarding coverage rates, unit costs of HIV/AIDS-related services, and other costs of HIV/AIDS as well as a macroeconomic model. According to projections (figure O.17), the fiscal costs increase from 2.6 percent of GDP in 2008 to 3.4 percent of GDP in 2015–17. After 2017, the total costs are expected to decrease gradually relative to GDP and reach around 2.9 percent of GDP by the end of

Figure O.17: Uganda: Projected Costs of HIV/AIDS Program, 2008–25



Source: Authors' calculations.
Note: ART = antiretroviral therapy.

the projection period. Uganda is a fast-growing country,[3] and the relatively stable costs of HIV/AIDS relative to GDP mask a steep increase in absolute terms, from $0.35 billion in 2008 to $1.4 billion by 2025.[4]

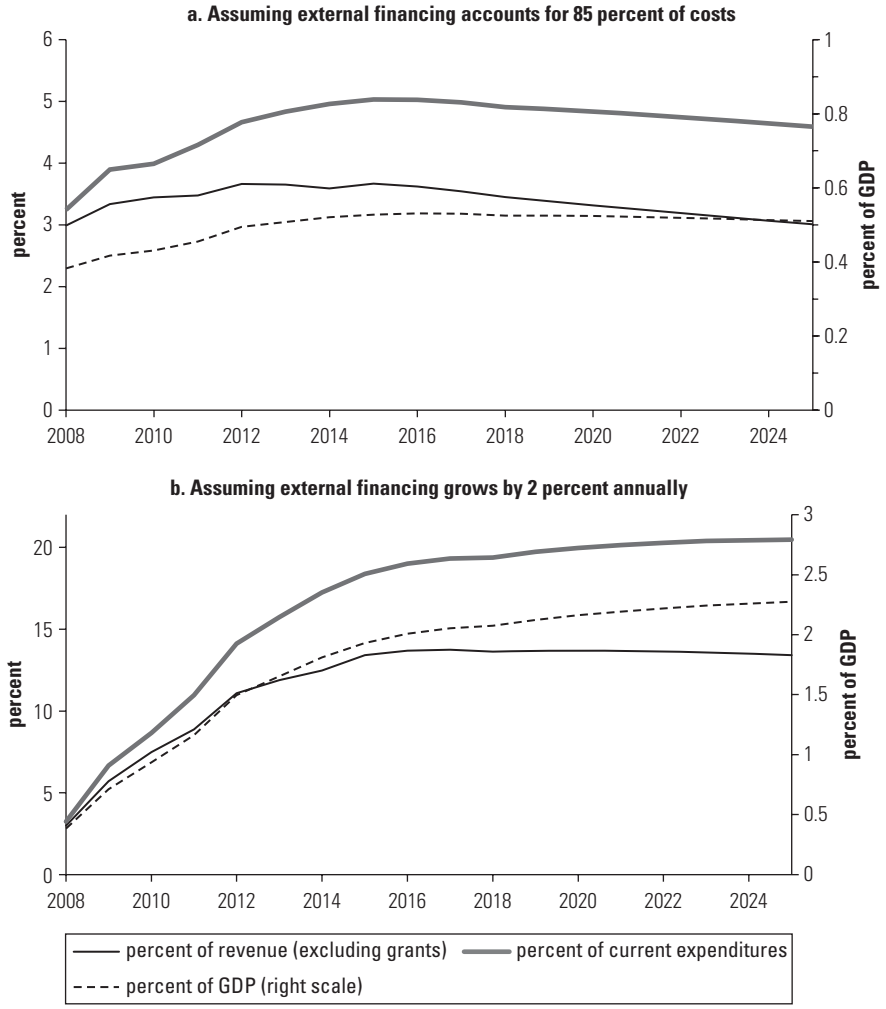
In recent years, external financing has contributed about 85 percent of total spending on HIV/AIDS, and the current NSP projects that this level of external financing will remain for the near future. However, the steep increase in the projected costs in absolute terms means that donor allocations to Uganda's HIV/AIDS program would need to increase relative to donor GDP to maintain a constant share of external financing. To assess the role of external financing and the exposure of domestic finance to a slowdown in donor financing, a scenario in which current rates of external financing remain fixed at 85 percent of the total costs is compared to a scenario in which external financing is constrained by donor countries' GDP and fiscal resources and grows at a rate of 2.5 percent annually (about the rate of growth of the G-7 economies[5]).

However, fiscal resources are much lower than in Botswana, not only in absolute terms, but also relative to GDP (domestic revenues in 2009/10 were projected at 15 percent of GDP in Uganda, and 33 percent of GDP in Botswana). Consequently, Uganda relies heavily on external support to finance its HIV/AIDS program. To illustrate the vulnerability of domestic finance to a slowdown in external support, this analysis provides two simple scenarios. If external financing remains at 85 percent of the total costs, HIV/AIDS-related financing would have to rise substantially in nominal terms, from about $370 million in 2008 to $800 million by 2015 (in constant 2008 prices, figure O.18a). Alternatively, if aid allocations are constrained to not grow faster than the GDP of main donor countries, domestic financing needs will increase sharply, rising to 2 percent of GDP by 2020, equivalent to 12.5 percent of total government revenues, and remain at about that level through 2025.

In this case, domestic financing of the HIV/AIDS program would rise to 0.5 percent of GDP by 2015, absorbing up to 3.5 percent of government revenues. Alternatively, if aid allocations are constrained to not grow faster than the GDP of main donor countries, domestic financing needs will increase significantly, rising to 2 percent of GDP by 2020, equivalent to 12.5 percent of total government revenues, and remain at about that level through 2025 (figure O.18b).

Due to the long duration of fiscal commitments under the HIV/AIDS response, current spending on HIV/AIDS gives an incomplete or even

Figure 0.18: Uganda: Domestically and Externally Financed HIV/AIDS Spending



Source: Authors' calculations.

misleading picture of its fiscal implications. In other words, current spending responds to a demand for public services for HIV infections that occurred in the past. Therefore, an assessment of HIV/AIDS fiscal implications needs to account for the number of new HIV infections because it is the new HIV infections that determine the demand for public services in the future.

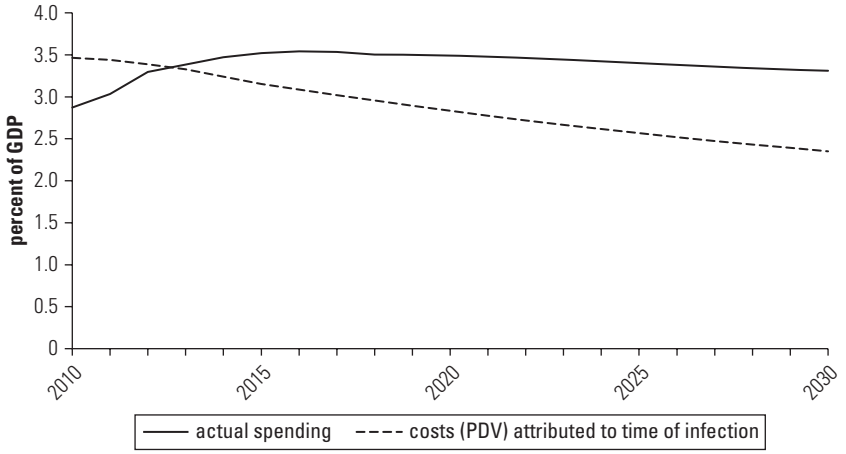
This means that the fiscal commitments of HIV/AIDS share many of the characteristics of a liability. Under the targets and standards specified in national HIV/AIDS policy, an HIV/AIDS infection results in a commitment for future government spending to provide certain services, which translates into future spending commitments. Therefore, HIV/AIDS can be described as a "quasi-liability," not a debt *de jure*, but a political and fiscal commitment that binds fiscal resources in the future and cannot easily be changed, similar to a pension obligation or certain social grants or services.

Using a discount rate of 5 percent, the value of the quasi-liability implied by the fiscal costs of HIV/AIDS comes out to 212 percent of GDP ($36 billion) as of 2010. About half of these costs (equivalent to 111 percent of GDP) are the result of infections that have already occurred (thus contingent on the parameters of the national HIV/AIDS program). The balance (equivalent to 101 percent of GDP) reflects the costs of projected future infections, and therefore not only depends on targeted coverage rates of HIV/AIDS-related services, but also on the success of the HIV/AIDS program to contain the number of new infections.

Similarly, the policy targets under the NSP and assumed in the projections here can be used to calculate the expected costs incurred by a single infection. Estimates suggest that the expected annual costs associated with an additional HIV infection occurring in 2010 rise to about $450 by 2025, and decline subsequently as a decreasing survival probability results in lower expected costs of treatment. The present discounted value of an additional infection, based on a discount rate of 5 percent, amounts to $5,900, corresponding to about 12 times GDP per capita (as of 2008, figure O.19).

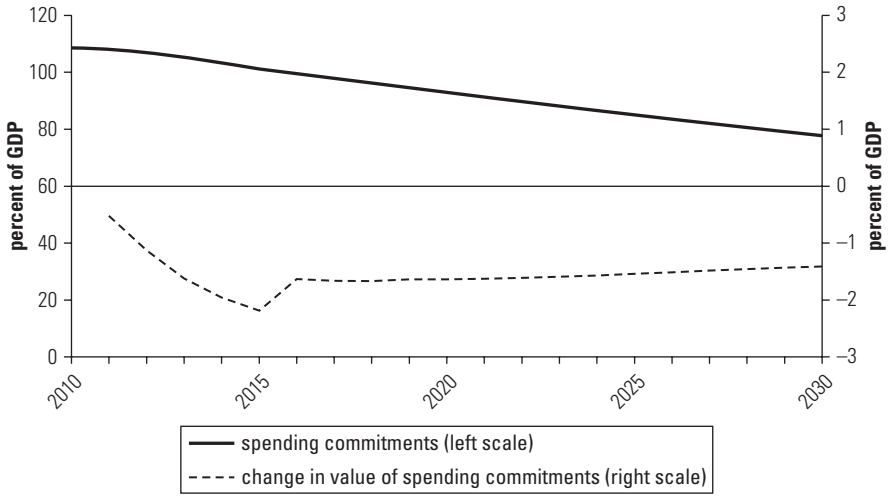
Using the estimate of the quasi-liability incurred by one new infection, one can calculate the quasi-liabilities incurred by new infections over time. The quasi-liability incurred by new infections declines steadily, from about 3.1 percent of GDP in 2010 to 2.1 percent of GDP in 2030. The value of the spending commitments incurred by new infections overall declines from 111 percent of GDP in 2010 to 75 percent of GDP in 2030 (figure O.20). Of the annual decline of about 1.5 percent of GDP, about 1 percent of GDP can be attributed to the fact that the value of new spending commitments is lower than previous spending. The balance, about 0.5 percent of GDP, reflects the fact that Uganda's economy is growing fast, and contributes to the decline in the value of the liability relative to GDP.

Figure O.19: Uganda: Actual Spending and Costs Incurred by New HIV Infections, 2010–30



Source: Authors' calculations.

Figure O.20: Uganda: Change in Value of Spending Commitments, 2010–30



Source: Authors' estimates and projections.

Conclusions

In many countries, the impacts of and the response to HIV/AIDS pose significant challenges from both a macroeconomic and fiscal perspective. This paper analyzes the cost of HIV/AIDS from a fiscal angle, interpreting the HIV/AIDS response as a long-term fiscal commitment, and broadens the scope of the analysis to identify fiscal costs of HIV/AIDS (such as certain social grants) that are not normally included in HIV/AIDS costing studies, but nevertheless contribute to the fiscal costs of HIV/AIDS. This report also analyzes the fiscal costs of HIV/AIDS in the context of governments' evolving resource envelopes, informing medium-term fiscal planning and providing a framework for managing domestic financing needs for HIV/AIDS programs.

To this end, this analysis interprets the impact of and the response to HIV/AIDS as a long-term fiscal commitment. While much of this long-term analysis is speculative based on current knowledge (who could have predicted the evolving costs of and rapidly accelerating access to treatment 10 years ago?), it offers a tool for assessing and, by appropriate planning, ensuring the long-term financial sustainability of national HIV/AIDS programs.

Because of the persistence of HIV/AIDS costs, current spending is not a good indicator of the sustainability of an HIV/AIDS program. Instead, it is more accurate to interpret the costs as a quasi-liability (similar to pension obligations), and analyze how this liability is evolving over time. More specifically, this analysis of HIV/AIDS as a fiscal quasi-liability offers tools to assess the evolving fiscal burden of HIV/AIDS, combining a microeconomic and a macroeconomic perspective. The microeconomic perspective includes the estimate of the fiscal commitment that, under the parameters of the national HIV/AIDS program, is incurred by a single infection. Similarly, one can analyze the fiscal commitments or savings associated with any other HIV/AIDS-related intervention. These costs can be substantial, nearly equal to GDP per capita (South Africa) up to 12 times GDP per capita (Uganda). Conversely, the estimated costs savings from an HIV infection prevented or delayed offers a benchmark for assessing the cost-effectiveness of prevention investments.

On the macroeconomic level, by aggregating the costs incurred by new infections, one can track the evolving fiscal burden of HIV/AIDS over time. While substantial, this analysis finds that the costs newly incurred are generally lower than current spending, and that the fiscal burden of

HIV/AIDS is declining over the projection period, largely reflecting a projected decline in HIV incidence (which is not a given). At the same time, the fiscal costs remain large, and increasingly reflect the success or failure of the HIV/AIDS program in preventing new infections. This analysis contributes to assessing different policy scenarios by providing estimates of the immediate fiscal savings from reduced HIV incidence in terms of the reduced fiscal commitments incurred by new infections.

This paper has implications for the design of HIV/AIDS-related programs and policies in several areas. The analysis shows that the impact of and the response to HIV/AIDS are significant from an overall fiscal perspective, not only because they intersect with many of the government's key policy objectives, but also because the HIV/AIDS response absorbs significant fiscal resources over a long period of time.

The fiscal costs of HIV/AIDS, however, are policy dependent; they rely on the supply and cost-effectiveness of HIV/AIDS-related services, as well as the demand for these services, which also reflects the effectiveness of HIV/AIDS policies. This macroeconomic analysis highlights the stakes in getting the HIV/AIDS response right and ensuring that it is cost-effectively delivered from a specific (fiscal) perspective. Additionally, this analysis provides tools to inform specific policy choices that would also draw on data, for example, on the state of the epidemic, transmission patterns, and specific interventions, which are beyond the scope of this analysis. In this regard, the study focuses on the link between HIV incidence and the fiscal costs of HIV/AIDS, translating the long-term consequences of an HIV infection into a specific cost that can be used for evaluating HIV policies from a fiscal angle.

This analysis should catalyze policy dialogue around the long-term financial sustainability of the national HIV/AIDS response and encourage the search for innovative financing mechanisms to address future fiscal liability. Improving value for current resources will require improvements in program and technical efficiency and effectiveness, including intensifying prevention efforts to stem new infections with improved allocative efficiency between program components of prevention, treatment and care and support; using national or regional solutions to realize economies of scale and reduce service delivery and procurement costs; strengthening private-public partnerships; and introducing policy reforms to generate private savings for health and social insurance.

Finally, in contrast to the large fiscal costs of HIV/AIDS, the availability of data on the costs of HIV/AIDS and related services, the coverage of

services, and the cost-effectiveness of interventions is limited. Investments in improving evidence on the drivers and course of the epidemic and the costs and effectiveness of alternative HIV/AIDS-related interventions are likely to yield high returns—in terms of improving the effectiveness and efficiency of the national HIV/AIDS response, reducing future costs, and achieving improved health outcomes.

Notes

1. The data included in ASSA (2006) are further discussed by Dorrington and others (2006). Johnson and Dorrington (2006) provide a discussion of some of the underlying assumptions and methods.
2. The size of the population grew at an annual average of 3.3 percent between 2000 and 2010, and the population size increased by about 60 percent between 1995 and 2010, according to United Nations Population Division (2009).
3. IMF and World Bank (2010) expect that GDP in Uganda will grow by an average of 7 percent annually between 2010 and 2030.
4. All dollars are U.S. unless otherwise noted.
5. G-7: Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.

References

ASSA (Actuarial Society of South Africa). 2006. "ASSA Select Model." http://www.actuarialsociety.org.za, accessed May 2009.

Botswana. 2010. *National Development Plan (NDP) 10*. Obtained online from Ministry of Finance and Development Planning, November, http://www.gov.bw/en/Ministries--Authorities/Ministries/Ministry-of-Finance-and-Development-Planning1/Tools--Services/Services--Forms/National-Development-Plan-NDP-10/ Use instead: http://www.gov.bw.

CSO (Central Statistical Office), and Macro International, Inc. 2008. *Swaziland Demographic and Health Survey 2006–07*. Mbabane: CSO.

DOH (South Africa). 2009. *2008 National Antenatal Sentinel HIV and Syphilis Prevalence Survey: South Africa Report*. Pretoria: Department of Health.

Dorrington, Rob E., Debbie Bradshaw, Leigh Johnson, and Debbie Budlender. 2006. "The Demographic Impact of HIV/AIDS in South Africa: National Indicators for 2006." Centre for Actuarial Research and South African Medical Research Council.

Ellis, Linette, Pieter Laubscher, and Ben Smit. 2006. "The Macroeconomic Impact of HIV/AIDS under Alternative Intervention Scenarios (with Specific Reference to ART) on the South African Economy." Bureau for Economic Research, University of Stellenbosch, South Africa.

Guthrie, Teresa, Nhlanhla Ndlovu, Farzana Muhib, Robert Hecht, and Kelsey Case. 2010. "The Long Run Costs and Financing of HIV/AIDS in South Africa." Centre for Economic Governance and AIDS in Africa, Cape Town.

IMF. 2010. World Economic Outlook Database. October 2010 edition, Washington, DC.

IMF, and World Bank. 2010. *Joint IMF/World Bank Debt Sustainability Analysis Prepared by the Staffs of the International Monetary Fund and the International Development Association.* Washington, DC: IMF and World Bank.

Johnson, Leigh F., and Rob E. Dorrington. 2006. "Modelling the Demographic Impact of HIV/AIDS in South Africa and the Likely Impact of Interventions." *Demographic Research* 14 (22): 541–74.

National Treasury. 2010. *Budget Review.* Pretoria: National Treasury.

SANAC (South African National AIDS Council). 2007. *HIV & AIDS and STI Strategic Plan for South Africa 2007–2011*. Pretoria: SANAC.

UAC (Uganda AIDS Commission). 2007. *Moving Toward Universal Access: National HIV & AIDS Strategic Plan 2007/8–2011/12*. Kampala.

UNAIDS. 2010a. 2010 *Report on the Global AIDS Epidemi*c. Geneva: UNAIDS.

———. 2010b. HIV and AIDS Estimates and Data. Accessed January 28, 2011, http://www.aidsinfoonline.org.

UNDP (United Nations Development Programme). 2009. *Human Development Report 2009*. New York.

United Nations Population Division. 2009. *World Population Prospects: The 2008 Revision—Population Database.* New York: United Nations.

WHO, UNAIDS (Joint United Nations Programme on HIV/AIDS), and UNICEF (United Nations Children's Fund). 2008. "Epidemiological Fact Sheet on HIV and AIDS: South Africa." WHO, Geneva.

World Bank. 2010a. *World Development Indicators 2010*. Washington DC: World Bank.

———. 2010b. "Botswana Public Expenditure Review: Key Messages." Presented at Public Expenditure Review Workshop, Gaborone, August 24.

CHAPTER 1

Introduction

HIV/AIDS continues to take a tremendous toll on the populations of many countries, especially in Sub-Saharan Africa. In some countries with high HIV prevalence rates, life expectancy has declined by more than a decade, and in a few cases, by more than two decades. Even in countries with HIV prevalence around 5 percent (close to the average for Sub-Saharan Africa), the epidemic can reverse gains in life expectancy and other health outcomes achieved over one or two decades.

Recognizing that HIV/AIDS is a serious health and development threat, the international response to the disease has been unparalleled, with worldwide funding rising from only US$260 million in 1996 to US$15.9 billion by 2009, and the creation of an international agency, the Joint United Nations Programme on HIV/AIDS (UNAIDS), dedicated to coordinating the international HIV/AIDS response (UNAIDS 2010a). Additionally, the impact of and the challenges represented by HIV/AIDS provided much of the impetus behind the creation of the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM); most of the funding provided by GFATM (about 60 percent) underwrites HIV/AIDS-related programs and increased financing from bilateral donors, in particular, the U.S. government, as well as philanthropic support from affected countries.

The increase in funding has been mirrored by a rapid scaling-up of the HIV/AIDS response in low- and lower-middle-income countries, where external grants are the dominant financing source for HIV/AIDS-related expenditures. However, significant financing gaps will need to be filled to achieve universal access to treatment, prevention, and mitigation interventions.

The scale-up of efforts to combat the epidemic and the commitment of major industrial countries to universal access to treatment are appropriate and appreciated. At the same time, these efforts carry implications for macroeconomic and fiscal management in aid-recipient countries and for the effectiveness of public policy initiatives in different sectors. In addition, HIV/AIDS has significant consequences for the public and private sectors in the affected economies, which can reduce national governments' abilities to effectively respond to the epidemic.

In this context, one of the objectives of the World Bank's HIV/AIDS *Agenda for Action* in Africa (World Bank 2008) is to assist countries in developing long-term, sustainable responses that are integrated into their national development agendas, including embedding HIV/AIDS in national development strategies and medium-term expenditure frameworks. The present study contributes to this agenda by improving tools available to assess the fiscal dimension of HIV/AIDS and the scaling-up of national HIV/AIDS responses, in the short term and in the medium term, and by analyzing the fiscal risks associated with national HIV/AIDS responses and the availability of external finance.

The study is related to perceived strengths of the World Bank in several areas, in terms of its macroeconomic focus, and it benefits from the World Bank's multisectoral engagement and capacity-building experience. Building on an underlying conception of HIV/AIDS as a broad development issue, this analysis focuses on the fiscal dimension of HIV/AIDS, including and going beyond the immediate costs of HIV/AIDS-related programs.

The purpose of this study is to refine the analysis of governments' fiscal burden resulting from HIV/AIDS and to assess the fiscal risks associated with scaling-up national HIV/AIDS responses. The findings from this study, and the analytical tools developed in it, could help governments in defining policy objectives, improving fiscal planning, and in conducting their dialogues with donor agencies. It could also contribute to the World Bank's policy advice on implementing the HIV/AIDS response, notably in the area of fiscal management and fiscal sustainability.

Relative to the existing literature, particularly studies estimating the costs of national HIV/AIDS responses and studies on the broad macroeconomic impacts of HIV/AIDS, this study's value added arises from the following components:

- A comprehensive analysis of the fiscal impacts of HIV/AIDS and the repercussions of the national HIV/AIDS response, incorporating (and representing the state of the art in) the fiscal, macroeconomic, epidemiological, and demographic dimensions of HIV/AIDS and national HIV/AIDS responses.
- An analysis of HIV/AIDS's fiscal impacts that goes beyond existing studies focusing on the costs of HIV/AIDS-related programs and also incorporates certain personnel and other government expenditures affected by HIV/AIDS, and thus arrives at more comprehensive and precise estimates of HIV/AIDS's fiscal costs.
- The study provides tools for assessing the sustainability of the scaling-up of HIV/AIDS programs in terms of the scale of the potential fiscal challenges and the uncertainties regarding crucial factors, such as the prices of drugs and the number of people seeking treatment.
- By explicitly taking into account the financing sources for different types of expenditures, the analysis evaluates the fiscal risks associated with alternative scenarios in the context of available external financing.

This synthesis report highlights work conducted under the umbrella of a World Bank program, "The Fiscal Dimensions of HIV/AIDS," which includes country studies on Botswana, South Africa, Swaziland, and Uganda, and starts out from and builds on three observations. First, in a number of countries, the fiscal costs of HIV/AIDS are large. This means that the impact of and the response to HIV/AIDS are relevant factors in medium- and long-term fiscal planning, and that the fiscal context (and external context, in light of the role played by external financing) is relevant for planning the sustainable financing of HIV/AIDS programs. Second, the impact of and the response to HIV/AIDS are long-term events that are going to affect public finance for many years to come. For this reason, current spending is an incomplete and potentially misleading indicator of the fiscal burden of HIV/AIDS. This study therefore interprets the costs of HIV/AIDS and the costs of the response as a "quasi-liability" that commits fiscal resources over many years. Third, most of the fiscal costs of HIV/AIDS are ultimately caused by new infections, and this analysis further estimates the fiscal resources committed (or saved) by an additional (or prevented) HIV infection. Building on these estimates, one can assess the evolving fiscal burden of HIV/AIDS over time.

The work program on the fiscal dimension of HIV/AIDS is intended to provide analyses and tools relevant for at least three types of actors involved in the international and national HIV/AIDS responses:

- Individuals involved in planning national HIV/AIDS responses, by providing insights on the implications of the epidemic and HIV/AIDS programs and highlighting fiscal aspects on a range of policy choices.
- Individuals (located, for example, in a ministry of finance) in charge of developing and implementing the national policy and development agenda, by providing tools to analyze the interactions between the impact of and the response to HIV/AIDS as well as the fiscal resource envelope.
- Individuals planning or observing the international HIV/AIDS response, by providing tools to analyze the links between external support and the fiscal burden of HIV/AIDS.

The study also provides a cross-section of HIV/AIDS spending and financing, focusing on 15 countries in southern and eastern Africa. While these countries include the countries with the highest HIV prevalence rates in the world, the intention is to provide a snapshot of the costs of HIV/AIDS across the region, including countries with low HIV prevalence and countries with very different levels of economic development (GDP per capita ranging from US$300 to US$7,600). The discussion highlights the large scale of HIV/AIDS spending (between 1.0 and 3.6 percent of GDP in 10 of these 15 countries). This review of HIV/AIDS spending and financing across countries is complemented by a discussion of the impact of the global economic crisis on HIV/AIDS financing. In addition to the immediate impact of the global crisis on the region, countries are also vulnerable to a slowdown in the availability of external financing of HIV/AIDS programs: external financing ranges from around 30 to 98 percent of HIV/AIDS spending across countries for the years sampled.

While discussion of the scale of current HIV/AIDS spending does indicate that HIV/AIDS represents a significant challenge from a macroeconomic and fiscal perspective in numerous countries, the cross-country approach cannot address many of the critical issues relevant for an assessment of the fiscal dimension of HIV/AIDS in any particular country, primarily because HIV/AIDS-related spending and the financing of HIV/AIDS programs are embedded in a fiscal and policy context, and because the impact of the epidemic and HIV/AIDS program costs imply

long-term fiscal commitments that are not adequately captured by current spending.

The country chapters summarize the results of the four country studies conducted in Botswana, South Africa, Swaziland, and Uganda. While these are countries in which the impact of and the response to HIV/AIDS pose significant challenges, they also represent a variety of situations regarding the domestic and external context. Three countries face very high HIV prevalence (as of 2009), with Swaziland's population aged 15–49 at 25.9 percent prevalence, Botswana's at 24.8 percent, and South Africa's at 17.8 percent (UNAIDS 2010b), while HIV prevalence is much lower in Uganda, at 6.5 percent. However, Uganda's level of economic development is much lower than that of the other three countries, as a consequence, the level of HIV/AIDS-related spending in Uganda relative to GDP is similar to that observed in Swaziland (relative to GDP). While the high level of external financing of Uganda's HIV/AIDS program (close to 90 percent in 2008) mitigates the current fiscal impact and provides key funding for the HIV/AIDS program, the domestic financing needs of the program are highly sensitive to the availability of HIV/AIDS-related external financing in the future. South Africa also has significant fiscal repercussions because of HIV/AIDS impacts on social spending. In Botswana and Swaziland, the HIV/AIDS response occurs over a period in which fiscal revenues are projected to slow down, reflecting the weakening outlook for mining revenues in Botswana and the declining Southern African Customs Union (SACU) revenues in Swaziland.

In addition to covering the specific situations of the respective countries, the analysis in the four country studies emphasizes the interpretation of the fiscal costs of HIV/AIDS and HIV/AIDS programs as long-term commitments or "quasi-liabilities." For example, people receiving treatment or other services under an HIV/AIDS program now will continue to demand these services. Policy targets on the coverage of HIV/AIDS-related services imply future spending commitments, and new infections occurring now translate into additional demand for HIV/AIDS-related services over the coming years.

Reflecting the nature of HIV/AIDS programs as a long-term commitment, the study projections extend over longer periods (about 20 years) than those typically covered by national strategic plans, which usually cover five years. The extended time period allows analysis of the implications of the HIV/AIDS program for the country's fiscal position by adapting tools used

for public debt analysis. Building on the observation that most of the costs of HIV/AIDS are ultimately caused by HIV infections, the analysis estimates the fiscal costs incurred by a new infection and uses this estimate to calculate the evolving fiscal burden over time, with new infections adding to the quasi-liability. In addition to insights regarding the magnitude and sustainability of the fiscal burden of HIV/AIDS, this analysis of HIV/AIDS as a quasi-liability also offers tools to assess the consequences of alternative HIV/AIDS policies, both on the macroeconomic and microeconomic level.

Background

The evidence on the scale of macroeconomic impacts of HIV/AIDS is weak; most empirical studies and calibrated models suggest a modest negative impact of HIV/AIDS on GDP per capita (see Haacker [2008b] for a recent discussion). However, studies addressing the long-term impacts of HIV/AIDS, which allow for a richer set of channels through which HIV/AIDS may affect macroeconomic outcomes (for example, through education, human capital accumulation, and fertility), may project larger impacts. Because this study focuses on the fiscal dimension of national HIV/AIDS responses with a time horizon of up to 10–20 years (too short for some of the long-run impacts to affect macroeconomic outcomes), it draws primarily on literature describing the impacts of HIV/AIDS on productivity and national savings. The impact on national savings also provides a channel through which the fiscal impacts of HIV/AIDS affect macroeconomic outcomes.

The study aims to push the envelope by providing a *fiscal* analysis of HIV/AIDS, assessing the implications of HIV/AIDS and HIV/AIDS programs for, and in the context of, the available fiscal space. In addition to informing the planning of the financing for HIV/AIDS programs, the study also contributes analysis valuable for the design of HIV/AIDS programs by quantifying the fiscal costs incurred by a single HIV infection and linking the costs of the HIV/AIDS program to HIV incidence. The analysis builds on several strands of various literature—notably discussions of fiscal implications of HIV/AIDS across countries, studies of the macroeconomic impacts of HIV/AIDS, and detailed costing studies of HIV/AIDS programs.

This analysis is informed by the general discussion of the fiscal dimension of HIV/AIDS available to date (see Haacker 2004). This study emphasizes

many of the fiscal impacts of HIV/AIDS that studies focusing on the direct costs of the national response omit. However, as a cross-country discussion, it provides little specific guidance to policy makers. Also relevant are the literature on *fiscal space* for health and other development spending and the literature on the *macroeconomic implications of scaling up aid*. The fiscal space literature (see, for example, Heller and others 2006) represents a comprehensive approach for managing a scaling-up of (largely) aid-financed expenditures, and David (2008) provides a comprehensive discussion of fiscal space and sustainability issues in the context of HIV/AIDS. The existence of *constraints to scaling up* is also relevant for the analysis of the fiscal dimension of national HIV/AIDS responses, especially given that HIV/AIDS-related spending is concentrated in the health sector (see, for example, Haacker 2008a and Kumaranayake 2008). Relative to this literature, the present study provides value added by conducting in-depth country studies that inform decision makers in the respective countries and by providing improved tools to assess the fiscal consequences of HIV/AIDS programs and the course of the epidemic over time.

The other main reference points for this study are available country studies of the macroeconomic repercussions of HIV/AIDS and studies estimating the costs of HIV/AIDS programs. Detailed studies are available for three of the four countries the study covers, including Jefferis, Siphambe, and Kinghorn (2006) and Botswana Institute for Development Policy Analysis (BIDPA 2000) for Botswana; Ellis, Laubscher, and Smit (2006) and Laubscher, Visagie, and Smit (2001) for South Africa; and Jefferis and Matovu (2008) for Uganda. While this study builds on these macroeconomic studies, which also cover, to various degrees, fiscal aspects of HIV/AIDS, the fiscal repercussions become central in the studies presented in the report, and the analysis is embedded in a discussion of the state of public finances and health sector financing. In addition to estimates of the costs of HIV/AIDS programs informing recent macroeconomic studies, the analysis also builds on studies specifically estimating the costs of HIV/AIDS programs. Notably, the analysis for South Africa builds on the recent comprehensive study by Guthrie and others (2010). Additionally, costing studies like Over (2008) for treatment or Stover and others (2006) for prevention offer useful points of reference. Relative to these costing studies, the scope of the analysis presented here is wider, in terms of explicit discussions of the fiscal context, and includes costs categories (for example, the impact on

government employees and—for some countries—the impact of HIV/AIDS on certain categories of social expenditures).

Regarding the literature on the *demographic and epidemiological aspects of HIV/AIDS*, the study does not offer fundamentally new approaches. In addition to estimates available for specific countries, the analysis builds on publications like United Nations Population Division (2009a, 2009b), UNAIDS (2010), and evidence from the medical literature to inform the assumptions regarding the model parameters.

In summary, the present study builds on and combines three different strands of literature: macroeconomic studies on the impact of HIV/AIDS, estimates of the costs of HIV/AIDS programs, and demographic and epidemiological estimates. Relative to this literature, it provides value added along three dimensions: (i) explicitly embedding the estimates of the costs of HIV/AIDS in a discussion of the fiscal context; (ii) capturing some of the fiscal consequences of HIV/AIDS that are not included in costing studies of HIV/AIDS programs; and (iii) assessing the consequences of HIV/AIDS over time, including an explicit analysis of the links between HIV incidence and the evolving costs of HIV/AIDS.

The principal data sources for HIV/AIDS-related spending and the financing of HIV/AIDS programs are the United Nations General Assembly Special Session (UNGASS) reports compiled by national authorities in collaboration with UNAIDS, and made available on the UNAIDS Web site.[1] Table 1.1 summarizes the latest available information from these sources (augmented in a few cases where the spending data in the UNGASS reports were incomplete) for a group of 15 countries in southern and eastern Africa.[2] The countries were chosen to capture those countries with the highest HIV prevalence worldwide (hence the focus on southern and eastern Africa), but also to represent country differences in the region, and therefore a number of countries with low HIV prevalence are included.

For the 15 countries covered in this report, total HIV/AIDS-related spending has, for the years indicated in table 1.1, accounted for US$4.4 billion (0.9 percent of GDP), corresponding to US$14 per capita. External financing accounted for over half of total spending for the years shown. The 15 countries represent a significant share of global HIV/AIDS spending: about 30 percent, and one-third of external HIV/AIDS financing.[3]

Regarding the cost burden of HIV/AIDS from a national perspective, a useful summary measure is the cost relative to GDP. While HIV prevalence is an important determinant of the burden of HIV/AIDS thus defined, so is

Table 1.1: Selected Countries: HIV/AIDS Spending and Financing

COUNTRY	YEAR	HIV PREVALENCE (%)	HIV/AIDS SPENDING			EXTERNAL FINANCING (% OF TOTAL)	GDP PER CAPITA (US$)
			TOTAL (US$ MILLIONS)	PERCENT OF GDP	PER CAPITA (US$)		
Angola	2009	2.1	33.7	0.05	1.9	—	3,972
Botswana	2008	23.9	348.1	2.6	194.4	32.1	7,552
Congo, Dem. Rep. of	2008	1.4	96.4	0.8	1.5	86.0	184
Kenya	2008	6.3	687.0	2.6	19.5	86.0	755
Lesotho	2008	23.2	56.4	3.6	22.9	53.1	645
Madasgascar	2008	0.1	12.0	0.1	0.6	54.7	468
Malawi	2008	11.9	107.4	2.6	7.8	97.6	298
Mozambique	2008	12.5	146.4	1.5	7.1	95.6	478
Namibia	2007	15.3	18.5	0.2	9.1	49.2	4,341
South Africa	2009	18.1	2,088.0	0.7	42.3	27.3	5,824
Swaziland	2006	26.1	48.5	1.8	47.7	61.3	2,698
Tanzania	2008	6.2	465.0	2.3	11.7	98.1	519
Uganda	2008	6.5	302.7	1.8	8.9	88.5	504
Zambia	2008	15.2	279.3	2.6	23.5	97.1	901
Zimbabwe	2009	15.3	54.1	1.2	4.6	69.8	375
Total (latest years)		8.2	4,744	1.0	14.6	42.3	1,534

Sources: UNGASS country reports for 2010 for HIV spending (http://www.unaids.org/en/KnowledgeCentre/HIVData/CountryProgress/2010CountryProgressAllCountries.asp), augmented by domestic sources for Swaziland and Zambia, IMF (2010) for GDP.

Note: — = not available.

the level of GDP per capita. For example, among the three countries with the highest HIV prevalence, spending relative to GDP (3.6 percent) is the highest in Lesotho, which has a much lower level of GDP per capita than Botswana or Swaziland. The next highest level of spending, at 2.6 percent of GDP, occurs in a group of countries including Botswana, Kenya, Malawi, and Zambia. While the level of HIV prevalence in Malawi was only about half the level of Botswana, and access to HIV/AIDS-related services much lower,[4] the high level of spending reflects that GDP per capita in Malawi (in U.S. dollar terms) was only 4 percent of the level of GDP per capita in Botswana. In general, cross-country comparisons based on spending relative to GDP understate the differences in the burden, because they mask differences in the quality and coverage of services. The role of economic determinants in the burden of HIV/AIDS is therefore larger than spending comparisons reveal.

Significant differences in the role of external financing are also evident across countries. While external support financed over half of the costs of

HIV/AIDS programs in the region, its share ranged from about 20 percent in South Africa to 98 percent in Malawi. The extent to which external support has enabled the HIV/AIDS response in Southern Africa Development Community (SADC) member countries with relatively low levels of GDP per capita is illustrated in table 1.2. For example, out of total HIV/AIDS-related spending of between 1.5 percent of GDP and 2.6 percent of GDP in Malawi, Mozambique, and Zambia, high levels of external support, exceeding 95 percent of the costs of the HIV/AIDS program, have reduced the domestic financing needs to around 0.1 percent of GDP or less.

Another conclusion from the data presented in table 1.2 addresses the link between disease burden and domestically financed HIV/AIDS spending. The three countries facing the highest domestic financing burden according to table 1.2 are the very same countries with the highest levels of HIV prevalence: Botswana, Lesotho, and Swaziland. Thus, the international HIV/AIDS response has provided partial insurance to countries facing high levels of HIV prevalence—providing support to HIV/AIDS

Table 1.2: Selected Countries: Domestically Financed HIV/AIDS Spending

			DOMESTICALLY FINANCED HIV/AIDS SPENDING	
COUNTRY	YEAR	TOTAL HIV/AIDS SPENDING (% OF GDP)	% OF GDP	% OF GOVT. EXPENDITURES
Angola	2009	0.05	—	—
Botswana	2008	2.6	1.7	4.4
Congo, Dem. Rep. of	2008	0.8	0.1	0.5
Kenya	2008	2.6	0.4	1.4
Lesotho	2008	3.6	1.7	2.6
Madasgascar	2008	0.1	0.1	n.a.
Malawi	2008	2.6	0.1	0.2
Mozambique	2008	1.5	0.1	0.2
Namibia	2007	0.2	0.1	0.4
South Africa	2009	0.7	0.5	1.6
Swaziland	2006	1.8	0.7	2.1
Tanzania	2008	2.3	0.0	0.2
Uganda	2008	1.8	0.1	0.4
Zambia	2008	2.6	0.0	0.2
Zimbabwe	2009	1.2	0.4	1.5

Sources: UNGASS country reports for 2010 for HIV spending (www.unaids.org/en/KnowledgeCentre/HIVData/CountryProgress/2010CountryProgressAllCountries.asp), augmented by domestic sources for Swaziland and Zambia, IMF (2010) for GDP, as well as various IMF country reports for government expenditures.

Note: — = not available.

programs in countries like Botswana or South Africa that otherwise (in light of their relatively high-income levels) receive limited grant funding. However, this insurance is partial because the required domestic spending also tends to increase with the level of HIV prevalence.

Because the fiscal costs of HIV/AIDS occur mainly in the sectors of health, education, and social spending, it is instructive to relate the level of HIV/AIDS-related spending to these sectors. Table 1.3 compares the level of HIV/AIDS-related spending with total or public health spending. Because HIV/AIDS-related spending transcends the health sector, these figures cannot be interpreted in terms of HIV/AIDS-related spending absorbing a certain share of health spending. However, the provision of health services is a significant aspect of public services—if the level of HIV/AIDS-related expenditures is large relative to health expenditures, it therefore serves as an indicator for the operational challenges of scaling up HIV/AIDS-related services.

Table 1.3: Selected Countries: HIV/AIDS Spending and Health Spending

COUNTRY	TOTAL HIV/AIDS SPENDING (% OF GDP)	DOMESTICALLY FINANCED HIV/AIDS SPENDING (% OF GDP)	TOTAL HEALTH SPENDING (% OF GDP)	PUBLIC HEALTH SPENDING (% OF GDP)
Angola	0.05	n.a.	2.70	2.21
Botswana	2.57	1.75	5.60	4.16
Congo, Dem. Rep. of	0.83	0.12	5.40	1.20
Kenya	2.58	0.36	4.50	1.68
Lesotho	3.55	1.67	6.43	3.63
Madasgascar	0.13	0.06	4.47	3.10
Malawi	2.63	0.06	9.75	5.79
Mozambique	1.48	0.07	5.61	4.26
Namibia	0.21	0.11	6.69	3.64
South Africa	0.73	0.53	8.34	3.36
Swaziland	1.77	0.68	5.91	3.83
Tanzania	2.25	0.04	5.13	3.37
Uganda	1.77	0.20	6.33	1.43
Zambia	2.61	0.08	6.00	3.71
Zimbabwe	1.23	0.37	—	—

Sources: UNGASS country reports for 2010 for HIV spending (www.unaids.org/en/KnowledgeCentre/HIVData/CountryProgress/2010CountryProgressAllCountries.asp), augmented by domestic sources for Swaziland and Zambia, IMF (2010) for GDP, and WHO (2010) for health spending.

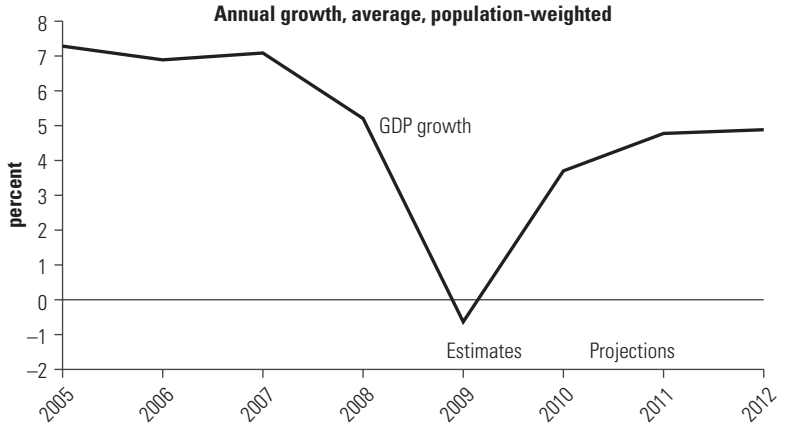
Note: — = not available; Data on HIV/AIDS-related spending relate to years shown in table 1.1, data on health spending are for 2008.

Table 1.3 illustrates the scale of the policy (and financing) challenges that the HIV/AIDS response poses in a number of SADC member countries. Total HIV/AIDS-related spending is equivalent to at least 40 percent of total health expenditure in four countries (Botswana, Lesotho, Tanzania, and Zambia), and exceeds 60 percent of public health expenditure in five countries (the four countries referred to above, plus the Democratic Republic of Congo). From a fiscal perspective, the most immediate financing challenges arise from domestically financed HIV/AIDS-related expenditures; this exceeded 40 percent of public health spending in two countries (Botswana and Lesotho). Looking further ahead, externally financed HIV/AIDS-related spending also poses considerable fiscal challenges, arising from the need to solicit the required external support or responding to shortfalls in anticipated external support.

The global financial crisis affects fiscal space available for the financing of HIV/AIDS programs through two channels— its impact on the domestic economies of countries facing substantial HIV/AIDS-related challenges and its impact on main donor countries, and thus the availability of external support. The roles these different channels play for the financing of HIV/AIDS programs depend on the extent to which a country depends on external support.

For example, for SADC member countries,[5] average GDP growth has declined from an average of 7 percent through 2007 to -1 percent in 2009, followed by a gradual recovery (figure 1.1). This means that domestic resources expanded much slower than expected in 2008. Regarding the outlook for the financing of HIV/AIDS programs (and any other public policy objectives), this negative economic impact is compounded by the fiscal repercussions of the crisis. While data for the budget turnouts for fiscal year 2009/10 are not yet available for all countries in the region, budget data for Botswana and South Africa, two countries that finance their HIV/AIDS programs mainly from domestic sources, can be used as an example. In Botswana, government finance depends largely on revenues from the mining sector, which has been severely hit by a slump in demand for diamonds. As a consequence, the preliminary budget turnout for fiscal year 2009/10 is a deficit of 16 percent of GDP, projected to recover only gradually over the next couple of years. In South Africa, the fiscal balance has deteriorated from a surplus of 1.7 percent of GDP in 2007/8 to a deficit of 7.3 percent of GDP in 2009/10, and public debt is projected to rise from 28 percent of GDP in 2007/8 to 43 percent of GDP in 2012/13 (South Africa 2010).

Figure 1.1: Southern African Development Community: GDP Growth, 2005–12

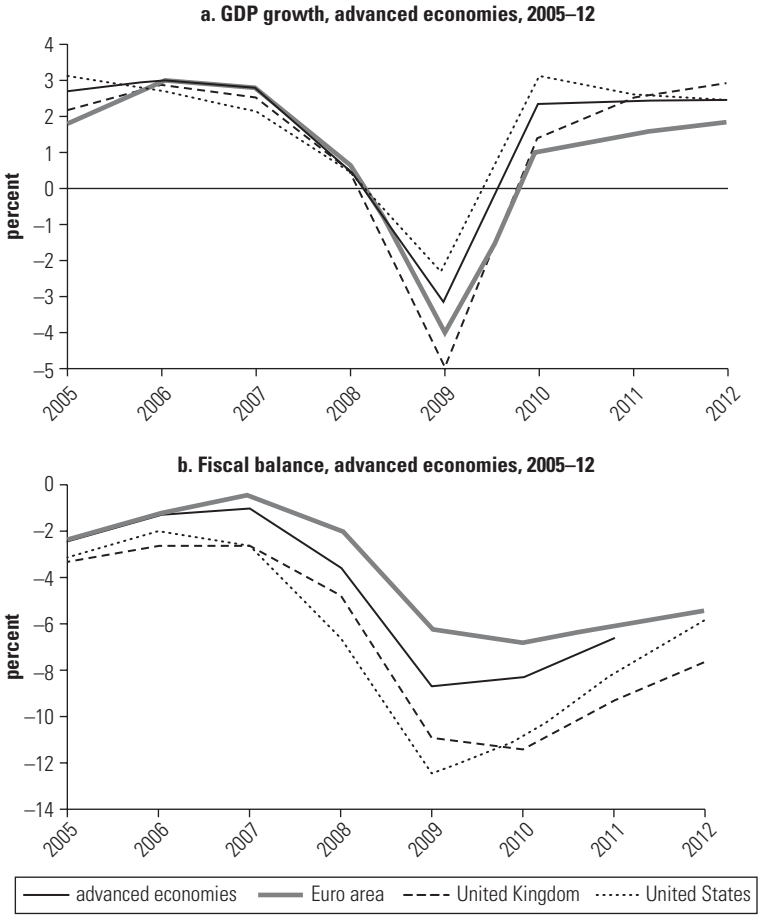


Source: IMF (2010).

Given that more than half of HIV/AIDS-related spending among the countries covered in tables 1–3 is financed through external support, the impact of the global crisis on the main donor countries is as important as the domestic impact. Moreover, external financing accounts for more than 90 percent of HIV/AIDS spending in four SADC member countries (Malawi, Mozambique, Tanzania, and Zambia). At least for these countries, the changing global environment has immediate and significant implications for the financing of their HIV/AIDS programs.

Figure 1.2 summarizes estimates and projections for key macroeconomic variables (GDP growth and the fiscal balance) for advanced economies overall, the United States (a major contributor to HIV/AIDS programs through the U.S. President's Emergency Plan for AIDS Relief [PEPFAR]), the Euro area, and the United Kingdom (major contributors to GFATM). As for SADC member countries, advanced economies have experienced a steep drop in economic growth, although the decline is somewhat less pronounced than for SADC (about 5 percentage points, rather than 7 percentage points), and recovery is expected to occur more quickly. At the same time, the fiscal balance deteriorates steeply, and remains in deficit for the coming years. For the United States, the deterioration in the fiscal balance is extraordinary, and the fiscal deficit estimated for 2009 is the highest recorded since the end of World War II (Council of Economic Advisors 2010). As a result, the International Monetary Fund (IMF 2010) projects

Figure 1.2: Macroeconomic Trends, Advanced Economies, 2005–12



Source: IMF (2010).

that the level of public debt in the United States will double relative to GDP between 2007 and 2015 (from 42 percent of GDP to 86 percent of GDP). In the United Kingdom, the economy contracted by 5 percent in 2009, and the deterioration in the fiscal balance is similar in magnitude to the United States: net debt is projected to increase from 38 percent of GDP in 2007 to 82 percent of GDP in 2012.

While the fiscal deterioration has been less severe in the Euro area, the fiscal position was weaker in some countries at the outset, resulting in the "Greek economic crisis" and putting the treasury bonds of a number of

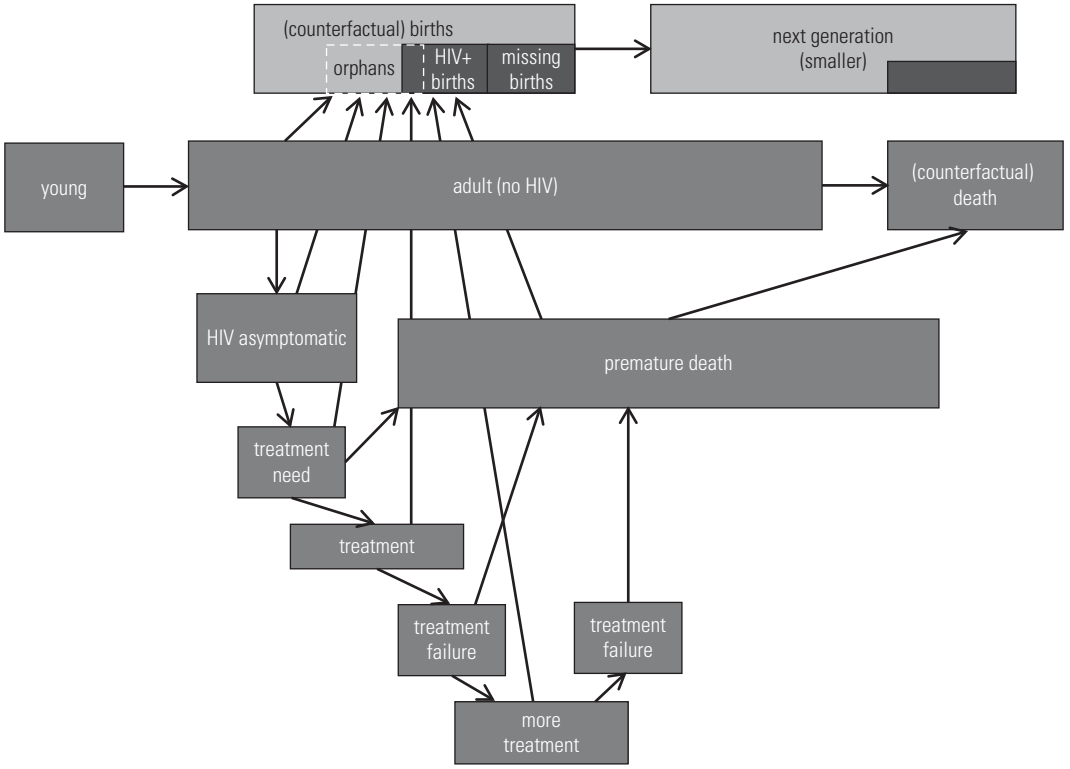
countries under pressure.[6] Thus, the fiscal environment in advanced economies over the coming years will be much tighter than previously expected, and the fiscal repercussions of the global economic crisis will extend well into the economic recovery. Consequently, increasing demands for funding of HIV/AIDS programs will face tighter competition. It is against this background that UNAIDS (2010b) has shifted the emphasis from estimating international funding gaps to developing "smarter, faster, lower cost, and more effective solutions." This particularly applies to those countries where the combination of high costs of HIV/AIDS programs and high levels of external financing make them particularly vulnerable to shortfalls in external support.

Botswana, South Africa, and Swaziland face a high disease burden and corresponding high costs for their HIV/AIDS responses, overall, and in terms of domestically financed spending. The following chapters describe findings from the studies in these countries as well as in Uganda.

Methodology

The analytical framework rests on three pillars—a demographic and epidemiological module, a set of tools to assess the fiscal costs of HIV/AIDS, and a macroeconomic model. The demographic and epidemiological module translates assumptions regarding the scale and the effectiveness of national HIV/AIDS responses, notably regarding changes in HIV incidence and scaling-up of access to antiretroviral treatment, into projections of demographic variables and variables describing the state of the epidemic, such as the number of people living with HIV/AIDS and the number of people requiring and receiving treatment. The structure of the model is illustrated in figure 1.3. It concentrates on the disease progression of HIV, in line with the available medical literature, and estimates of the course and the state of the epidemic for the respective countries. In addition, it contains extensions to capture the implications of HIV/AIDS for the youth population (including the number of births, mother-to-child transmission of HIV, and orphans) and on the senior population. The latter is calculated as the number of people living with HIV/AIDS who die prematurely, minus the number of those who have died for HIV/AIDS-related reasons, but would eventually have died in the absence of HIV/AIDS, illustrated by the progression from "premature death" to "counterfactual death" in figure 1.3.

Figure 1.3: Demographic and Epidemiological Module



Source: Authors.

In line with the fiscal focus of this analysis, the most substantial component of the framework regards the fiscal repercussions of HIV/AIDS. The fiscal analysis is designed to address three different issues:

- Estimating the costs of both the impact of HIV/AIDS and the response to it, to quantify the implications of HIV/AIDS on fiscal capabilities at a point in time.
- Estimating the costs incurred by a single infection, to inform policy makers about the fiscal consequences of ongoing infections or specific prevention measures.
- Estimating the evolving fiscal costs of HIV/AIDS as a quasi-liability, to assess (i) the implications of alternative HIV/AIDS policies for fiscal space and (ii) the sustainability of HIV/AIDS spending.

To these ends, the analysis first builds projections of the fiscal costs of HIV/AIDS, based on the targets of national policies on HIV/AIDS, available estimates of the costs of HIV/AIDS programs, and other information. Unlike an analysis with a more narrow, operational focus, it also aims to capture fiscal costs of HIV/AIDS not included in a costing study of an HIV/AIDS program, such as the impacts of HIV/AIDS on government employees and certain social expenditures. The availability of the data that this analysis draws from differs considerably across countries, ranging from very detailed costing studies and fiscal data available for South Africa, to fairly crude costing estimates focusing on the main HIV/AIDS spending categories for some other countries.

Second, the analysis estimates the costs incurred by a single infection. This analysis starts from the objectives of the national HIV/AIDS program (for example, a treatment coverage rate of x percent), and calculates the expected fiscal costs caused by one additional infection under these targets. The analysis further interprets these costs as a quasi-liability—under the objectives of the HIV/AIDS program an additional infection binds future fiscal resources—and calculates the value of this liability (that is, the amount that would need to be put aside now to cover the costs of this infection) as the present discounted value of the expected costs incurred by an HIV infection. By transforming the projected costs over time into a quasi-liability at a point in time, the analysis can facilitate the evaluation of the fiscal repercussion of an HIV/AIDS-related intervention.

Third, the study combines the estimates of the fiscal costs and of the costs incurred by a single HIV infection to analyze the evolving fiscal burden of HIV/AIDS. As current costs of HIV/AIDS largely reflect HIV infections that have occurred in the past, while current policies affect the demand for HIV/AIDS-related services over many years—even decades—current spending is not a good indicator of the fiscal burden of HIV/AIDS. Therefore, the study goes on to estimate the evolving fiscal burden based on the quasi-liability, which under a country's HIV/AIDS policies is incurred as a consequence of past and current HIV infections, or equivalently, the costs of providing HIV/AIDS-related services and coping with the impact of HIV/AIDS for all people currently living with HIV/AIDS. The costs incurred by new infections add to this liability, while the liability declines as the anticipated HIV/AIDS services caused by past infections are delivered. This analysis yields indicators to assess the fiscal consequences of alternative HIV/AIDS policies based on the quasi-liability associated with

the respective policies and allows an analysis of the fiscal sustainability of HIV/AIDS programs by drawing on tools normally applied to the analysis of the sustainability of public debt.

Because the analysis relates the fiscal costs of HIV/AIDS to fiscal capacities or the size of the economy, it is important for the fiscal analysis to capture the consequences of HIV/AIDS on the scale of economic activity. The framework therefore includes a macroeconomic model. Building on a neoclassical growth framework, it captures the implications of the demographic impacts of HIV/AIDS and of the costs of the impact of and response to HIV/AIDS for economic growth. Most important, the size of the population (overall and working-age) increases more slowly as a consequence of premature mortality and—with a longer lag—the impact of HIV/AIDS on the youth population and slower population growth translate into a lower rate of economic growth. Additionally, the costs of coping with and responding to the epidemic partially translate into a lower investment rate, further slowing down the rate of economic growth.

Finally, it is useful to take note of some shortcomings in this analysis. The framework was designed to provide a comprehensive account of the fiscal costs of HIV/AIDS, including assessments of the impacts of HIV/AIDS on fiscal space, the sustainability of HIV/AIDS programs, and the costs incurred by new infections. It provides guidance relevant for planning the financing of the response to HIV/AIDS and understanding the implications of alternative HIV/AIDS policies for fiscal space, thus aiding the policy decision process. However, the focus is on the *consequences* of HIV infections, and the framework does not include a module describing the determinants of adult HIV infections. The second important shortcoming of the analysis regards the availability of data, which is uneven across countries and frequently insufficient for detailed fiscal analysis. Nevertheless, these shortcomings do not detract from the applicability, significance, and value of the findings.

Notes

1. http://www.unaids.org/en/KnowledgeCentre/HIVData/CountryProgress/2010CountryProgressAllCountries.asp.
2. For Swaziland, data are also taken from NERCHA and UNAIDS (2008), and for Zambia, data are drawn from NAC Zambia (2010).

3. According to UNAIDS (2010a), HIV/AIDS spending increased from US$13.7 billion to US$15.9 billion, while external support declined slightly from US$7.7 billion to US$7.6 billion between 2008 and 2009. Most of these data relate to fiscal year 2008/9, but some to other periods. Because of the incomplete available data, the authors could not calculate precise ratios.
4. In 2008 (the year the spending data in table 1.1 relate to for these countries), the coverage rate of antiretroviral treatment in Malawi was 51 percent (Malawi 2010), whereas in Botswana it was 82 percent (NACA and UNAIDS 2010).
5. The countries covered in table 1.1, minus Kenya and Uganda, plus Mauritius and the Seychelles.
6. The Greek crisis is still evolving as of November 2010.

References

BIDPA (Botswana Institute for Development Policy Analysis). 2000. *Macroeconomic Impacts of the HIV/AIDS Epidemic in Botswana*. Gaborone.

Council of Economic Advisors. 2010. "Economic Report of the President: 2010 Report Spreadsheet Tables." Washington, DC.

David, Antonio. 2009. "Fiscal Space and Sustainability of HIV/AIDS Programs in Sub-Saharan Africa." In *The Changing HIV/AIDS Landscape—Selected Papers for the World Bank's Agenda for Action*, ed. Elizabeth L. Lule, Richard M. Seifman, and Antonio C. David, 123–58. Washington, DC: World Bank.

Ellis, Linette, Pieter Laubscher, and Ben Smit. 2006. "The Macroeconomic Impact of HIV/AIDS under Alternative Intervention Scenarios (with Specific Reference to ART) on the South African Economy." Bureau for Economic Research, University of Stellenbosch, South Africa.

Guthrie, Teresa, Nhlanhla Ndlovu, Farzana Muhib, Robert Hecht, and Kelsey Case. 2010. "The Long Run Costs and Financing of HIV/AIDS in South Africa." Centre for Economic Governance and AIDS in Africa, Cape Town.

Haacker, Markus. 2004. "The Impact of HIV/AIDS on Government Finance and Public Services." In *The Macroeconomics of HIV/AIDS*, ed. Markus Haacker. Washington, DC: IMF.

_____. 2008a. "Financing the Response to AIDS: Some Fiscal and Macroeconomic Considerations." *AIDS* 22 (Suppl. 1): 17–22.

_____. 2008b. "Health, HIV/AIDS, and Growth." Unpublished manuscript, World Bank and London School of Hygiene and Tropical Medicines.

Heller, Peter S., Menachem Katz, Xavier Debrun, Theo Thomas, Taline Koranchelian, and Isabell Adenauer. 2006. "Making Fiscal Space Happen: Managing Fiscal Policy in a World of Scaled-Up Aid." IMF Discussion Paper No. 06/270, Washington, DC.

IMF (International Monetary Fund). 2010. *World Economic Outlook Database*, April 2010 Edition. Washington, DC.

Jefferis, Keith, and John Matovu. 2008. *Assessing the Macroeconomic Impact of HIV/AIDS in Uganda, Phase III—Analysis of Macroeconomic Impact*. Kampala: Ministry of Finance Planning and Economic Development.

Jefferis, Keith, Happy Siphambe, and Anthony Kinghorn. 2006. *The Economic Impact of HIV/AIDS in Botswana*. Gaborone: Econsult.

Kumaranayake, Lilani. 2008. "The Economics of Scaling Up: Cost Estimation for HIV/AIDS Interventions." *AIDS* 22 (Suppl. 1): 23–33.

Laubscher, Pieter, Linette Visagie, and Ben Smit. 2001. "The Macro-Economic Impact of HIV/AIDS in South Africa." Economic Research Note No. 10, Bureau for Economic Research, University of Stellenbosch, South Africa.

Malawi, Office of the President and Cabinet. 2010. *Malawi HIV and AIDS Monitoring and Evaluation Report: 2008–9, UNGASS Country Progress Report, Reporting Period: January 2008–December 2009*. Lilongwe.

NAC (National AIDS Commission). 2010. *Status of the National Response to the 2001 Declaration of Commitment on HIV and AIDS, January 2008–December 2009*. Lesotho, UNGASS Country Report, Maseru.

NACA, and UNAIDS (Joint United Nations Programme on HIV/AIDS). 2010. *Progress Report of the National Response to the 2001 Declaration of Commitment on HIV and AIDS, 2008–9*. Gaborone.

NERCHA (National Emergency Response Council on HIV and AIDS), and UNAIDS (Joint United Nations Programme on HIV/AIDS). 2008. "The Kingdom of Swaziland National AIDS Spending Assessment 2005/06 and 2006/07." Mbabane.

Over, Mead. 2008. "Opportunities and Constraints in the Roll-Out of Antiretroviral Therapies." Paper presented at *HIV/AIDS in Africa: Socio-Economic Considerations*, United Nations University New York, September 9.

South Africa, National Treasury. 2010. Budget Review. Pretoria.

Stover, John, and others. 2008. "The Global Impact of Scaling Up HIV/AIDS Prevention Programs in Low- and Middle-Income Countries." *Science* 311 (March 10): 1474–76.

UNAIDS. 2010a. 2010 *Report on the Global AIDS Epidemi*c. Geneva: UNAIDS.

———. 2010b. HIV and AIDS Estimates and Data. Accessed January 28, 2011, http://www.aidsinfoonline.org.

United Nations Population Division. 2009a. *World Population Prospects: The 2008 Revision—Highlights*. New York: United Nations.

———. 2009b. *World Population Prospects: The 2008 Revision—Population Database*. New York: United Nations.

WHO (World Health Organization). 2010. *National Health Accounts 1995–2007*. Accessed April 29, http://www.who.int/nha/en/.

World Bank. 2008. *Our Commitment: The World Bank's Africa Region HIV/AIDS Agenda for Action, 2007–2011*. Washington, DC.

CHAPTER 2

Botswana

I. Introduction

Botswana is among the countries with the highest level of HIV prevalence in the world. According to the Joint United Nations Programme on HIV/AIDS (UNAIDS 2010a, 2010b), prevalence among the population aged 15–49 was 24.8 percent, and 320,000 people were living with HIV. As a result of HIV/AIDS, key health indicators have deteriorated catastrophically—life expectancy at birth has declined from 66 years in 1990 to 50 years in 2002, recovering only partly to 54 years by 2008 (World Bank 2010a). Consequently, during 2005–10, the probability of reaching age 50 dropped to 55 percent, compared to 88 percent without AIDS (United Nations Population Division 2009b).

The scale of the epidemic in Botswana brings extraordinary challenges for responding to the epidemic. Even though recent survey data point to some decline in HIV incidence, the large number of people already living with HIV, as well as the ongoing new infections, will continue to pose significant challenges for many years (or even decades). For example, the number of people receiving treatment will continue to rise for many years, and a large number of young people will grow up in households affected by illness or death.

The objectives of this study are to assess fiscal policy challenges arising from the HIV/AIDS response, develop tools to better understand the links between the HIV/AIDS program and the fiscal costs of HIV/AIDS, and thus inform the planning of the national HIV/AIDS response and fiscal planning in general.

The study contributes to addressing challenges in three areas:

- Compared to a conventional costing study, this analysis provides value added in two directions: It includes aspects of the HIV/AIDS impact (for example, the implications of the impact on public servants) that are not normally covered by a costing analysis, and—based on the recognition that the fiscal costs of HIV/AIDS are highly persistent—it adopts a long-term perspective to considering the fiscal sustainability of HIV/AIDS costs.
- This analysis of the fiscal dimension of HIV/AIDS is embedded in a discussion of the fiscal context and outlook. The study complements the ongoing Public Expenditure Review being conducted by the World Bank, describing the fiscal costs of HIV/AIDS as one of the significant challenges for public finance for the near future and potentially decades, contributing to the challenges of fiscal adjustment as mining revenues slow down.
- The study develops improved tools to analyze the trade-offs inherent in HIV/AIDS programs, capturing the persistence of the costs incurred. In addition to projections of current HIV/AIDS spending, these costs are attributed to HIV infections that occurred much earlier, and the evolving fiscal costs are directly linked to HIV incidence.

Section II takes stock of the the HIV/AIDS impact in Botswana to date. It starts with a discussion of the state and course of the epidemic and its most direct consequences on health outcomes. Following is a review of the macroeconomic consequences of HIV/AIDS that is based on substantial studies that have been conducted in Botswana. Finally, there is a disconnect between economic and human development—whereas economic development (measured, for example, by gross domestic product [GDP] per capita) has been positive over the last two decades, health indicators such as life expectancy have deteriorated sharply. As a result, comprehensive development indices such as the Human Development Index (HDI) show a decline over this period.

Section III sets the ground for the fiscal analysis by describing the state of public finances—drawing on, among other sources, available budget data and the national development framework—and summarizing available data on overall health spending and financing and on the costs and financing of the national HIV/AIDS repsonse.

Section IV provides the substance of this analysis. It starts out with a summary of the demographic and epidemiological projections that this

analysis builds on. Based on the objectives of the national strategic framework of HIV/AIDS and available spending data, the fiscal costs of HIV/AIDS are calculated and projected. This study's cost projections are complemented by three subsections providing further analytical content: a discussion of HIV/AIDS as a long-term fiscal commitment that has many features of a fiscal liability, using tools normally applied to debt sustainability analysis; an analysis that allocates the costs of HIV/AIDS to the time an infection occurs, providing additional tools to analyze the link between HIV incidence and the costs of an HIV/AIDS program; and a discussion of the role of external aid.

II. The Impact of HIV/AIDS in Botswana

To provide context for this study's analysis of the fiscal dimension of HIV/AIDS in Botswana, this section provides a general review of HIV/AIDS impacts. Some HIV/AIDS impacts have implications for public finance that are not captured by the estimated costs of the HIV/AIDS response. For example, the epidemic affects public servants as well as the general population, and a slowdown in GDP would affect domestic fiscal revenues. In addition, the impact of the epidemic and the response to it intersect with key public policy objectives, such as improving health, increasing access to education, and reducing poverty. The broad macroeconomic effects of HIV/AIDS (for example, on economic growth) also have fiscal repercussions.

This discussion of the HIV/AIDS impacts in Botswana sets out with a brief review of the course and the state of the epidemic. The discussion then turns to health, the area where the epidemic's impacts are most apparent. The broader macroeconomic and development repercussions of HIV/AIDS are then explored, including a review of studies that analyze the macroeconomic impact of HIV/AIDS in Botswana. This review is then complemented by a discussion of the broader development impacts, using the United Nations Development Programme (UNDP) Human Development Index as a point of reference.

The course and state of the epidemic

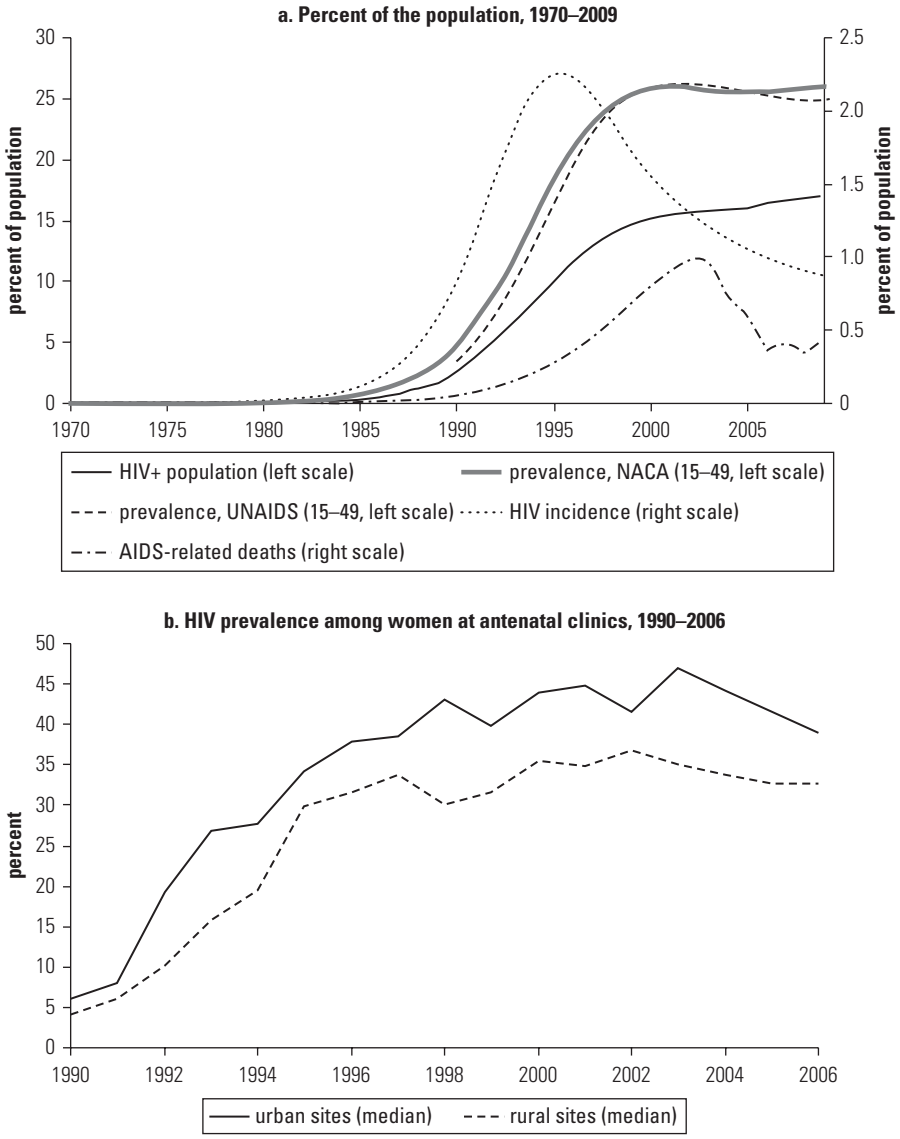
HIV/AIDS in Botswana has a relatively short history. The first case of HIV was diagnosed in 1985, although studies analyzing the demographic impact

of HIV/AIDS (for example, NACA [2008] or CARe [2006]) assume that the first cases occurred somewhat earlier. In 1986, HIV prevalence reached 1 percent of the population aged 15–49 (and 0.5 percent of the overall population). The epidemic escalated to current levels in the 1990s, with HIV prevalence increasing from 4.7 percent in 1990 to 25.9 percent in 2000 among those 15–49 years old (figure 2.1a).[1] In this period, HIV incidence (the number of new infections) peaked at 2.3 percent of the population and close to 4 percent of the population of aged 15–49.[2]

As the number of people living with HIV/AIDS increased, AIDS-related mortality also increased: crude mortality attributed to HIV/AIDS increased from 0.1 percent in 1990 to 0.8 percent in 2000, and peaked at 1.0 percent in 2002.[3] Although HIV incidence has declined strongly since the mid-1990s (to about half of its peak level in absolute numbers by 2008), HIV prevalence continued to rise through 2001, as HIV incidence remained higher than AIDS-related mortality. Starting in 2002, a new development became apparent (figure 2.1a): crude mortality declined from 1.0 percent to 0.35 percent in 2006, reflecting the impact of increased access to antiretroviral treatment. Figure 2.1b complements the estimates of HIV prevalence among pregnant women from antenatal clinics, which are the primary source of data on which the demographic estimates in figure 2.1a are based. These data suggest that HIV prevalence has been higher in urban areas, peaking at 47 percent in 2003 in urban areas, and at 37 percent in 2002 in rural areas.[4]

Figure 2.2 summarizes the findings of the recent 2008 Botswana AIDS Impact Survey (CSO 2009) and, for prevalence, compares them with the outcomes of the earlier 2004 survey (CSO 2005). For women, HIV prevalence accelerates rapidly between age groups 15–19 and 30–34, where it peaks at 49 percent in the 2008 survey, and at 44 percent in the 2004 survey. For men, prevalence is much lower for the young cohorts, peaking at 36 percent (ages 30–34) in the 2004 survey, and at 44 percent for ages 40–44 in the 2008 survey. The patterns are consistent with a decline in HIV incidence among young adults; for women and men, HIV prevalence in this age group has declined considerably between the two surveys. HIV prevalence, according to CSO (2009), is higher in urban than in rural settings (17.9 percent compared to 17.1 percent), this can be attributed to the gap in prevalence rates for women (21.2 percent compared to 19.3 percent), whereas prevalence is somewhat lower in urban settings for men (13.8 percent compared to 14.6 percent).

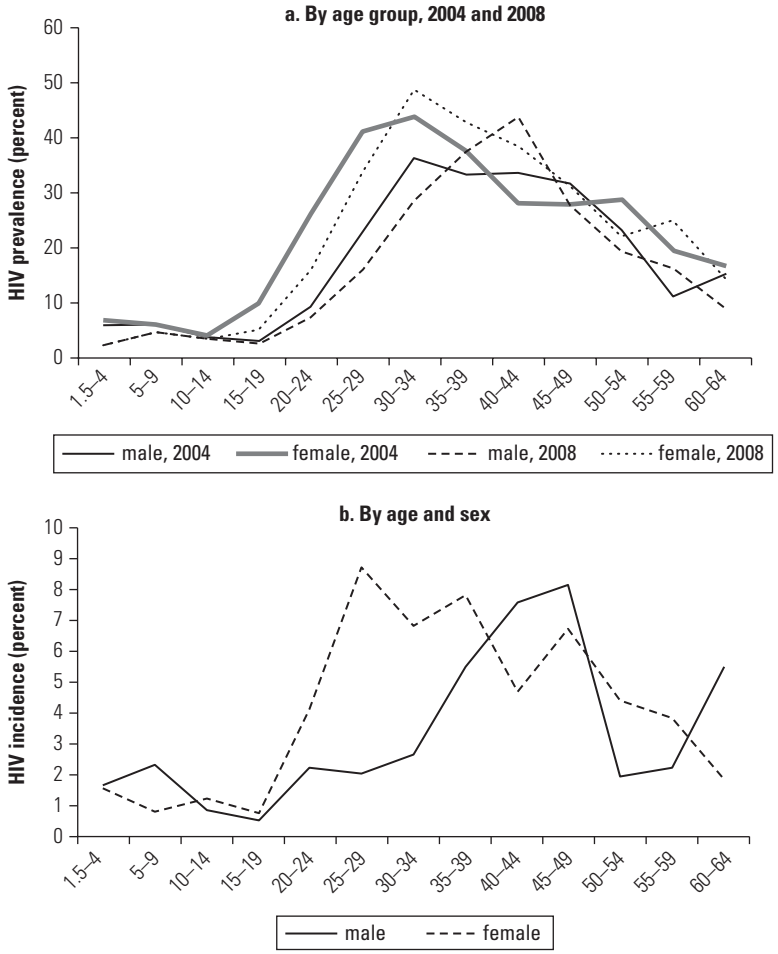
Figure 2.1: Evolution of the HIV Epidemic



Source: NACA (2008); UNAIDS (2010a).

Notes: Prevalence (15–49) is shown in percent of the population aged 15–49, all other variables are shown in percent of the total population; missing values for 2004 have been proxied by intrapolation. NACA = National AIDS Coordination Agency.

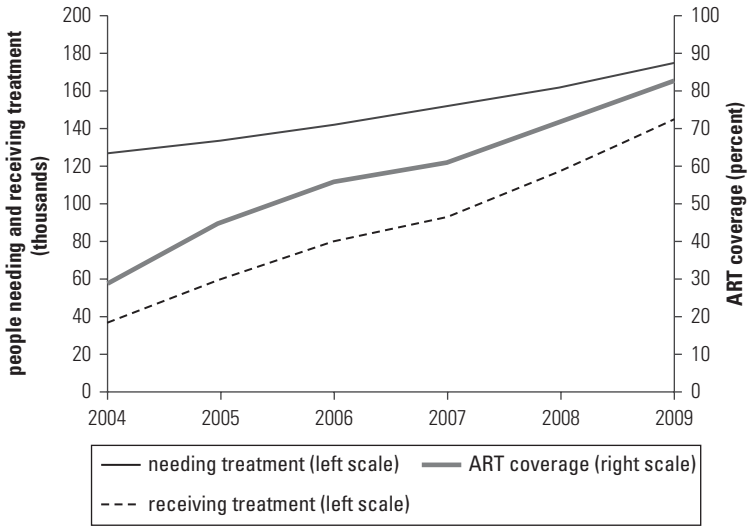
Figure 2.2: HIV Prevalence by Age Group, 2004 and 2008



Source: CSO (2005, 2009).

An important element of Botswana's response to HIV/AIDS is the national antiretroviral treatment program (MASA). Launched in 2002, MASA was the first program in Sub-Saharan Africa to provide no-cost antiretroviral therapy nationwide. The number of people receiving treatment has risen rapidly, from 10,000 in 2003 to 145,000 in 2009 (NACA 2008; WHO 2010; figure 2.3). As of end-2007, about 80 percent of the 92,000 persons on treatment were receiving it through the public sector. The balance was split between patients enrolled through the private sector and patients whose treatment was outsourced to the private sector.

Figure 2.3: Access to Antiretroviral Therapy, 2004–09



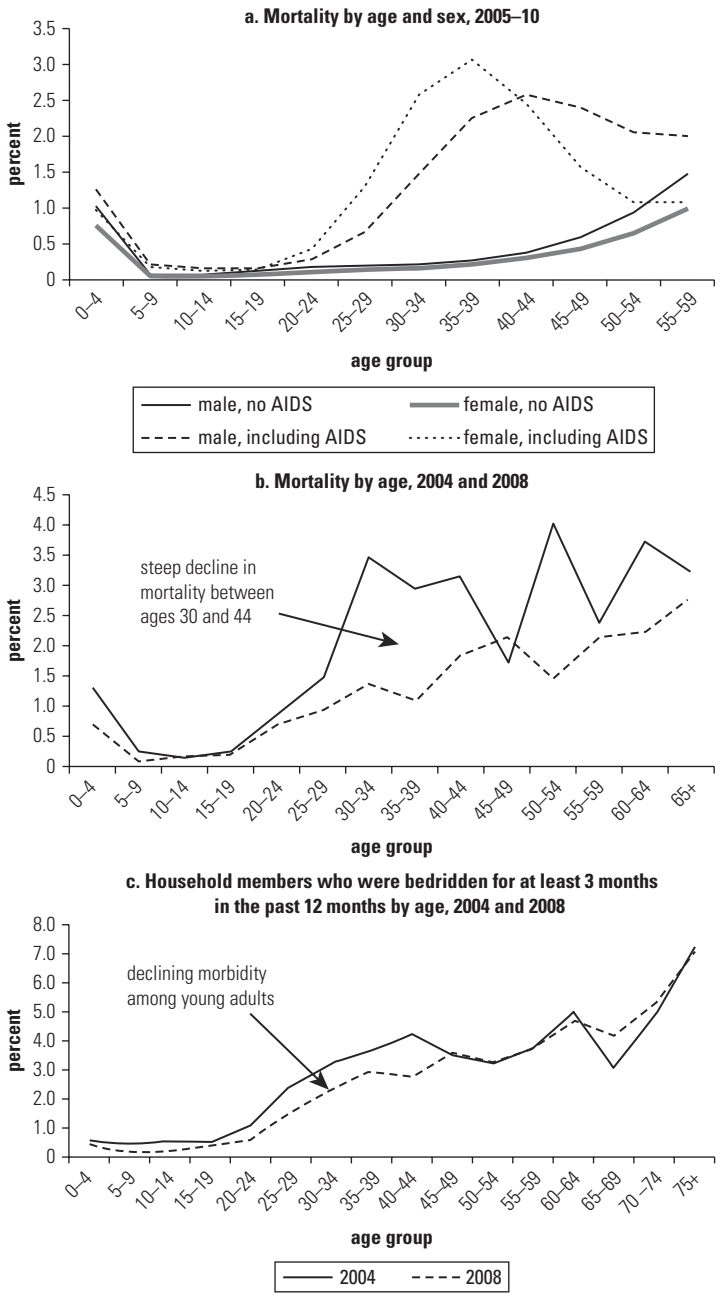
Source: WHO (2010a).
Note: Treatment need and coverage rate refers to CD4 count of 350.

Implications of HIV/AIDS for health outcomes

Figure 2.4 summarizes the available data on mortality and morbidity. The United Nations Population Division (2009b; see figure 2.4a) estimates that HIV/AIDS has resulted in a substantial increase in child mortality (as a result of mother-to-child transmission). For adults, mortality increases sharply starting with the cohort of ages 20–24. For women, it peaks in the 35–39 age group at 3.1 percent annually (compared to only 0.2 percent in a no-AIDS scenario), and subsequently declines until mortality rises again because of old age. For men, HIV/AIDS-related mortality peaks later, between ages 40 and 44, at about 2.6 percent. While HIV/AIDS-related mortality then tapers off, mortality for other reasons increases with age, so that mortality remains high at over 2 percent.

While the estimates by United Nations Population Division (2009b) are model generated, figures 2.4b and 2.4c provide estimates for mortality and morbidity from two waves of the Botswana AIDS Impact Survey (CSO 2005, 2009). These survey data, collected over a period in which treatment access improved significantly, also offer an indication of the health impacts of the scaling-up effort. Mortality among young adults declined sharply between

Figure 2.4: HIV/AIDS, Mortality, and Morbidity



Sources: a. Authors' calculations, based on United Nations Population Division (2009b); b. authors' calculations, based on CSO (2005, 2009); c. authors' calculations, based on CSO (2005, 2009).

2004 and 2008, most notably for the 30–35 age group, dropping from 3.5 percent in the 2004 survey (CSO 2005) to 1.5 percent in the 2008 survey (CSO 2009). However, mortality among young adults remains very high, at about three times the level of the counterfactual "no-AIDS" estimates prepared by United Nations Population Division (2009b). Morbidity, measured by the share of household members who were bedridden, has declined, though not as sharply as mortality, and remains elevated among young adults.

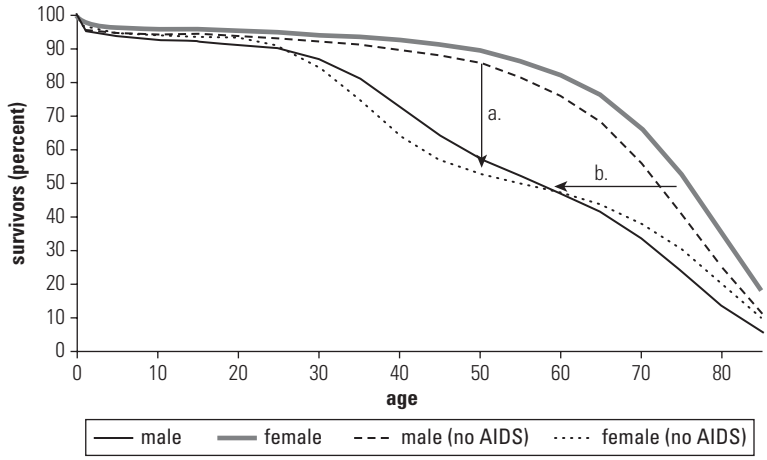
A significant outcome of the increased mortality among young adults is a disproportionate increase in the number of orphans, especially double orphans. According to NACA (2008), about 15 percent of the population aged 0–17 were orphans (that is, had lost at least one parent) in 2007, including 11 percent of the youth population who had been orphaned as a result of AIDS-related mortality.[5] Among the children orphaned by AIDS, 36 percent were double orphans, whereas the corresponding share was only 5 percent among children who lost a parent for other reasons.

The consequences of increased mortality over a life span are illustrated in figure 2.5, showing estimated survival curves. Life expectancy at birth was estimated at 55 years for 2005–10 (United Nations Population Division 2009b), representing a loss of 13 years.[6] Correspondingly, the probability of surviving to age 50 has declined to 55 percent, compared to 88 percent without AIDS, and the median life expectancy from the mid 70s to the mid 50s.[7]

Macroeconomic impact

The macroeconomic impact of HIV/AIDS in Botswana has been analyzed in numerous studies.[8] An obvious starting point for this discussion is the BIDPA (2000) study, which is the earliest of these studies and—because of its wide scope—a useful reference point. Building on a neoclassical growth model adapted by Cuddington (1993) to capture some of the impacts of HIV/AIDS through the labor market, and featuring a formal and informal sector and two types of labor (skilled and unskilled), BIDPA (2000) estimated that as a consequence of the HIV/AIDS epidemic, GDP growth declined by about 1 percentage point, so that the GDP is 23 percent smaller by 2021 than it would be without the impacts of HIV/AIDS. Because lower population growth results in an increase in the capital-labor ratio, which more than offsets the negative impacts of HIV/AIDS on GDP per capita, BIDPA (2000) suggests that the rate of growth of GDP per capita increases by 0.4 percentage points.

Figure 2.5: Survival Rates from Age 0 by Sex, 2005–10



Source: Authors' calculations, based on United Nations Population Division (2009).
Note: a. Share of cohort reaching age 50 down by over one-third; b. Median life expectancy declines from about 75 to around 55.

There are two dimensions that distinguish the BIDPA (2000b) study from most other studies of the macroeconomic impact of HIV/AIDS. First, it provides a thorough discussion of the HIV/AIDS impact on the fiscal balance (discussed below), and, recognizing that HIV/AIDS impacts are highly uneven across households, it discusses the HIV/AIDS impacts on poverty and inequality because of increased expenditures and shocks to household income.[9]

MacFarlan and Sgherri (2001), using a model very similar to BIDPA (2000), project a slowdown in nonmining GDP growth in Botswana of up to 4 percentage points by 2010 based on more pessimistic demographic projections and assumptions regarding the HIV/AIDS impact on investment rates and labor productivity. While MacFarlan and Sgherri (2001) excluded the mining sector from their analysis, BIDPA (2000) captured some of the implications HIV/AIDS in this sector.[10] Sackey and Raparla (2001) provide a useful extension of BIDPA (2000), complementing a discussion of the estimates from BIDPA (2000) with a basic discussion of the impact of HIV/AIDS on the labor market and on the government budget.

Using a fairly simple macroeconomic model, Masha (2004) analyzes the macroeconomic repercussions of Botswana's National Strategic Framework (NSF) on HIV/AIDS. Masha predicts that, as a result of the interventions programmed under the NSF, the decline in GDP growth

by 2015 will be reduced by 0.8 percentage points (compared to a decline of 2.2 percentage points without interventions). Additionally, Masha (2004) estimated HIV/AIDS fiscal costs under the NSF and that indirect fiscal savings from the reduced impact of HIV/AIDS also result in a decline of certain expenditures.

Jefferis, Siphambe, and Kinghorn (2006) set out to update and build on BIDPA (2000). Reviewing the predictions made by BIDPA (2000), they concluded that the model was largely appropriate. However, economic growth was higher than predicted by BIDPA (2000), partly because of major developments that occurred after the study, most important, the scale-up of antiretroviral treatment.[11]

Regarding the macroeconomic impacts of HIV/AIDS, Jefferis, Siphambe, and Kinghorn (2006) contrasted their estimates not only with a no-AIDS scenario, but also with a scenario that includes HIV/AIDS impacts with no scale-up of antiretroviral treatment.[12] Overall, they estimated that annual GDP growth is reduced by about 1.2 percentage points, compared to 1.5–2.0 percentage points in the absence of widespread access to antiretroviral treatment, implying a moderate increase in the rate of growth of GDP per capita of about 0.4 percentage points.

Similar to BIDPA (2000), Jefferis, Siphambe, and Kinghorn (2006) also provide a substantial analysis of HIV/AIDS impacts on the fiscal balance (discussed later) as well as an analysis of HIV/AIDS impacts on poverty. Increased household expenditures as a result of HIV/AIDS add about 1 percentage point to the poverty headcount. Assessing the income effects is more complicated, because one household's loss due to the death of an income earner (as suggested by microeconomic studies) may be another household's gain (because of increased employment opportunities), so that the macroeconomic effects are smaller than the immediate household level impacts of HIV/AIDS. Dependency rates are projected to increase, and Jefferis, Siphambe, and Kinghorn (2006) suggest that the household impacts are disproportionally large for the lowest income quintile.

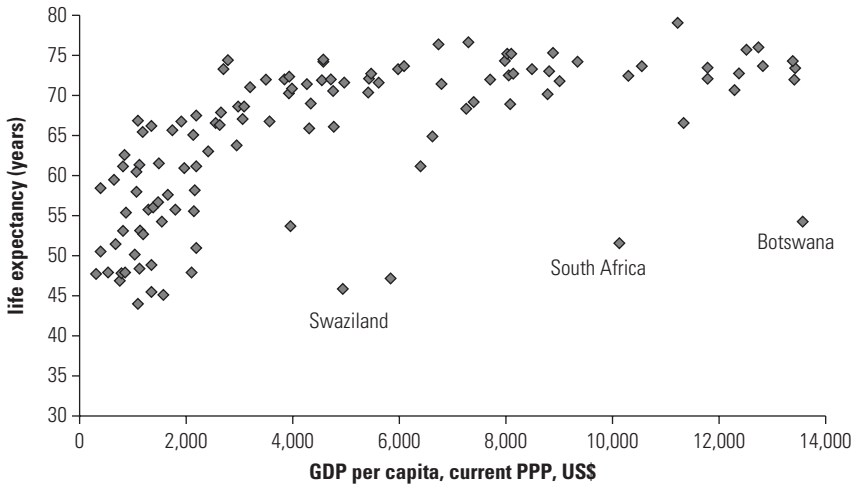
Disconnect between economic and human development

Although economic development and improvements in health indicators normally go hand in hand, this link is broken in Botswana because of the impacts of HIV/AIDS. The disconnect between Botswana's economic

status and health status is illustrated by figure 2.6, which plots life expectancy against the level of GDP per capita for a large number of countries. Overall, life expectancy increases with GDP per capita. While there is a great variability in life expectancy for countries with GDP per capita below US$2,000 (purchasing power parity, 2005 prices), very few of these countries have a life expectancy exceeding 65 years. Conversely, very few countries with GDP per capita exceeding US$2,000 have a life expectancy below 65 years. However, along with a small number of other countries affected by high HIV prevalence, and two countries that have recently acquired great (oil) wealth, Botswana is an outlier: life expectancy is about 20 years lower than in the countries with similar GDP per capita (Turkey, Romania, Malaysia, and Argentina), and at about the same level as in Kenya (GDP per capita one-ninth of Botswana's) and Ethiopia (GDP per capita one-sixteenth of Botswana's).

NACA (2003) relatedly points out that "high morbidity and mortality rates due to HIV/AIDS have seen Botswana slip down the UNDP Human Development Index (HDI) rankings from 71 in 1996, to 122 in 1999/2000." Since then, Botswana's ranking has slipped further to 125 as of 2007 (UNDP 2009).[13] This is primarily the consequence of the devastating impact of HIV/AIDS on life expectancy: Botswana ranks 60th in terms of

Figure 2.6: Life Expectancy and GDP per Capita, 2008



Source: World Bank (2010a).

GDP per capita, but ranks 159th (among 181 countries covered) in terms of life expectancy.[14]

These developments—and the fact that the composite HDI masks large differences in underlying trends in GDP per capita and life expectancy—are illustrated in figure 2.7. Among the seven countries covered (Bolivia, Botswana, China, the Arab Republic of Egypt, Guatemala, Indonesia, and the Islamic Republic of Iran), Botswana starts out at about the midpoint in 1980 (figure 2.7). Driven by high rates of economic growth, Botswana had risen to the top of these seven countries by 1990. However, Botswana's HDI declined in absolute terms from 1990 to the lowest level among the seven countries, and has remained there until 2007. Figures 2.7b and 2.7c show the underlying trends for life expectancy and for GDP per capita: while the Botswana experienced the largest increase in GDP per capita among the countries covered, the catastrophic decline in life expectancy between 1990 and 2000 was sufficient to drop Botswana's HDI rank from the top to the bottom.

III. HIV/AIDS and Public Finance

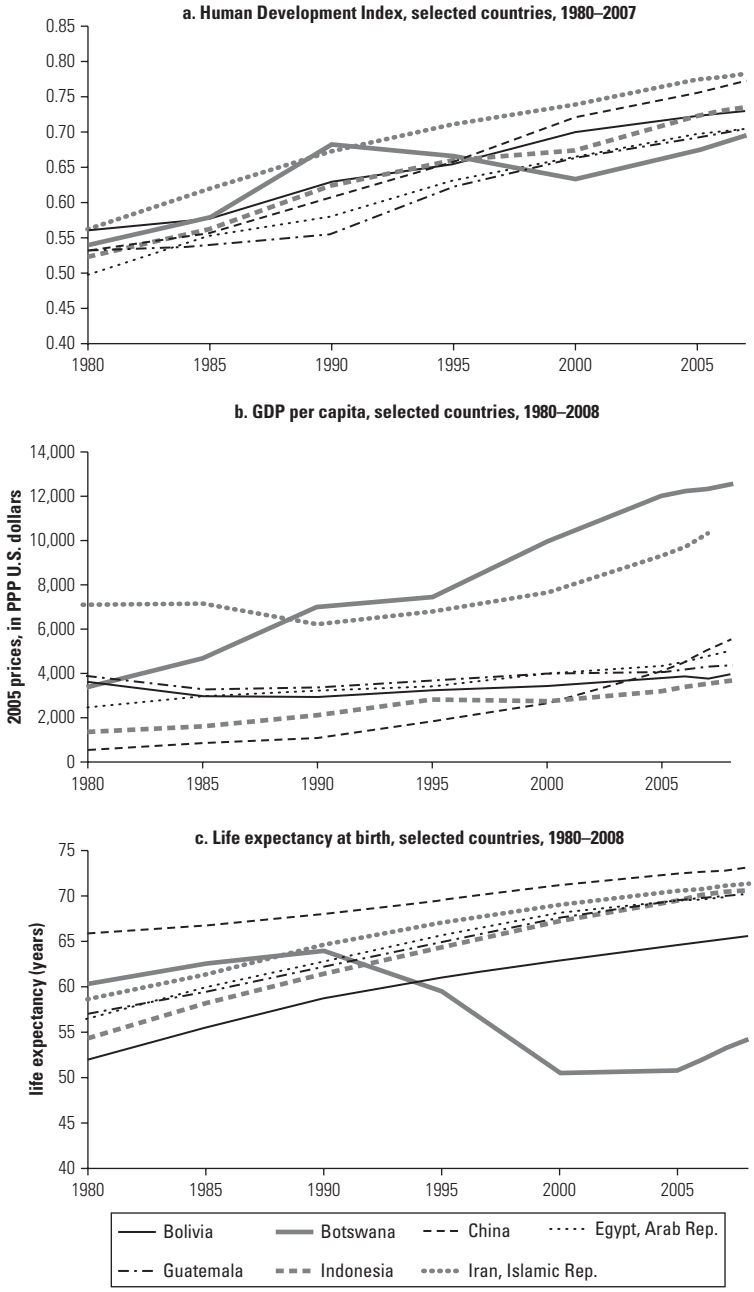
Before presenting the estimates of the fiscal costs of HIV/AIDS and an analysis of how the fiscal burden evolves over time, this section takes stock of the state of public finance and the role of public health spending. Then, it reviews data and estimates of the fiscal costs of HIV/AIDS and the response to HIV/AIDS so far.

The state of public finances

This review of the state of public finance serves as a reference point for assessing the magnitude of the challenges in financing the costs of HIV/AIDS and the HIV/AIDS program. Beyond the immediate fiscal situation, for which this study draws largely on budget data, this discussion is informed by the *National Development Plan* (NDP) *10* (Botswana 2010) and the World Bank's Botswana Public Expenditure Review (2010b).

Several aspects of the fiscal context are relevant for assessing the fiscal implications of HIV/AIDS. First, because of large mineral revenues, government spending is relatively high in Botswana. Second, Botswana was hard hit by the recent global financial crisis and responded by adopting an expansionary fiscal policy, with budget deficits reaching 16 percent of GDP in 2009/10.

Figure 2.7: Human Development Index and Underlying Factors, Seven Countries



Sources: UNDP (2009); World Bank (2010a).

This needs to be taken into account for when assessing fiscal developments (including health spending) between 2008 and 2010, and the coming years will see an adjustment from the very high fiscal deficits in 2009/10 and budgeted for 2010/11. Finally, the role of the mineral sector and the corresponding fiscal revenues are expected to slow down over the coming years; longer-term fiscal projections need to consider this shrinking resource envelope.

Table 2.1 summarizes recent fiscal developments. Between 2006/7 and 2010/11, mineral revenues declined (or are projected to decline) by about

Table 2.1: Summary of Government Operations

	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10[a]	2010/11[b]
					(Percent of GDP)			
Revenues and grants	38.7	37.0	39.9	40.1	35.8	34.0	32.5	28.5
Domestic revenues	38.6	36.3	39.7	39.5	35.1	33.3	32.2	28.2
Nonminerals	19.1	18.4	19.9	20.3	19.7	21.9	24.2	21.4
Minerals	19.5	17.9	19.8	19.2	15.4	11.4	8.0	6.8
Grants	0.1	0.7	0.2	0.7	0.7	0.7	0.4	0.3
Total expenditure and net lending	38.9	35.9	31.6	28.9	31.1	39.2	48.3	41.3
Current expenditure	30.9	28.4	25.4	23.4	23.3	26.7	30.9	28.6
o/w: wages and salaries	9.9	10.6	9.4	8.5	8.6	9.7	12.7	12.6
o/w: interest	0.5	0.6	0.6	0.3	0.3	0.3	0.4	0.5
Capital expenditure	10.2	8.1	6.8	5.9	8.2	12.8	16.9	12.8
Net lending	–2.2	–0.6	–0.5	–0.4	-0.4	–0.2	0.5	–0.1
Overall balance	–0.2	1.2	8.3	11.2	4.8	–5.2	–15.8	–12.8
Expenditures by economic classification								
Education	9.4	8.4	7.5	7.1	7.8	8.7	11.4	10.6
Health	3.9	4.1	3.7	3.3	3.3	3.4	4.6	2.7
					(US$ millions)			
Revenues and grants	3,332	3,755	4,232	4,643	4,539	4,439	3,888	3,739
o/w: minerals	1,679	1,815	2,099	2,222	1,955	1,484	957	895
Total expenditure and net lending	3,349	3,635	3,351	3,345	3,935	5,123	5,776	5,413
Overall balance	–16	120	881	1,298	604	–684	–1,887	–1,673
Memorandum item: Real GDP growth (calendar year)	6.3	6.0	1.6	5.1	4.8	3.1	–6.0	6.3

Sources: Ministry of Finance and Development Planning for fiscal data, IMF (2010b) for remaining data.

a. Preliminary.

b. Budget.

two-thirds, a trend that began before, but was accelerated by, the global crisis. Because nonmineral revenues and grants did not change by much over this period, this translated into a decline in government revenues from 40 percent of GDP to 30 percent of GDP. However, the government followed an expansionary fiscal policy through the economic crisis, with total expenditures increasing from 31 percent of GDP in 2007/8 to 48 percent of GDP in 2009/10 (and 41 percent of GDP in the 2010/11 budget).

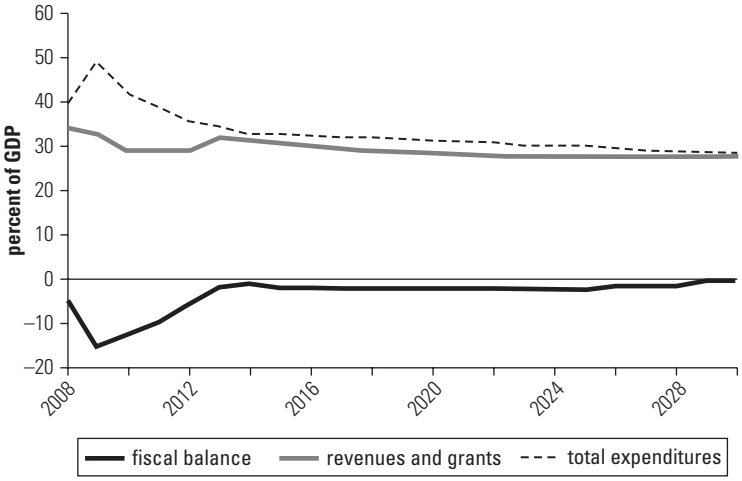
Looking ahead, the immediate challenge is fiscal stabilization, and this has been addressed in the draft NDP 10 (through 2015/16; Botswana 2010), and the assumptions regarding the fiscal outlook in this analysis reflect the projections included in NDP 10.[15] For the following period, the government assumes a decline in mineral revenues. This study's fiscal projections follow Clausen (2008) and Kojo (2010), the latter based on the ongoing Public Expenditure Review conducted by the World Bank (2010b). In the longer run, the projections assume that part of the decline in mineral revenues is offset by revenue measures in other areas, as envisioned under the enhanced revenues scenario described in the Public Expenditure Review. Regarding expenditures, much of the expected adjustment occurs through 2014 (in line with the NDP 10 [Botswana 2010]).[16] Subsequently, this study expects expenditures will decline very slowly relative to GDP (but still increasing in absolute terms), broadly in line with fiscal revenues (figure 2.8).

Health spending and financing

Because much of the challenges in the response to HIV/AIDS occur in the health sector, and because most antiretroviral treatment in Botswana is delivered through the public sector, a brief outline of some aggregate data on health spending and financing provides useful context.

Figure 2.9 illustrates the evolution of health expenditures based on data compiled by WHO (2010a). Domestically financed public health spending dominates health spending in Botswana, and accounts fully for the increase in health spending that has occurred since 2001. Before 2001, public health spending accounted for just over half of total health expenditures, with total expenditures hovering just above 4 percent of GDP. Among private health spending, nongovernmental organizations (NGOs) account for the largest share (about 60 percent), followed by private out-of-pocket spending (one-third). Between 2001 and 2005, public health expenditures accelerated rapidly relative to GDP, to about 5 percent, before falling back to a level of less

Figure 2.8: Fiscal Outlook, 2008–30



Source: Ministry of Finance through 2010/11, authors' assumptions thereafter.

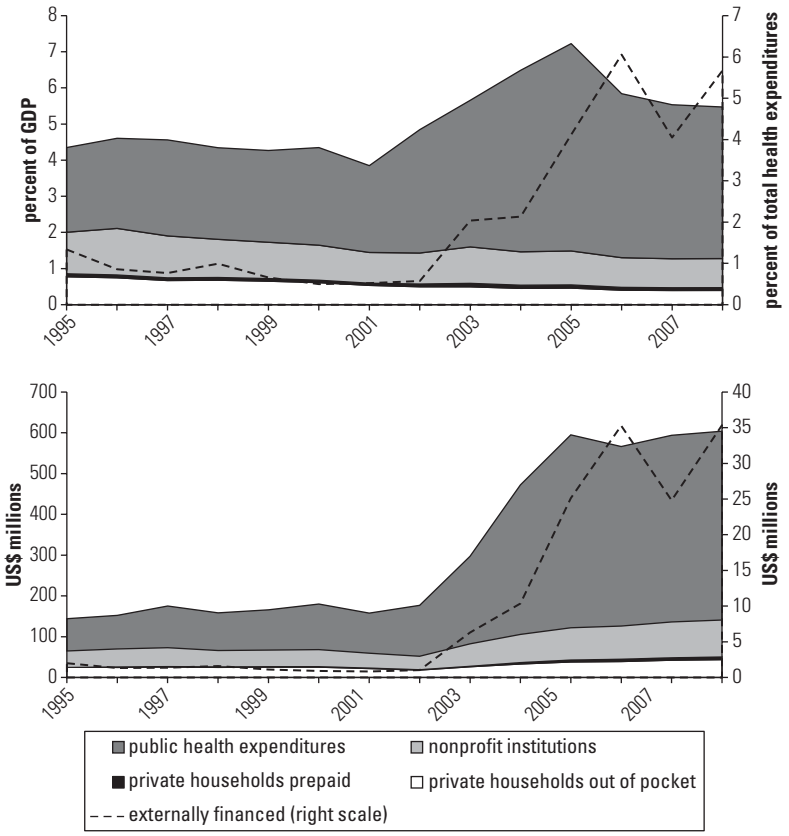
than 4 percent.[17] Because some of these developments occurred during a period of rapid GDP acceleration, this study also includes estimates of health spending in absolute numbers (transformed into U.S. dollars). From this perspective, public health spending increased from a level of about US$125 million in 2002 ($110 per capita) to US$473 million in 2005 ($388 per capita), and has remained at about this level. External financing played a subordinate role (less than 1 percent of total health spending), at least until 2002, but increased to around 5 percent of total spending during the most recent years.

One of the strengths of the data compiled by the WHO is the wide country coverage—for 2007, data on 191 countries are available (WHO 2010c). Total health spending in Botswana is comparable to other countries in its income bracket, although public health expenditures play a relatively large role (figure 2.10).[18]

Costs of national HIV/AIDS response

The bulk of HIV/AIDS-related spending is covered by the National Strategic Framework on HIV/AIDS and coordinated by the National AIDS Coordination Agency (NACA). Estimates of HIV/AIDS-related spending

Figure 2.9: Health Expenditures by Source of Financing, 1995–2008

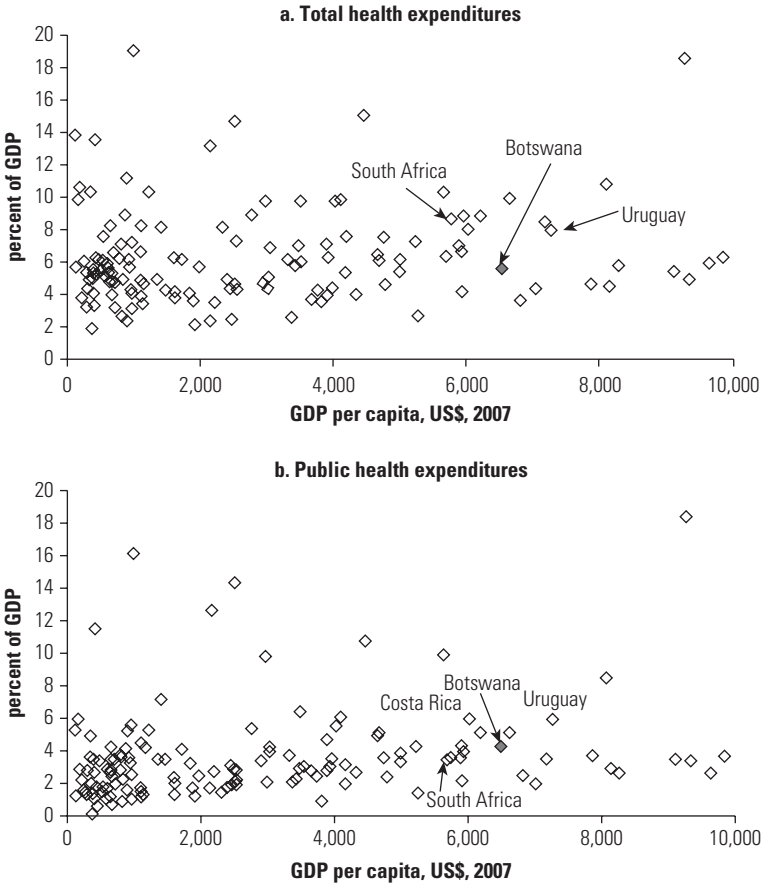


Source: WHO (2010a).

are available from National AIDS Spending Assessments, covering the years 2003–05 and the United Nations General Assembly Special Session (UNGASS) reports for 2008 and 2010 (Ministry of State President and NACA 2008; NACA and UNAIDS 2010).[19]

Table 2.2 summarizes the data available on HIV/AIDS-related spending. HIV/AIDS-related spending increased from 1.9 percent of GDP in 2003 to 2.6 percent of GDP in 2008. As noted before, this increase took place at a time when GDP was rising rapidly—real GDP grew at a rate of 4 percent annually, and nominal GDP in U.S. dollar terms grew at a rate of 11 percent annually. The increase in HIV/AIDS-related spending relative to GDP is therefore equivalent to a nominal increase from US$150 million to US$348 million.

Figure 2.10: Health Expenditure across Countries, 2007



Source: WHO 2010c.

Table 2.2 summarizes funding sources for the HIV/AIDS response financing by broad category.[20] Much of the increase in HIV/AIDS-related spending has been financed by external support, which increased from 0.1 percent of GDP to 0.8 percent of GDP (and from US$12 million to US$112 million in absolute terms). Of this, the bulk was accounted for by bilateral financing (mostly from the United States, specifically the President's Emergency Plan for AIDS Relief), which accounted for about two-thirds of external support in 2007 and 2008. Notably, about 30 percent of external support came from other international sources, reflecting high levels of support from private international

Table 2.2: HIV/AIDS-Related Spending

	2003	2004	2005	2006	2007	2008
			(Percent of GDP)			
Total	1.9	2.1	2.2	—	2.7	2.6
Prevention	0.2	0.3	0.3	—	0.3	0.2
Treatment	1.0	1.1	1.1	—	1.3	1.3
Orphans and social mitigation	0.4	0.4	0.5	—	0.7	0.6
Other	0.2	0.2	0.3	—	0.4	0.5
Total	1.9	2.1	2.2	—	2.7	2.6
Public	1.7	1.7	1.7	—	1.7	1.7
Private	0.0	0.1	0.1	—	0.0	0.1
International	0.1	0.3	0.4	—	0.9	0.8
Bilateral					0.6	0.5
Multilateral					0.0	0.0
Other international					0.3	0.3
			(Pula millions)			
Total	741.0	974.5	1,134.5	1,676.0	2,047.4	2,358.7
			(US$ millions)			
Total	150.2	207.9	224.2	—	333.6	348.1
Memorandum item:						
GDP (US$ billions)	8.1	10.1	10.4	11.3	12.4	13.5

Sources: Ministry of State President and NACA (2008), NACA and UNAIDS (2007, 2010) for spending data, and IMF (2010a) for GDP.
Note: — = not available.

sources.[21] Meanwhile, spending from domestic sources (dominated by public spending) has remained flat relative to GDP. Public spending remained at about 1.7 percent of GDP, but increased from US$136 million to US$229 million per year in absolute terms.

From the perspective of public finance, the increased burden of HIV/AIDS, as far as it is evident from these HIV/AIDS line items, has therefore been met from two sources—the benign economic environment allowing the government to raise allocations toward the HIV/AIDS program in line with high rates of GDP growth, and the increase in external support. Looking forward (and considering the global economic development since 2008), it is not clear whether either of these sources will continue to meet the fiscal burden of HIV/AIDS. Botswana was hit hard by the global crisis, experiencing a decline in real GDP of 6 percent in 2009 and a depreciation against the U.S. dollar, so that GDP in U.S. dollar terms contracted by 14 percent.

In addition to the estimates of actual spending under the umbrella of the national HIV/AIDS response, which also identify the costs to the government, a number of studies have estimated further aspects of the fiscal costs of HIV/AIDS. BIDPA (2000) embeds an analysis of the fiscal costs of HIV/AIDS in a very comprehensive macroeconomic assessment. On the expenditure side, BIDPA distinguishes between employment costs (such as an increase in skilled salaries, death benefits and pensions, and training and recruitment costs), health spending (treatment), education spending (fiscal savings resulting from smaller cohorts), and social expenditures. While methodologically the BIDPA study remains an important benchmark, the estimates included are now obsolete.[22]

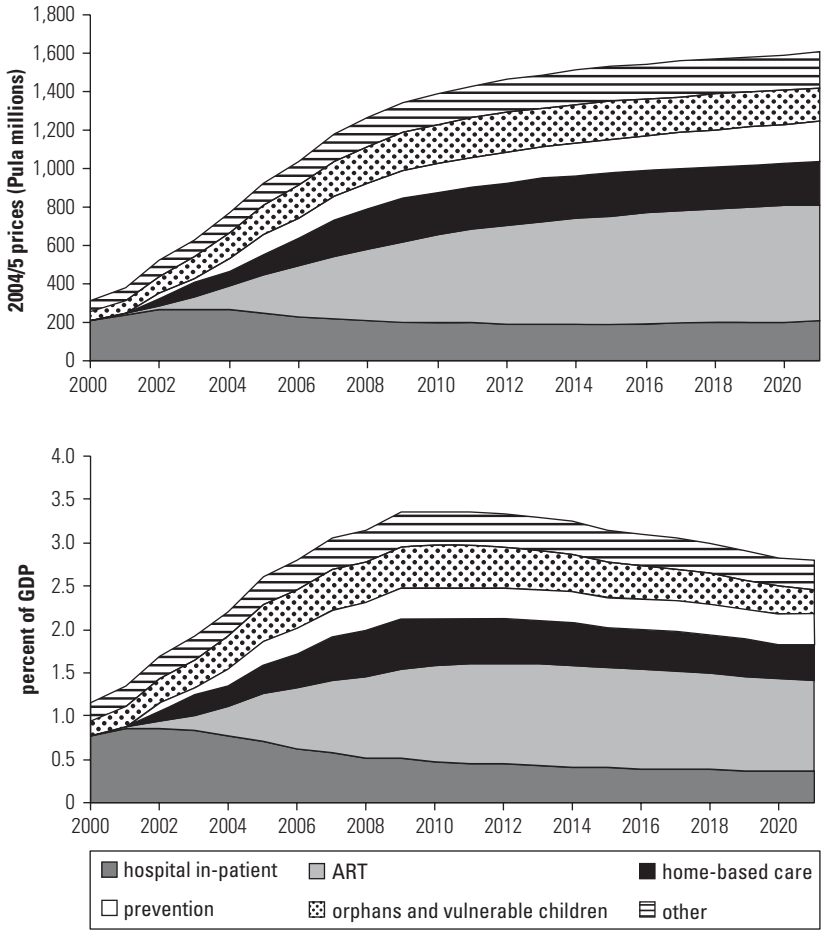
More recently, Jefferis, Siphambe, and Kinghorn (2006) assessed the fiscal impacts of HIV/AIDS, building in part on the framework developed by the BIDPA (2000) study, but refining the analysis in some directions. On the expenditure side, they itemize the costs of antiretroviral treatment, hospital inpatient costs, home-based care, prevention, program management, orphan support, and old-age pensions. According to their estimates (figure 2.11), HIV/AIDS-related expenditures are projected to peak in 2010 (at 3.4 percent of GDP) and gradually decline to 2.8 percent of GDP by 2021. Much of the initial increase is driven by the costs of antiretroviral treatment, whereas the cost of inpatient treatment declines.

Two additional studies are narrower in scope, but offer some relevant lessons for the context of this study. Picazo and David (2008) take stock of HIV/AIDS-related expenditures and financing needs implied by the National Strategic Framework (NSF). While their study adopts a much shorter time horizon, it provides a thorough analysis of the effectiveness of different types of HIV/AIDS-related interventions. They stress the need to increase funding for prevention measures, and identify inefficiencies resulting in higher costs for certain interventions.

Masha (2004) discusses some of the macroeconomic and fiscal repercussions of the NSF for HIV/AIDS 2003–9 (NACA 2003). Masha noted that:

> The NSF envisages a substantial allocation of resources to fighting the epidemic. However, through its demographic and macroeconomic effects, which in themselves are highly desirable, it also helps contain certain categories of expenditure, and, by mitigating the adverse effects of

Figure 2.11: Projected HIV/AIDS-Related Spending, 2000–21



Sources: a. Jefferis, Siphambe, and Kinghorn 2006; b. Jefferis, Siphambe, and Kinghorn 2006; authors' calculations.

HIV/AIDS on the tax base, it mobilizes domestic revenue to offset some of the fiscal costs of the program.

This study's analysis incorporates many of these indirect effects.

HIV/AIDS impact on government employees. The most visible HIV/AIDS impact on government capacity is the increase in morbidity and mortality among government employees. Increased absenteeism and sick leave, increased attrition, and the need to recruit new staff affect the ability of the government to conduct business and provide services, and these factors,

along with medical and death-related benefits, also add to the fiscal costs of HIV/AIDS.[23] The evidence available on these costs in Botswana is very limited. Two early studies of the education sector (Bennell and others 2001; Chilisa, Bennell, and Hyde 2001) document the upward trend in mortality and sick leave among staff (and students) through 1999, and a decline in mortality in 2000 attributed to the provision of antiretroviral treatment to public servants. These studies, however, are now outdated, cannot easily be generalized, and do not fully cover the costs relevant for this study.

The most tangible indicator of the impact of HIV/AIDS on public servants is the increase in mortality. The Ministry of State President and NACA (2008) reported 472 deaths among public servants in 2006/7, 460 in 2007/8, 400 in 2008/9, and 508 in 2009/10. This translates into mortality rates among public servants of about 0.4 percent for 2005/6 (applying an estimated number of government employees of 120,000, as reported by IMF [2007]), much lower than available estimates for mortality among the population aged 20–59, which was around 1.5 percent in 2005–10, according to the United Nations Population Division (2009b). In the absence of more specific data on HIV/AIDS impacts on public servants, this study used the mortality figures of the United Nations Population Division to assess the costs of increased mortality on public servants.[24]

Regarding the costs of increased **sick leave**,[25] government employees are assumed to take 90 days of sick leave in the year preceding death. Additionally, government employees receiving antiretroviral treatment are assumed to take 10 days of sick leave annually, which would cover the occasional visit to a clinic[26] and illness. Public servants may also use sick leave to care for sick dependents, but there is not sufficient data to include this factor in the calculations.

The costs of HIV/AIDS-related **medical benefits** are included in the estimates of the costs of the national HIV/AIDS program; however, these costs represent a significant share of the costs of the HIV/AIDS impact of on public servants. Therefore they are included here as a memorandum item. The number of government employees is about 120,000 (IMF 2007), and medical benefits schemes usually also cover the immediate family, therefore this study assumes that the scheme would cover about 200,000 adults, corresponding to about 20 percent of the population of aged 20–59.[27] If, accordingly, 20 percent of the costs of treatment and care under the national HIV/AIDS program can be attributed to medical benefits for government

employees and related costs, this would correspond to about 0.2 percent of GDP, or 3 percent of wages and salaries.

Attending **funerals** for AIDS-related deaths is an important reason for absenteeism for government employees. Chilisa, Bennell, and Hyde (2001) reported that the amount of leave taken for funeral attendance equaled about two-thirds of the leave taken for illness, for both students and staff. Bennell and others (2001) reported similar findings for staff in primary and secondary education in Botswana. To estimate the extent of absenteeism to attend funerals, Haacker's (2004) assumption was used, whereby each death results in 40 person-days for funeral attendance.

When discussing HIV/AIDS impacts on increased mortality among government employees, two other significant fiscal costs are **pensions and death-related benefits** (such as funeral grants). In Botswana, pensions for government employees are administered through the Botswana Public Officers Pension Fund, which operates a defined-contribution scheme. This means that contributions are paid into an individual account. In the event of death or retirement, the balance from the account is paid out or transformed into an annuity, either to the retiree or to surviving dependents. Consequently, increased mortality because of HIV/AIDS does not increase the costs of pension-related benefits to the government of Botswana.[28]

Costs resulting from **increased turnover of government employees** include administering the exit (due to death or retirement) of employees; advertising and filling a position, including financial costs such as advertising, but also staff time for selecting candidates and processing appointments; and productivity losses because new employees, or people moving to a new assignment, are learning on the job. Regarding the costs of administering the exit/filling a vacancy, this study assumes that these costs correspond to one month's salary of the position filled.[29] It is also assumed that the productivity of a new employee is 25 percent lower during the first year due to learning on the job, which is at the lower end of the range reported by Rosen and others (2004) for the private sector.[30]

Vacancy periods associated with increased attrition can also add to the disruptions of public services. The Directorate of Public Service Management (2009) indicates that it takes about two months to fill an advertised post. Because some time often elapses from the moment the need to fill a position arises to the time at which it is advertised, a vacancy period of three months appears plausible. However, unlike absenteeism, there are no salary

costs incurred during a vacancy period. Therefore it is not included in estimates of the financial or productivity costs of HIV/AIDS.

Finally, increased staff turnover because of HIV/AIDS-related attrition results in additional training costs.[31] These costs are difficult to quantify, and thus, as a memorandum item, this study includes a training cost of half a year of working time in the estimates of increased attrition costs.

Table 2.3 summarizes the estimates of the costs of the HIV/AIDS impact on government employees in 2008 based on an HIV/AIDS-related mortality of 1.5 percent and 11 percent of employees receiving treatment.[32] The costs of the impact of HIV/AIDS on public servants (excluding medical costs) account for 2.6 percent of wages and salaries and about 0.23 percent of GDP. The biggest cost item is sick leave, accounting for about half of the nonmedical costs. Including medical and related costs, the costs of the impact of HIV/AIDS on public servants reach 0.5 percent of GDP, or 5.6 percent of wages and salaries, of which medical costs account for almost three-quarters.[33]

IV. Modeling the Fiscal Dimension of HIV/AIDS

This analysis of the fiscal dimension of HIV/AIDS combines three elements: (1) estimates and projections of the state of the epidemic; (2) estimates and projections of the fiscal costs of HIV/AIDS; and (3) a simple model and assumptions describing the macroeconomic and fiscal context. The estimates and projections of the state of the epidemic were generated

Table 2.3: Costs of Impact of HIV/AIDS on Public Servants, 2008

	IN PERCENT OF . . .		
COSTS	WAGES AND SALARIES	GOVERNMENT EXPENDITURES	GDP
Sick leave	1.1	0.30	0.10
Funeral attendance	0.3	0.10	0.02
Increased turnover	0.5	0.10	0.04
Training	0.8	0.20	0.07
	0.7	0.23	2.60
Medical benefits (imputed)	2.9	0.80	0.25
Total	5.6	1.40	0.48

Source: Authors' estimates.

from a spreadsheet-based model that builds on assumptions regarding the number of new adult infections, and derives estimates of the number of people living with HIV/AIDS, people needing and receiving treatment, and HIV/AIDS-related deaths.[34] Additionally, the model estimates and projects the number of children living with HIV/AIDS and of orphans. Assumptions regarding the state and course of the epidemic were taken from NACA (2008) and Stover and others (2008), and updated in a number of places (for example, to incorporate the latest estimates of access to treatment). Underlying estimates of the size and the structure of the population were taken from United Nations Population Division (2009b). Looking forward, certain assumptions (for HIV incidence and coverage of a number of interventions directly affecting the course of the epidemic, such as treatment access and prevention of mother-to-child transmission) were calibrated in line with targets contained in the draft National Strategic Framework for HIV/AIDS 2010–16.

The estimates of the fiscal costs of HIV/AIDS are based on coverage rates of key interventions included in the draft National Strategic Framework 2010–16, available estimates of actual HIV/AIDS-related spending (notably NACA and UNAIDS 2009), and studies of the macroeconomic impact and costs of HIV/AIDS (such as Jefferis, Siphambe, and Kinghorn 2006). Additionally, this analysis includes an allowance for the costs of the impact of HIV/AIDS on public servants, as discussed earlier.

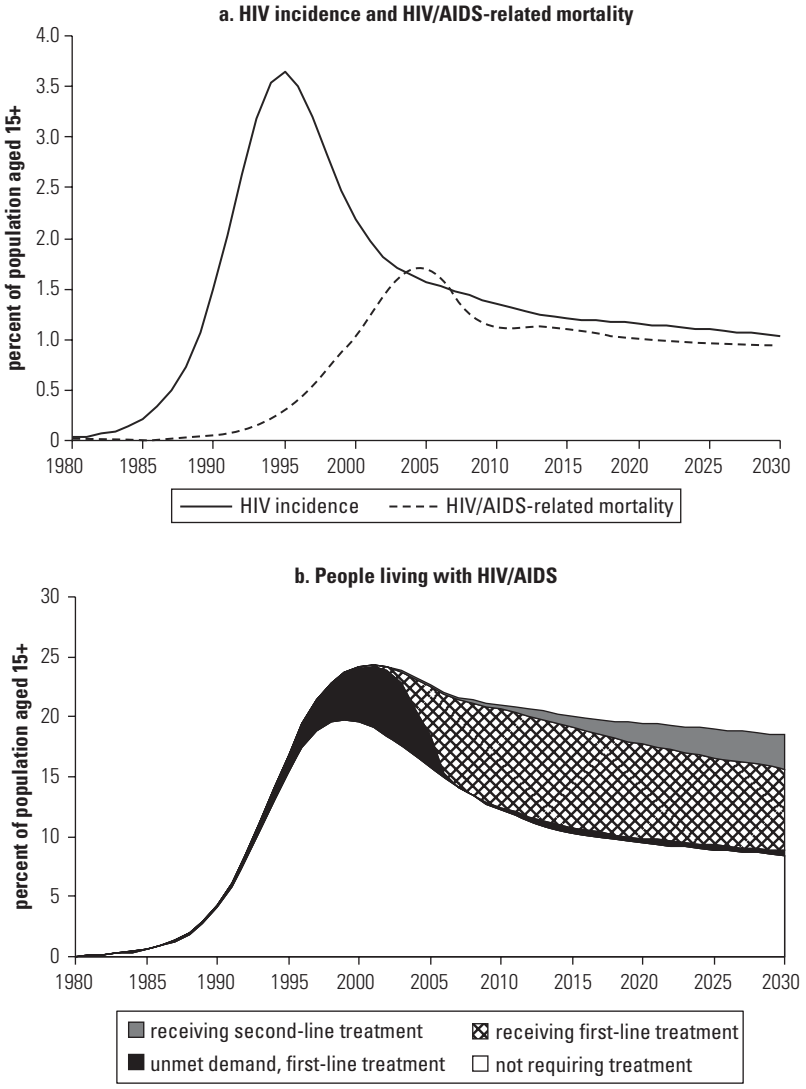
The assumptions regarding the **fiscal context** have already been explained in this paper and summarized in figure 2.7. Because the projections extend over two decades, they incorporate expectations regarding declining government revenues from mining, a decline that—according to NDP 10—is projected to occur starting around 2015 (in the period that would be covered by NDP 11).[35] As government revenues (relative to GDP) slow down, government expenditures correspondingly grow more slowly (and decline relative to GDP).

Especially over the longer run, the fiscal analysis also needs to take into account the **macroeconomic consequences** of HIV/AIDS. Notably, the working-age population grows more slowly as a consequence of HIV/AIDS,[36] and the studies of the macroeconomic impact of HIV/AIDS discussed earlier indicate that this translates into lower GDP growth and thus lower government revenues. To capture these macroeconomic consequences of HIV/AIDS (and their fiscal repercussions), the analysis builds on a simple macroeconomic framework (discussed in the appendix).

The state and course of the epidemic

Figure 2.12 summarizes the estimates and projections of the course of the epidemic for the population aged 15+. The critical factors driving changes in the number of people living with HIV/AIDS—HIV incidence

Figure 2.12: Estimates and Projections on the State of the HIV Epidemic, 1980–2030



Source: Authors' estimates and projections.

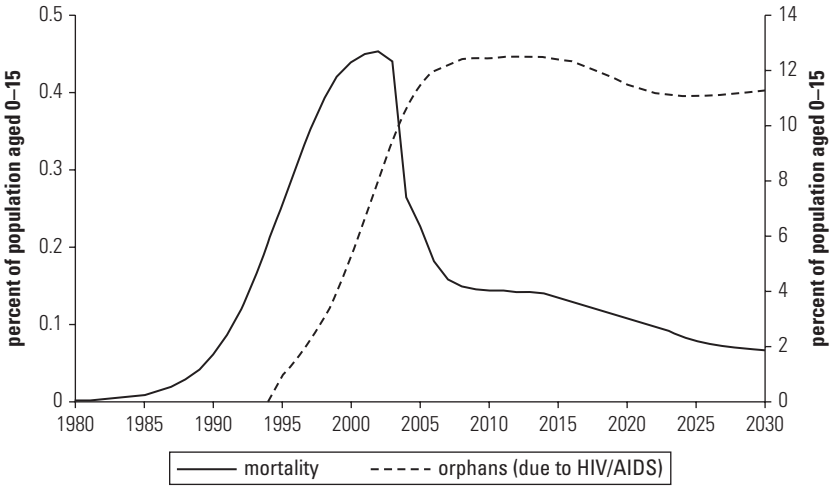
and HIV/AIDS-related mortality—are summarized in figure 2.12a. Until the mid-1990s, increasing HIV prevalence was driven by escalating HIV incidence, which peaked at 3.6 percent of the adult population in 1995. HIV/AIDS-related mortality did not yet play an important role in this early phase, but accelerated sharply from 0.1 percent of the population aged 15+ in 1992 to 1.7 percent of this population in 2005. Meanwhile, HIV incidence declined between 1995 and 2005, and for two years, fell below the level of mortality, so that the number of people living with HIV/AIDS declined in absolute terms. Between 2005 and 2010, mortality declined sharply, reflecting the increased availability of treatment. This study's projections envisage further gradual declines in HIV incidence rates and in HIV/AIDS-related mortality (except for a small rebound in 2011–13). Because incidence remains higher than mortality, the number of people living with HIV/AIDS continues to increase slowly over the projection period, from 280,000 in 2010 to 320,000 in 2030.

One result of the increased access to antiretroviral treatment is the significant increase in the number of people living with HIV/AIDS, who on average survive much longer compared to the period before 2002, when access to treatment was still very limited. While HIV prevalence decreases steadily from a peak of 24 percent in 2002 and 21 percent in 2010 to 18 percent in 2030 (figure 2.12),[37] the number of people receiving treatment increases sharply, rising from close to zero in 2000 to 8.6 percent of the adult population in 2010 (40 percent of people living with HIV/AIDS) and 9.6 percent of the adult population (52 percent of people living with HIV/AIDS) by 2030.

During this time, there is a shift among people receiving treatment (figure 2.12b). The number of people receiving first-line antiretroviral treatment peaks at 8 percent of the adult population by 2013 and subsequently declines slowly to 6.8 percent by 2030. Meanwhile, the number of people receiving second-line therapy rises sharply, from 0.4 percent of the adult population in 2010 to 2.8 percent in 2030, corresponding to 29 percent of people receiving treatment.

One important demographic aspect of HIV/AIDS is its impact on the youth population (figure 2.13). Mortality drops sharply (by two-thirds) between 2002 and 2008, reflecting not only increased access to pediatric treatment, but also—even more important—a reduction in mother-to-child transmission, lowering the number of new infections in utero or at birth.

Figure 2.13: Impact of HIV/AIDS on Youth Population, 1980–2030



Source: Authors' estimates and projections.

The number of orphans, however, continued to increase between 2005 and 2010. This reflects lower HIV infection rates among children from mothers living with HIV and longer survival rates among children living with HIV, as well as the fact that orphan numbers depend on adult mortality over an 18-year period, and mortality in 2005–10 was still high relative to the 18-year average.

Assumptions regarding fiscal costs of HIV/AIDS

In addition to the macroeconomic and fiscal assumptions summarized above, and the estimates and projections of the state of the epidemic, this study's estimates of the fiscal costs of HIV/AIDS are based on the draft NSF 2010–16. Estimates and projections of the costs of implementing the NSF were not available at the time of writing. Instead, estimates were derived from data on actual HIV/AIDS-related spending (for example, NACA and UNAIDS 2009), available estimates of the costs of some key components of the HIV/AIDS program (for example, Marlink 2009), prior and ongoing work (for example, Jefferis, Siphambe, and Kinghorn

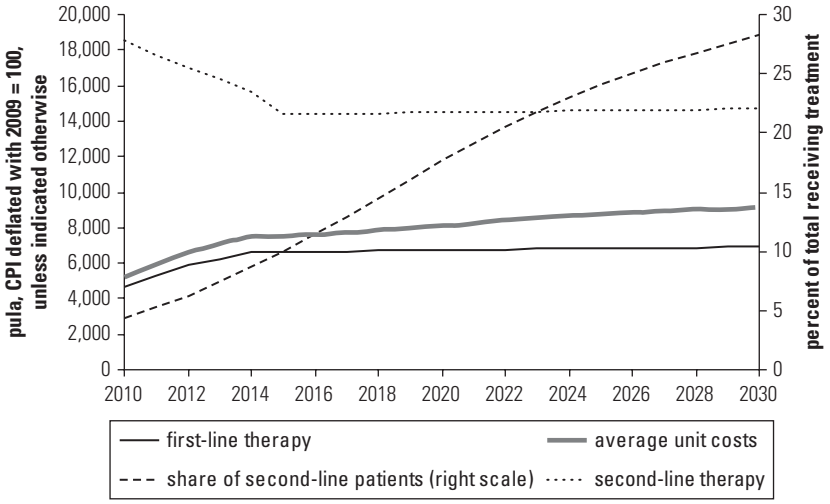
[2006], or Jefferis [2010], and some international data, for example, projected drug prices. The most important targets under the NSF included are:

- Proportion of persons aged 15–49 years who have tested within the last 12 months and know their HIV status: rising to 60 percent.
- Proportion of HIV-positive pregnant women accessing universal HAART (highly active antiretroviral treatment): rising to 90 percent.
- Proportion of HIV-positive persons accessing integrated HIV, tuberculosis, and sexual and reproductive health services: rising to 80 percent.
- Proportion of HIV-positive children and adolescents accessing a package of HIV/AIDS treatment, care, and support: rising to 90 percent.
- Proportion of population in need who access comprehensive quality community- and home-based care services: rising to 80 percent.
- Percentage of households with orphaned and vulnerable children receiving free basic external support for care and support: rising to 70 percent.

Because treatment costs account for a substantial proportion of the fiscal costs of HIV/AIDS, it is useful to spell out the relevant assumptions in some more detail (see also figure 2.14). This study assumes that the government of Botswana will gradually assume the full costs of drugs that are currently donated (in line with Marlink [2009]). For this reason, the costs of first-line antiretroviral treatment and pediatric treatment are increasing over the first years of the projections, from P 3,800 to P 6,600 by 2015 (full costs, including drugs and any other expenses), and P 6,900 by 2030 (including a small allowance for real wage increases). The costs of second-line drugs are assumed to decline through 2016 (in line with Stover [2009]), and remain at about that level through 2030 (again, making a small allowance for real wage increases).

The second key factor driving the unit costs of treatment is the increasing role of second-line treatment (also figure 2.12b). This is playing a subordinate role in 2009 (4 percent of people receiving treatment), but the share of people receiving second-line treatment is expected to rise steadily, because an increasing number of people reach a stage at which first-line treatment is no longer effective. With the increasing role of more expensive forms of treatment, the average unit costs of treatment increase.[38]

Figure 2.14: Unit Costs for Antiretroviral Therapy, 2010–30



Source: Authors' calculations.

In addition to the different components of the NSF, this analysis covers certain budget line items that are not covered by the NSF, but nevertheless form part of the fiscal costs of HIV/AIDS. Specifically, certain allowances for the costs of HIV/AIDS on government employees, which are covered in more detail in the section on the impact of HIV/AIDS on government employees.

However, for lack of data availability, this analysis does not capture certain social expenditures (other than orphan allowances) affected by HIV/AIDS, such as old-age pensions[39] and destitution allowances.[40] Because increased mortality among the working-age population reduces the probability of reaching age 65, HIV/AIDS reduces expenditures on old-age pensions. However, with total costs of old-age pensions at about 0.2 percent of GDP, these fiscal savings are a small share of HIV/AIDS costs. Because HIV/AIDS increases the risk of poverty, it does have an impact on the uptake of destitution allowances. However, increased mortality also reduces the number of people qualifying for destitution allowances, so that the net costs are lower than the gross fiscal costs of HIV/AIDS.

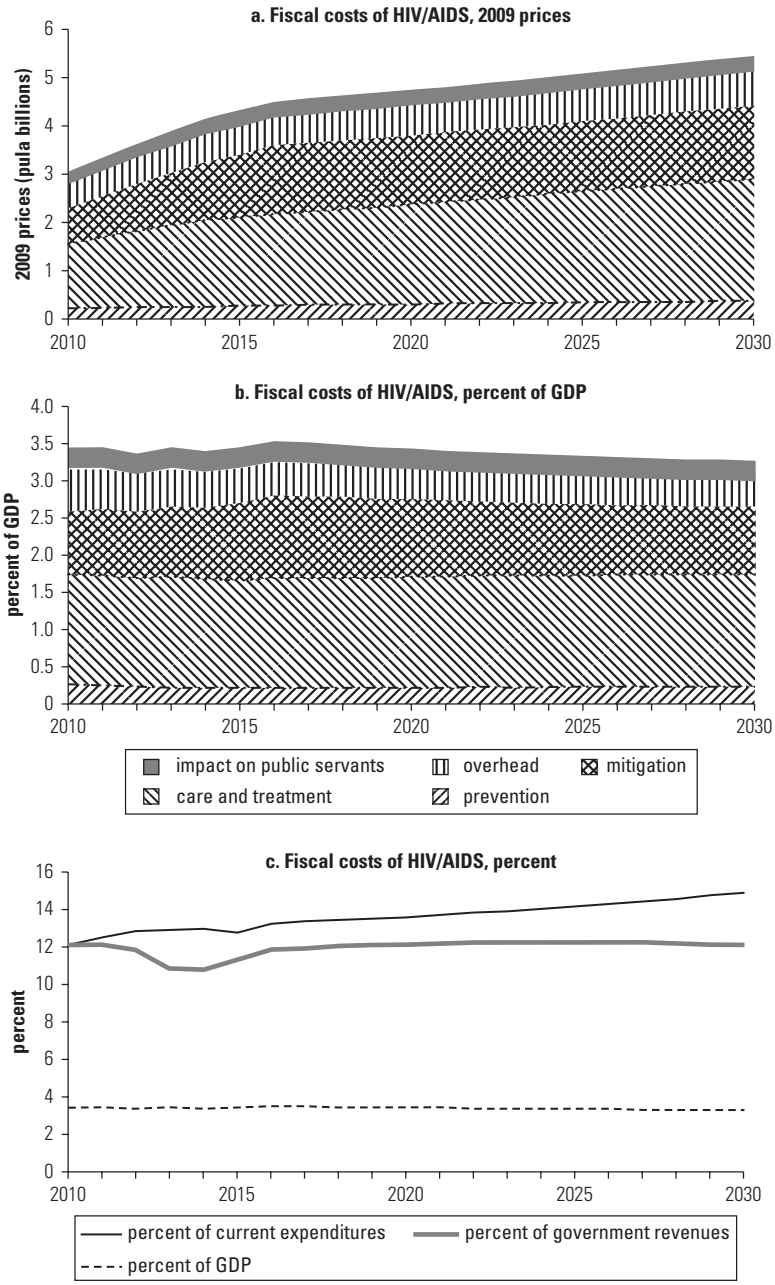
Fiscal dimensions of HIV/AIDS and the HIV/AIDS program

Figure 2.15 summarizes this study's projections of the fiscal costs of HIV/AIDS. In absolute terms, the costs increase steadily over the projection horizon, almost doubling from P 3 billion in 2010 to P 5.5 billion in 2030. The biggest component of the fiscal costs of HIV/AIDS, and the factor that dominates the increase in costs, is the cost of care and treatment, which increases from P 1.3 billion (43 percent of total) to P 2.5 billion (46 percent of total), reflecting the increasing number of people receiving treatment (rising from 119,000 in 2010 to 168,000 in 2030), and the increasing use of second-line treatment over this period. Another important factor is the increase in the costs of mitigation, which reflects the increase in the number of orphans through much of the projection period (discussed above), increasing from P 0.8 billion to P 1.5 billion (25 and 28 percent of total, respectively), whereas the costs of prevention programs increase from P 0.2 billion in 2010 to P 0.4 billion in 2030 (remaining at 7 percent of total). The impact of HIV/AIDS on public servants (excluding treatment and other costs already counted in the other cost categories) amounts to about P 0.3 billion throughout the projection period, and declines from 0.3 percent of GDP in 2010 to 0.2 percent of GDP in 2030.

As the macroeconomic and fiscal context evolves over the projection period, the fiscal costs of HIV/AIDS are also related to GDP (figure 2.15b) and government revenues and expenditures. Between 2010 and 2014, the economy is expected to rebound from the economic crisis.[41] While the costs of HIV/AIDS increase sharply over this period in absolute terms, they remain at about 3.5 percent of GDP. While the fiscal costs of HIV/AIDS continue to increase through 2030, the fiscal burden declines slowly, so that the fiscal costs of HIV/AIDS account for 3.3 percent of GDP by the end of the projection period.

Meanwhile, the fiscal burden of HIV/AIDS—measured against the scale of government operations—changes considerably. This is because government revenues are highly dependent on rents from resource extraction, and decline more than proportionally as the share of resource extraction in GDP contracts. Following the projected economic recovery, the fiscal costs of HIV/AIDS therefore rise from 10.8 percent of government revenues in 2013 to 12.2 percent of government revenues in 2021. Relative to current expenditures (which fluctuate less than government revenues), the shift in the fiscal burden of HIV/AIDS is even more pronounced, because fiscal

Figure 2.15: Projected Costs of HIV/AIDS Program, 2010–30



Source: Authors' estimates and projections.

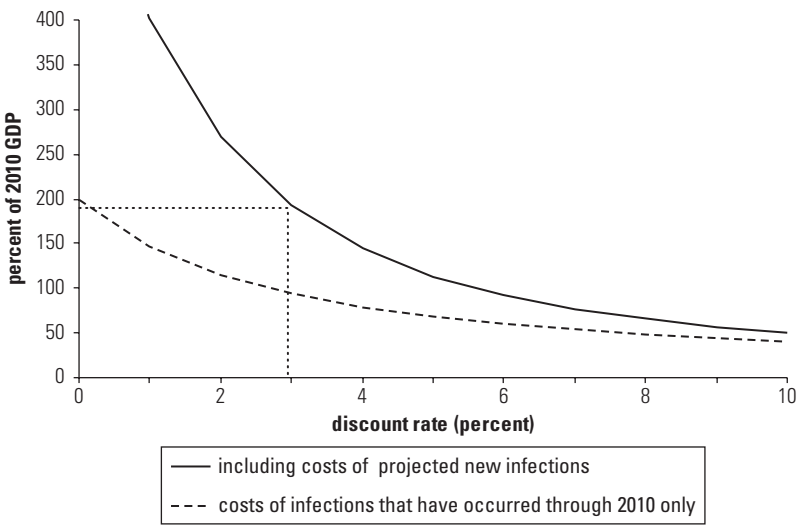
costs are projected to increase from 12.1 percent of current expenditures in 2010 to 13.7 percent of current expenditures by 2021.

HIV/AIDS as a fiscal liability

Because the impacts of HIV/AIDS incur fiscal costs that are highly persistent, these costs in any given year are a very incomplete and imperfect measure of the epidemic's impact. For this reason, the previous section discussed how the projected fiscal costs of HIV/AIDS evolve over time (figure 2.15). The persistence of the costs of HIV/AIDS also means that these costs are similar to a debt that needs to be served over a long period of time. This means that instruments commonly used to analyze a country's indebtedness and debt sustainability can be adapted to assess the implications of HIV/AIDS and of alternative HIV/AIDS policies for the government's fiscal space and fiscal sustainability.

With these considerations in mind, figure 2.16 provides estimates of the present discounted value (PDV, the most common summary indicator of the magnitude of a liability) of the fiscal costs of HIV/AIDS.[42] Because the PDV

Figure 2.16: Present Discounted Value of the Fiscal Costs of HIV/AIDS, as of 2010



Source: Authors' estimates and projections.

of a liability over long periods is highly sensitive to the discount rate, this study uses estimates of the PDV for discount rates between 0 percent and 10 percent. Using a discount rate of 3 percent (not unlike the real interest rate at which the government would be able to borrow), the overall fiscal burden of HIV/AIDS corresponds to 197 percent of GDP.

Because a large share of HIV/AIDS costs are for infections that occurred in the past, and because projected new infections also depend on the success of HIV/AIDS-related policies, another useful indicator is the PDV of infections that have already occurred. At 94 percent of GDP, these costs account for about half of the projected fiscal burden. This burden, like social security obligations, can be interpreted as a quasi-fiscal liability, restricting fiscal space in the future in a way similar to public debt. While it does not raise any immediate issues regarding the sustainability of the state of public finance (because of Botswana's high level of external reserves and very low public debt), it does illustrate the extent to which the fiscal burden of HIV/AIDS compresses fiscal space in Botswana.

To place these estimates into perspective, these costs can be compared to those of natural disasters. Rasmussen (2004) estimated that natural disasters have, "on average, affected over 2 percent of the population each year and caused more than one half of 1 percent of GDP in damage" in developing countries. Richter Hume (2005) estimated that the overall damage (a more comprehensive measure than the fiscal impact focused on in this study) from the December 2004 tsunami amounted to 4.5 percent of GDP in Sri Lanka, 0.5 percent of GDP in Indonesia, one-third of a percent of GDP in Thailand, and less than one-quarter of a percent of GDP in India. Only in Maldives did the overall costs of the impact of the tsunami (about half of GDP) resemble the fiscal costs estimated for the HIV/AIDS impacts in Botswana. In summary, the *overall* economic costs of natural disasters are normally lower than the fiscal costs of HIV/AIDS that occur in Botswana *each year*.

HIV incidence and the costs of HIV/AIDS

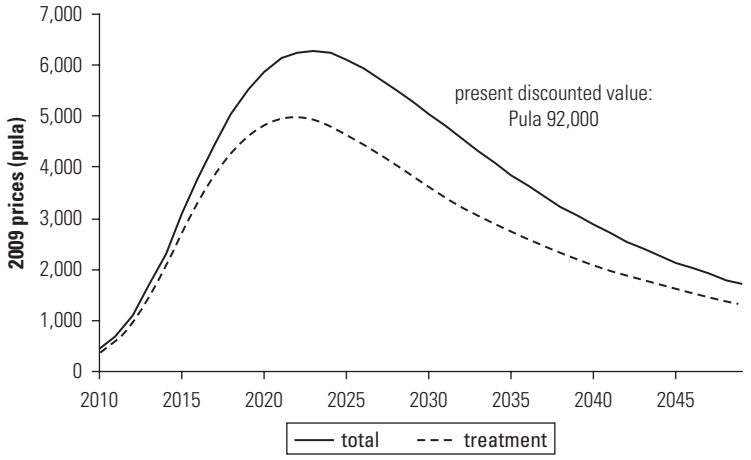
The *2008 Report on the Global AIDS Epidemic* (UNAIDS 2008) highlights intensified HIV prevention as a prerequisite to attaining and sustaining comprehensive treatment access.[43] While prevention, HIV incidence, and treatment need are obviously linked, the long lags between infection and treatment mean that fiscal savings occur only after many years in addition

to being spread over many years, while the costs of increased prevention occur immediately. These long lags make an assessment of the link between HIV incidence and the costs of an HIV/AIDS program difficult.[44]

The interpretation of the fiscal costs of HIV/AIDS as a quasi-liability, that is, a fiscal commitment, can be expanded to obtain a sharper analysis of the links between HIV incidence (and the outcomes of prevention programs) and the fiscal costs of HIV/AIDS. Analysis proceeds in two steps: first is the impact of one additional infection on the fiscal costs of HIV/AIDS, and second, a macroeconomic analysis is provided that attributes the fiscal costs of HIV/AIDS to the points in time at which they are ultimately incurred, that is, when an infection occurs.

Figure 2.17 presents estimates of the costs of one additional HIV infection, assumed to occur in 2010, including the costs of treatment as well as indirect consequences such as the costs of orphan support and of pediatric treatment (necessary because of mother-to-child transmission).[45] Estimates suggest that the expected annual costs caused by one additional HIV infection occurring in 2010 rise to P 6,300 by 2024, and decline subsequently. These costs are dominated by the costs of treatment (also shown in figure 2.17), which peaks at close to P 5,000.[46] Overall, the fiscal cost incurred by one additional infection (measured by the PDV, applying

Figure 2.17: Costs of One Additional Infection



Source: Authors' calculations.

a discount rate of 3 percent) is approximately P 92,000, that is, about two times GDP per capita.

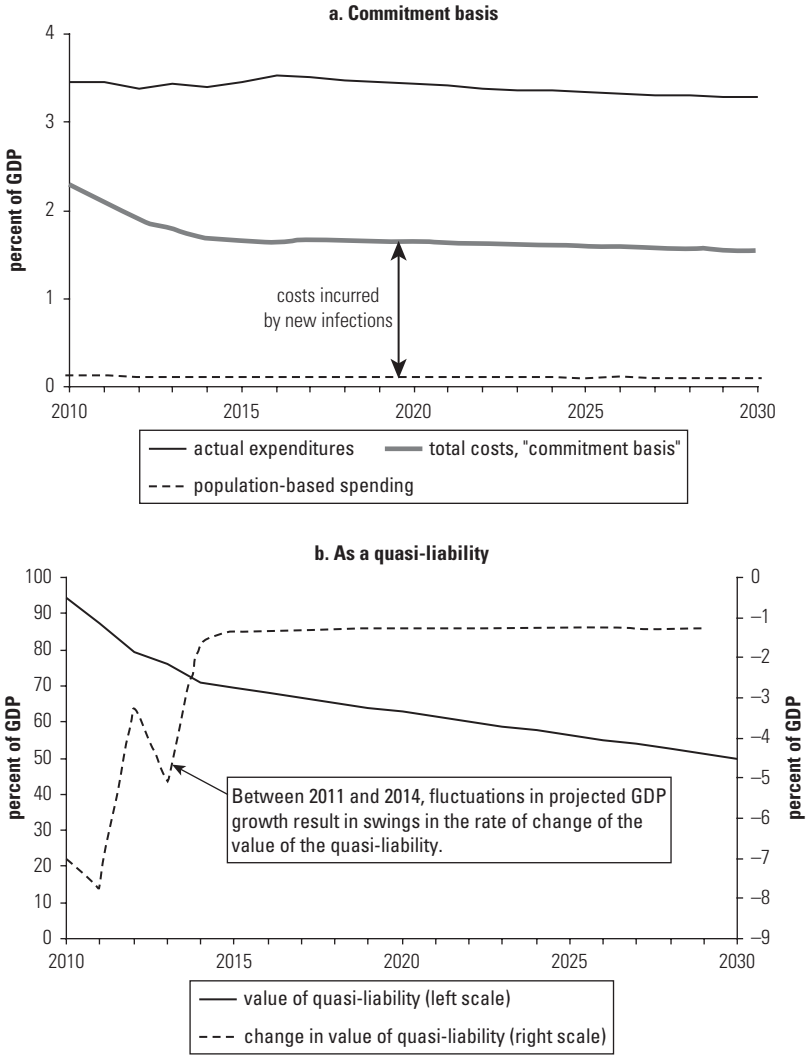
This microeconomic analysis of the high cost of one additional infection is in sharp contrast with the macroeconomic perspective, whereby changes in HIV incidence affect the fiscal costs of HIV/AIDS only with very long lags. Below, the study attempts to reconcile the microeconomic and macroeconomic perspectives by analyzing the fiscal costs of HIV/AIDS on a "commitment" basis, that is, attributing the bulk of the costs of HIV/AIDS to the point in time at which they are actually incurred, that is, the time of infection.[47] To this end, the costs incurred by one additional infection for each year are calculated, and multiplied by the number of projected infections in that year. To this, we add projected expenditures not linked directly to HIV prevalence (essentially, certain prevention measures targeting the entire population), because these are not captured by the incremental analysis.

Figure 2.18 shows that the costs of HIV/AIDS on a commitment basis are much lower than actual spending on HIV/AIDS (figure 2.18a), accounting for less than half of projected spending. This reflects that most of the current costs of HIV/AIDS address the needs of people living with HIV/AIDS who were infected in the past. Compared to actual expenditures, the lower and declining costs of HIV/AIDS on a commitment basis thus reflect that HIV incidence has slowed down, and—eventually—HIV/AIDS-related spending will decline.

Figure 2.18b takes this point further, showing how the quasi-fiscal liability of HIV/AIDS costs (measured by the PDV of the costs of infections that have already occurred, as described in figure 2.16) evolves over time. Over the first few years of the projection period, it declines sharply, primarily because GDP growth is high, and the value of the quasi-liability is shown relative to GDP. From 2015 on, the rate of decline is much lower, and primarily reflects that the costs newly incurred are lower than actual spending. Overall, the value of the quasi-liability implied by the HIV/AIDS program declines from 94 percent of GDP in 2010 to 50 percent of GDP by 2030.

This analysis of HIV/AIDS as a quasi-liability highlights three important facts: first, the extraordinary magnitude of HIV/AIDS when interpreted as a fiscal shock, which would raise questions regarding fiscal sustainability if the government's fiscal position was not relatively benign at the outset. Second, the analysis underscores the fiscal necessity in reducing HIV incidence rapidly, with each infection adding the equivalent of about two times GDP

Figure 2.18: Fiscal Costs of HIV/AIDS, "Commitment Basis," 2010–30



Source: Authors' estimates and projections.

per capita to the fiscal burden. Third, the analysis identifies the changes in the fiscal position that occur over the projection period, largely reflecting the projected declines in HIV incidence, resulting in an improved fiscal position as the quasi-fiscal liability implied by the HIV/AIDS program declines from 94 percent of GDP to 50 percent of GDP. Thus, while the

fiscal cost of HIV/AIDS is and will remain extraordinarily high over the next decades, the fiscal burden will ease considerably over this period.

The role of external assistance

As observed earlier, external assistance has played an important role in financing Botswana's HIV/AIDS response. However, unlike most countries facing a severe HIV/AIDS epidemic, Botswana receives very little external assistance. To understand the potential role for external financing to alleviate the fiscal burden of HIV/AIDS in Botswana, this section first puts the external support Botswana's HIV/AIDS program in an international context and follows up with the discussion of external assistance's potential to ease the HIV/AIDS burden.

Table 2.4 highlights the role of external assistance in financing Botswana's HIV/AIDS program. According to NACA and UNAIDS, external assistance accounted for about 30 percent of the costs of the HIV/AIDS program in 2008–10. A unique aspect of external support is the role of private international assistance (notably the Gates Foundation, Merck, and the

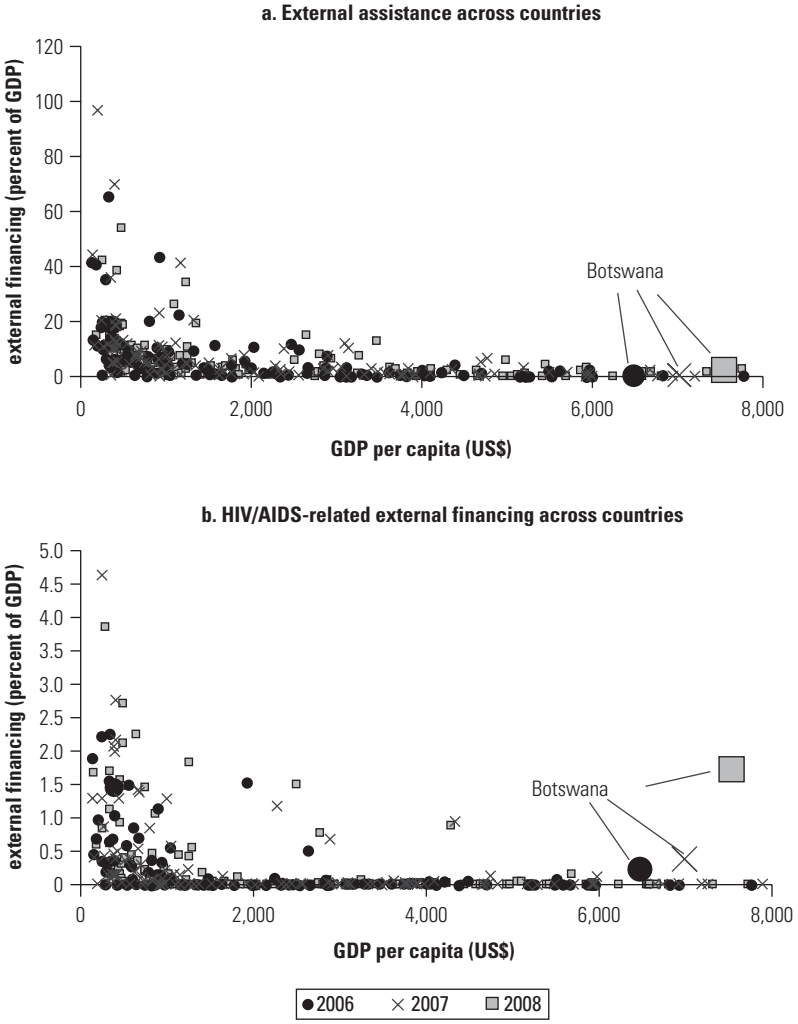
Table 2.4: Botswana: Financing of HIV/AIDS Program

	2006	2007	2008
		(Percent of GDP)	
Total	—	2.7	2.6
Public	—	1.7	1.7
Private	—	0.0	0.1
International	—	0.9	0.8
Bilateral	0.0	0.6	0.5
Multilateral	0.0	0.0	0.0
Other international	0.0	0.3	0.3
		(Percent of total costs)	
Total	—	100.0	100.0
Public	—	64.5	65.7
Private	—	1.9	2.2
International	—	33.6	32.1
Bilateral	—	23.8	20.8
Multilateral	—	0.5	0.4
Other international	—	9.3	10.8
		Memorandum item	
Total costs (US$ millions)	—	333.6	348.1

Sources: NACA and UNAIDS (2010), and IMF (2010a) for GDP.

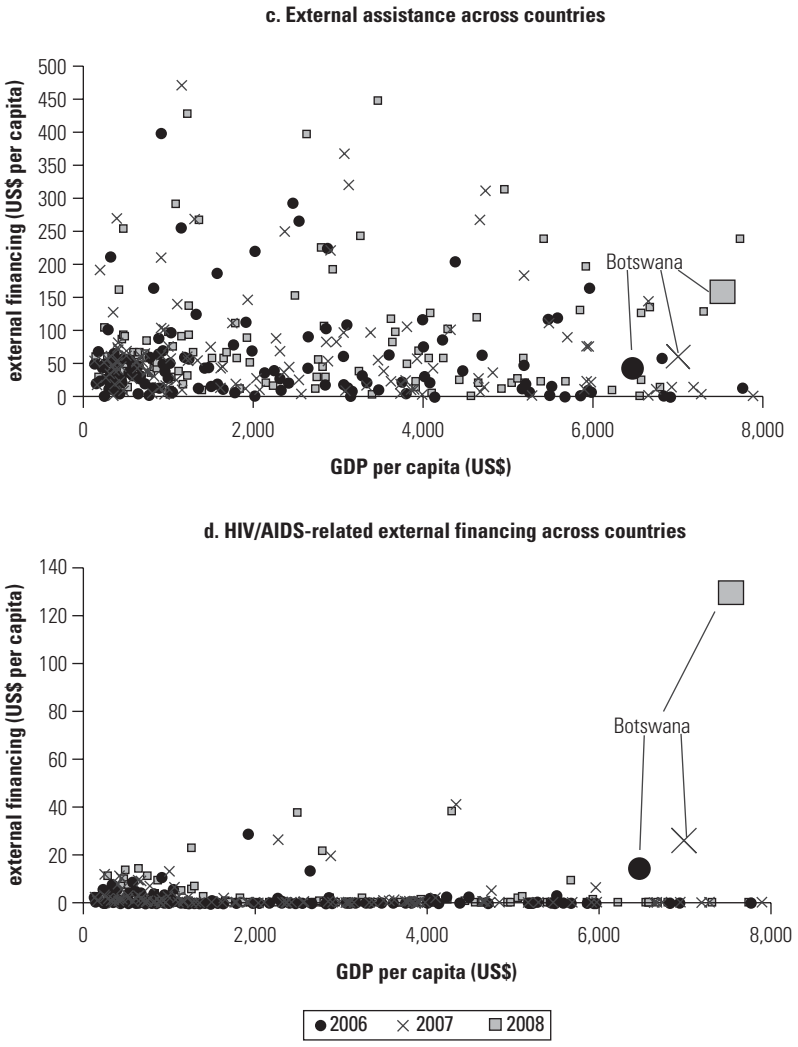
Note: — = not available.

Figure 2.19: External Assistance across Countries, 2006–08



Clinton Foundation), which accounted for about one-third of external support, and 10 percent of the costs of the HIV/AIDS program.

To appreciate the magnitude of external support for Botswana's HIV/AIDS program, it is useful to place it in an international context. Comprehensive data on official assistance (bilateral and multilateral) are compiled for the most important donor countries by the OECD (OECD 2010), but comparable data are not available for private institutions.



Sources: OECD (2010); IMF (2010a).

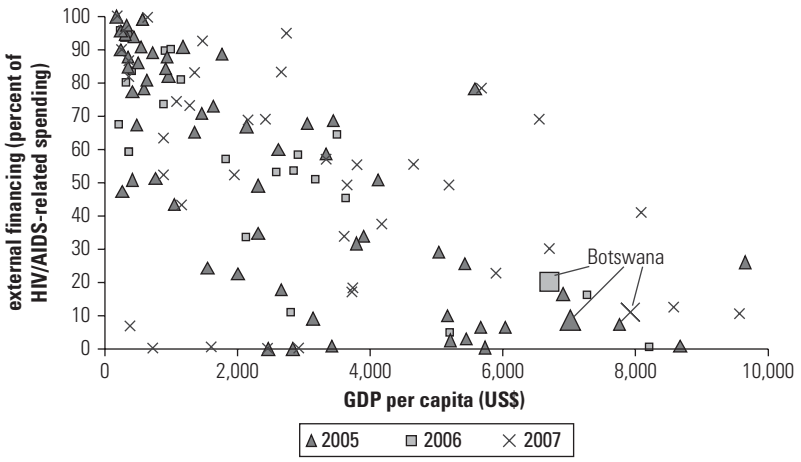
Narrowing the focus of cross-country analysis to official assistance, of course, is an important limitation, but it allows the net to be cast much wider than it would be otherwise possible. Figure 2.19 summarizes available data on external assistance overall[48] and HIV/AIDS-related external assistance.[49] Figure 2.19a shows that external aid overall plays a modest

role from a macroeconomic perspective, reaching 2.1 percent of GDP in 2008 (and lower levels earlier). As evident from figure 2.19b, a large proportion of the external assistance received by Botswana in recent years is related to the HIV/AIDS response, increasing from one-third of total aid disbursements in 2006 to 80 percent of total aid disbursements in 2008.

The high levels of Botswana's external support are also shown in figure 2.19d, which shows HIV/AIDS-related external financing in terms of dollars per capita. In any year covered, external support to Botswana's HIV/AIDS program was among the highest globally, especially in 2008—disbursements of US$130 per capita represent an outlier, the next highest annual disbursements on a per capita basis accrued to Namibia in 2007 (US$41) and 2008 (US$38).

High levels of external support to Botswana, of course, reflect the extraordinary burden of disease (and fiscal pressures) the country is facing. This becomes clear when external support is related to the costs of the HIV/AIDS program. Figure 2.20 shows external support as a percentage of total HIV/AIDS program spending using data from UNAIDS (2008). It appears that the extent of external support (relative to the costs of the HIV/AIDS program) primarily reflects a country's level of GDP per capita. While between 80 percent and 100 percent of HIV/AIDS-related spending are covered by external support for most low-income countries, this rate is

Figure 2.20: External Financing of HIV/AIDS Programs across Countries



Source: Author's calculations, based on UNAIDS (2008) and IMF (2010a).

lower at higher levels of GDP per capita.[50] The high levels of external support enjoyed by Botswana thus reflect the high costs of the HIV/AIDS program, and—judging from figure 2.19—the extent of external support appears to be in line with international norms.[51]

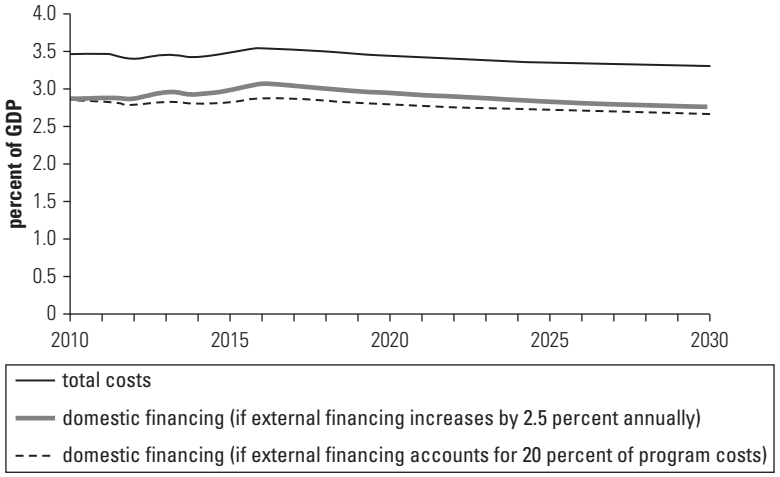
Projecting the extent of external assistance, especially over the 20-year horizon covered by this analysis, is a speculative exercise, particularly in light of the increased uncertainty regarding the state of the global economy and the deteriorated state of public finance in some of the major donor countries. Nevertheless, this study provides a quantitative exercise to illustrate the implications of external assistance for the HIV/AIDS burden. The fiscal burden of HIV/AIDS is analyzed in two scenarios. The first describes a situation in which external support is demand driven, with donors continuing to support the HIV/AIDS program at a given rate. In the second scenario, HIV/AIDS financing may not grow faster than the level of GDP of main donor countries, so that budget allocations for HIV/AIDS external assistance remain constant relative to donors' GDP. Specifically, the scenarios assume:

(1) External assistance indefinitely accounts for 20 percent of the costs of the HIV/AIDS program, but not of the costs of the impact of HIV/AIDS on public servants, which are assumed to be fully covered from domestic fiscal resources.

(2) External assistance starts out at 20 percent of the costs of the HIV/AIDS program in 2010, and grows at a rate of 2.5 percent annually, which is about the rate of growth of major donor countries historically, and projected by IMF (2010b) through 2015.

The outcomes of the two scenarios in terms of domestic financing needs are summarized in figure 2.21. With external support of 20 percent of HIV/AIDS program costs, domestic financing needs hover just below 3 percent of GDP. Thus, the fiscal burden of HIV/AIDS remains very high, and the PDV of the costs of HIV/AIDS amounts to 156 percent of GDP (the PDV of the total costs equals 192 percent of GDP). Beyond the very high fiscal burden in this scenario, it appears that Botswana is not very vulnerable to a slowdown in external financing. This not only reflects the limited role of external financing, but also that the program had been fully developed from the outset, and that the increase in spending projected over the coming years is less steep than in most other countries.

Figure 2.21: External Support and Domestic Financing Needs



Source: Authors' estimates and projections.

V. Conclusions

The scale of the HIV epidemic in Botswana brings extraordinary challenges in responding to the epidemic. The objectives of this study were to assess fiscal policy challenges arising from the HIV/AIDS response, develop tools to better understand the links between the HIV/AIDS program and the fiscal costs of HIV/AIDS, and thus inform the planning of the national HIV/AIDS response, and fiscal planning in general.

Specifically, the study:

(1) Provided a comprehensive analysis of the fiscal costs of HIV/AIDS, with a wider scope than a costing analysis that typically focuses only on the policy response to HIV/AIDS.

(2) Embedded the analysis of the HIV/AIDS costs in a discussion of the fiscal context, and interpreted these costs as a quasi-liability.

(3) Developed tools to assess the (fiscal dimension of) trade-offs between HIV/AIDS policies and measures that account for the persistence of the spending commitments.

Regarding the scale of the HIV/AIDS impact, this study's estimates and projections suggest that the fiscal costs of HIV/AIDS will rise from P 3 billion (2010) to P 5.5 billion by 2030. Relative to GDP, the fiscal costs peak at 3.5 percent of GDP around 2016, and slowly decline to 3.3 percent of GDP by 2030. The biggest component of the fiscal costs of HIV/AIDS is the cost of care and treatment, increasing from P 1.3 billion (43 percent of total) to P 2.5 billion (46 percent of total), reflecting the increasing number of people receiving treatment, as well as the increasing role of second-line treatment over this period. Mitigation expenses (largely in support of the increasing number of orphans) are expected to increase from P 0.8 billion to P 1.5 billion (25 and 28 percent of total HIV/AIDS costs, respectively), whereas the costs of prevention programs increase from P 0.2 billion in 2010 to P 0.4 billion in 2030 (remaining at 7 percent of total HIV/AIDS costs). The impact of HIV/AIDS on public servants (excluding treatment and other costs already counted in the other cost categories) amounts to about P 0.3 billion throughout the projection period and declines from 0.3 percent of GDP in 2010 to 0.2 percent of GDP in 2030. Unlike, for example, in South Africa, social expenditures other than orphan care do not appear to play a large role in the fiscal costs of HIV/AIDS in Botswana.

These costs occur over a period in which government revenues are projected to slow down because of an expected decline in mineral revenues. Consequently, the projected fiscal costs increase from 10.8 percent of government revenues in 2013 and 2014 to over 12 percent of government revenues from 2018. One of the crucial aspects of the fiscal dimension of HIV/AIDS is the persistence of the costs incurred by the impact of and the response to HIV/AIDS. Overall, the PDV of HIV/AIDS fiscal costs is 192 percent of GDP if the costs of projected infections are included, or 94 percent of GDP if only the costs committed as a result of infections that have already occurred are included. Even taking into account that the HIV/AIDS response in Botswana has partly been financed through external support, and that the fiscal context is relatively benign (though with difficult challenges lying ahead), these estimates indicate that the impact of and the response to HIV/AIDS represent an extraordinary fiscal challenge.

This analysis of the fiscal costs of HIV/AIDS over time also provides some tools for assessing fiscal trade-offs inherent in HIV/AIDS program choices. Similar to the analysis on the extent to which HIV/AIDS and the HIV/AIDS response absorb available fiscal space in terms of the PDV of the costs of HIV/AIDS, the implications of policy choices in terms of changes

in the PDV can also be assessed. For example, one additional infection is estimated to absorb fiscal resources equivalent to two times GDP per capita.

Combining the macroeconomic and microeconomic strands of the analysis, current spending and the costs incurred by new infections were compared. While the former remains well over 3 percent of GDP throughout the projection period, the latter declines from 2.3 percent of GDP in 2010 to 1.5 percent of GDP by 2030. This reflects that almost all of current spending is in response to infections that occurred in the past, and that reduced HIV incidence over the last years translates into lower spending commitments. Consequently, the quasi-liability implied by the costs committed under the HIV/AIDS program declines from 94 percent of GDP to 50 percent of GDP.

In summary, this study contributes to the design of the HIV/AIDS response and fiscal planning in several areas:

- It analyzes the fiscal costs of HIV/AIDS in the context of the government's evolving resource envelope, informing medium-term fiscal planning and providing a framework for managing the domestic financing needs of the HIV/AIDS program.
- Focusing on the costs incurred by an additional new infection, the study uses the PDV of the expected additional costs under the HIV/AIDS program as a tool to assess the fiscal implications of program options. However, this tool can also be applied to the analysis of specific prevention and other measures that form part of an HIV/AIDS program. Rather than assessing different profiles of government spending over several decades, this tool provides immediate indicators of the consequences of policy choices on fiscal space.
- Because of the persistence of HIV/AIDS costs, current spending is not a good indicator of the sustainability of an HIV/AIDS program. Instead, it is more accurate to interpret the costs over time as a quasi-liability (similar to pension obligations), and analyze how this liability is evolving over time. This approach provides an immediate measure of the impact of HIV/AIDS and the HIV/AIDS program on the government's fiscal capabilities and policy scope.

Finally, this analysis recommends considering the following policy issues to contain the fiscal costs of HIV/AIDS and better utilize existing funding sources: improve allocative and operational efficiency within the national

HIV/AIDS response; explore innovative financing mechanisms; strengthen institutions and health systems to improve service delivery; reform policy to generate private savings for health and social insurance; and conduct more cost-effectiveness, cost-benefit, and microeconomic studies to improve program efficiency and effectiveness.

VI. Annex

Assumptions on Macroeconomic Context

HIV/AIDS impacts have major implications for the size of the (working-age) population in the longer run, which is one of the most important determinants of GDP. For consistency of long-term projections, which frequently describe the fiscal costs of HIV/AIDS as a percentage of GDP, it is therefore necessary to capture the impact of HIV/AIDS on GDP and economic growth.

The macroeconomic module is fairly simple, designed to capture some of the major growth impacts of HIV/AIDS to complement and inform fiscal analysis. The model features one sector and one type of labor, and HIV/AIDS affects economic growth as it affects productivity, investment rates, and the supply of labor. Specifically, the model assumes that

$$Y_t = (1 + D)K_t^{\alpha}(AL_t)^{1-\alpha} \quad \text{and} \quad K_{t+1} = sY_t - \delta K_t, \quad \text{with } \alpha = \frac{1}{3}, \; s = 0.24$$

(before taking into account the impact of HIV/AIDS), and $\delta = 0.08$.

The most unusual aspect is the term $(1 + D)$, which reflects the rents from resource extraction. In line with available estimates of mineral production and revenues, D is projected to decline from 10 percent in 2015 (the endpoint of the current development plan) to 3 percent in 2030.

In this framework, the principal impacts of HIV/AIDS are:

- A slowdown in the growth of the working-age population L_t (in line with the population projections used),
- A decline in the savings rate S,[52]
- A decline in labor productivity A.[53]

Notes

1. If not indicated otherwise, estimates of HIV prevalence and other indicators of the evolution and scale of the epidemic are derived from NACA (2008), which also forms the basis of this study's projections. NACA (2008) provides a richer set of data than used by UNAIDS (2010a). The projected HIV prevalence from NACA for 2009 (26 percent of the population aged 15–49) is somewhat higher than the latest estimate (24.9 percent) from UNAIDS (2010a). However, similar differences also occurred between NACA (2008) and UNAIDS (2008).
2. Authors' calculation, based on estimates of the state of the epidemic from NACA (2008), and demographic estimates from United Nations Population Division (2009b).
3. HIV/AIDS is characterized by a long period between HIV infection and the emergence of the full symptoms of AIDS, followed by a short period to death (in the absence of treatment). Ghys and others (2008) suggest a median survival time of 11 years.
4. The level of HIV prevalence among pregnant women is higher than prevalence for the adult population overall because HIV prevalence is higher for women, and pregnant women tend to belong to cohorts for which HIV prevalence is higher.
5. NACA (2008) reports the size of the population of ages 0–14. To obtain an estimate of the size of the population of ages 0–17, this has been scaled up based on the age distribution of the population in Central Statistics Office (CSO 2009).
6. This already incorporates a rebound in life expectancy from increased treatment access, resulting in an increase in life expectancy from 48 years in 2000–2005 to 55 years in the 2005–10.
7. The estimates over the period 2005–10 include some years in which treatment coverage was limited. However, the indicators may not improve much further in 2010–15: while treatment coverage is higher than in the previous five-year period, mortality among people receiving treatment increases.
8. The only country for which a similar number of studies exists is South Africa.
9. This is further developed in Greener, Jefferis, and Siphambe (2000) and Greener (2004).
10. The model has been calibrated including the mining sector, but does not explicitly account for some peculiarities of this sector (for example, mineral rents).
11. In addition to an updated version of the BIDPA model, Jefferis, Siphambe, and Kinghorn (2006) offer an analysis based on a more elaborate computer-generated equilibrium (multisector) model. As the predictions generated by the different models are fairly similar, the different modeling strategies are not detailed in this paper.
12. Similar to Masha (2004), but here based on a much richer macroeconomic model.
13. The Human Development Index is a composite measure based on economic factors (GDP per capita), access to education (literacy, enrolment), and life expectancy.

14. Of the 179 countries covered, only Equatorial Guinea, where health and education indicators did not improve in line with oil revenues, has a larger discrepancy than Botswana in GDP per capita and life expectancy rankings.
15. The draft NDP 10 (Botswana 2010) observes: "There is a large amount of evidence from other African countries of the extremely high cost of postponing adjustment to a fall in government revenue. [. . .] The longer adjustment is postponed, the harder adjustment becomes because financial reserves have been exhausted, while borrowing instead of adjustment makes it more expensive and virtually impossible to borrow."
16. The government of Botswana (2010) emphasizes the need to adjust expenditures because of generally shrinking revenues, and supports the expenditure measures envisaged through 2013 because of the need "to avoid excessive borrowing and its associated costs, and as preparation for the lower rate of growth of revenue expected in NDP 11 and thereafter."
17. This study does not discuss recent trends in private health expenditures in Botswana from WHO (2010a). because these are not based on recent spending data, but projected forward in proportion to overall consumption spending since 2003. The data would therefore not capture any increase in health spending reflecting the escalating need for HIV/AIDS-related spending or the increased provision of antiretroviral treatment through the private (as well as the public) sector.
18. Especially considering that many of the countries in the WHO (2010c) study featuring higher health spending are much smaller than Botswana, including Niue (population 1,438), Kiribati (100,000), Marshall Islands (63,000), East Timor (about same population size as Botswana, but receiving large amounts of external aid), and Nauru (10,000).
19. A second National AIDS Spending Assessment (NACA and UNAIDS 2009) covering the years 2006–8 is almost complete but has not been published yet.
20. These figures are based on disbursements and actual spending and do not yet include support of the five-year, $50 million loan from the World Bank under the Botswana National HIV/AIDS Prevention Support Project—approved in July 2008—and supported by the European Commission through a grant of about $20 million, which effectively enables a zero-interest project loan.
21. Especially through the African Comprehensive HIV/AIDS Partnership, a partnership between the Bill and Melinda Gates Foundation and the Merck Pharmaceutical Foundation.
22. For example, the BIDPA (2000) study did not include the costs of antiretroviral treatment and did not anticipate the increased role of external assistance, reflecting a perception at the time that "it is clear that the costs of double or triple therapy are out of the question for the generalized treatment of HIV/AIDS."
23. Additionally, productivity on the job may decline. While this is documented for parts of the private sector (see, for example, Rosen and others [2004]), there is not a convincing way of generalizing these findings to the public sector, and therefore they were not used in this study.

24. The large differences in the mortality rates from population estimates and the data on civilian service could occur if coverage of public servants in the data reported by the Ministry of State President and NACA (2008) is lower than the totals reported by IMF (2007) labor market data, or if data on civil service mortality incompletely measure attrition for health-related reasons. Other factors that could conceivably play a role are large differences in HIV prevalence rates across population groups (implausible for Botswana) or differences in access to treatment, which is unlikely to play a large role because of the high overall treatment coverage rates.
25. Kinghorn and others (2002) and Abt Associates South Africa (2000) reported that public servants are entitled to 180 days of sick leave on full pay within a three year cycle, and may take another 180 days of sick leave at half pay (once annual leave balances are exhausted).
26. For South Africa, Rosen and others (2007) assumed that six patient visits are required during the first year on treatment. Harling, Bekker, and Wood (2007) report a total of 10,137 patient visits in a site, with 11,569 patient months of treatment, which would imply about 10.5 visits per patient per year.
27. Authors' calculation, based on United Nations Population Division (2009b).
28. This arrangement passes the financial risks associated with premature mortality on to the surviving dependents. However, government employees would be able to obtain some insurance through a funeral scheme operated by the Botswana Public Employees Union or one of several private insurance companies.
29. Rosen and others (2004) report that the death of an employee incurs a cost of between 7 and 25 days of supervisory time.
30. Rosen and others (2004) report a "reduction in productivity due to new employee's learning curve" of between 25 and 60 percent for skilled workers, and between 20 and 55 percent for unskilled workers. In many cases, a person filling a vacated position will come from a related position within the government (which may incur a lower learning cost), but would need to be replaced in his or her previous position. This assumption implies that the learning costs of a new appointment and the costs of shifts between positions, possibly including a new appointment further down the chain, are equivalent.
31. For example, if a job requires one year of training, such as a teacher, an agency employs 1,000 people, and the time a newly trained employee can be expected to stay on the job declines from 10 years to 8 years, the number of people that needs to be trained annually increases from 100 to 125 in order to fill all positions. Haacker (2004) provides a more extensive discussion of the impacts of HIV/AIDS on training costs and the returns to training.
32. The most recent year for which HIV/AIDS-related spending estimates are available is 2008. These data are based on population averages, calculated using estimates from Stover and others (2008) and United Nations Population Division (2009b). One factor not accounted for is the possibility that access to antiretroviral treatment among government employees is higher than it is for the general population.

33. The medical costs have been calculated as 20 percent of the costs of care and treatment included in the national HIV/AIDS program, reflecting the share of government employees in the labor supply. IMF (2007) reports that the public sector accounts for about 40 percent of total employment. The share of 20 percent used also corresponds to the size of the working-age population, including the informal sector, the unemployed, and people who do not participate in the (formal or informal) labor market.
34. Unlike a full demographic and epidemiological module, our model cannot capture certain inter-generational effects as lower fertility and increased mortality among children eventually affect the size of the adult population. This shortcoming plays a very limited role over the 20-year time frame we consider. For an analysis beyond this period, we would recommend a more sophisticated model.
35. For the long run, our projections on mineral revenues follow Clausen (2008), who projects a gradual decline in mineral revenues to 3 percent by 2030.
36. According to United Nations Population Division (2009b), the total population in 2010 is about 10 percent smaller than it would have been without the impact of HIV/AIDS (1.978 million compared to 2.222 million). By 2030, the United Nations Population Division (2009b) projects that the population size will grow to 2.337 million (23 percent smaller than without the impact of AIDS, at 3.045 million).
37. Note that these prevalence rates refer to the population aged 15+, and come out somewhat lower than the more commonly quoted HIV prevalence rate for ages 15–49.
38. The analysis in this area is subject to considerable uncertainties, depending on the course of prices of second-line drugs over the next two decades and long-term survival rates of people receiving second-line treatment.
39. All citizens of Botswana aged 65 or older are entitled to an old-age pension, amounting to P 166 per month (SSA 2009). In October 2009, there were 90,639 registered old-age pensioners (Matambo 2010), and the costs of old-age pensions amounted to about P 180 million, or 0.2 percent of GDP (authors' calculation, based on a pension of P 166/month).
40. There were 42,381 recipients of destitution allowances as of October 2009 (Matambo 2010). Destitution allowances included a cash benefit (P 61) and food rations (equivalent to P 172 per person per month) and are available to all destitute residents, who are considered to be people unable to support themselves because of old age, disability, or a chronic health condition; needy children with a terminally ill parent; or orphans or abandoned children not covered by the orphan care program. The total costs of destitution allowances are about P 120 million, equivalent to 0.1 percent of GDP.
41. IMF (2010b) projects that GDP will increase by 37 percent during 2010–14, corresponding to an annual growth rate of 6.6 percent, and following a contraction by 3.7 percent in 2009.
42. To estimate the fiscal costs of HIV/AIDS beyond 2030, projections were extended to 2070 using some crude assumptions regarding the course of HIV/AIDS (continued

gradual decline in HIV incidence) and the HIV/AIDS response (applying 2030 coverage rates forward), and some summary assumptions were applied regarding overall costs thereafter.

43. As summarized in the foreword to UNAIDS (2008): "Today, for every two people who start taking antiretroviral drugs, another five become newly infected. Unless we take urgent steps to intensify HIV prevention we will fail to sustain the gains of the past few years, and universal access will simply be a noble aspiration."
44. Although focusing on the impact of HIV incidence on government expenditures in the present section, this does not imply that these are the only—or even the most important—impacts of HIV/AIDS that the government would want to take into account.
45. Because the consequences of an HIV infection differ between men and women (different mortality patterns, risk of mother-to-child transmission for women), the estimates shown are calculated as the arithmetic mean of the costs of an additional infection for men and women, weighted by the shares in the number of new infections.
46. Note that these costs are weighted averages across the categories "receiving first-line treatment," "receiving second-line treatment," "not receiving treatment," and "deceased." For this reason, the expected costs of care and treatment per year are lower than the costs of first-line or second-line therapy.
47. The term "commitment" usually suggests that a government is legally obliged to fulfill a liability. The situation regarding HIV/AIDS spending is different, because the government is not legally obliged to meet certain targets under the HIV/AIDS program. The usage of the term "commitment" in this study, deriving from political commitments made under the HIV/AIDS program, is therefore weaker than the legal definition.
48. Because debt relief typically comes in large chunks and would therefore distort cross-country comparisons in any given year, data on external assistance overall (figures 2.18a and 2.18c) exclude debt relief (that is, sector 600, "Action Relating to Debt").
49. Data on HIV/AIDS-related external assistance include the categories 13040 ("STD Control Including HIV/AIDS") and 16064 ("Social Mitigation of HIV/AIDS") from OECD (2010).
50. These points are further discussed in Haacker (2009).
51. NACA and UNAIDS (2010) suggest somewhat higher levels of external support than those reported in UNAIDS (2008).
52. This assumes that in addition to the fiscal costs of HIV/AIDS, each death incurs a private cost equivalent to 1 × GDP per capita. The rate at which these costs translate into reduced savings and investment is assumed to be equal to the aggregate savings rate. For example, a fiscal cost of 2 percent of GDP and a mortality rate of 1 percent would translate into an overall cost of 3 percent of GDP, and a decline in savings of 0.51 (= 0.17 × 3%) percent of GDP.
53. This assumes that A grows at a rate of 1 percent over the projection period. However, to capture the aftermath of and recovery from the economic crisis, A is set to

match the GDP projections from IMF (2010b) through 2015. Regarding the impact of HIV/AIDS, it is assumed here that a mortality rate of 1 percent reduces A by 0.5 percent, that is, $A_t = (1.01)^t(1–0.5m)A_0$.

References

Abt Associates South Africa. 2000. *The Impact of HIV/AIDS on the Health Sector in Botswana*. Sandton, South Africa: Abt Associates.

Bennell, Paul, Karin Hyde, and Nicola Swainson. 2002. "The Impact of the HIV/AIDS Epidemic on the Education Sector in Sub-Saharan Africa." Centre for International Education, University of Sussex.

BIDPA (Botswana Institute for Development Policy Analysis). 2000. *Macroeconomic Impacts of the HIV/AIDS Epidemic in Botswana*. Gaborone.

Botswana, government of. 2010. *National Development Plan (NDP) 10*. Obtained online from Ministry of Finance and Development Planning, November, http://www.gov.bw/en/Ministries—Authorities/Ministries/Ministry-of-Finance-and-Development-Planning1/Tools—Services/Services—Forms/National-Development-Plan-NDP-10/Use instead: http:// www.gov.bw.

CARe (Centre for Actuarial Research). 2006. "The Demographic Impact of HIV/AIDS in Botswana: Modelling the Impact of HIV/AIDS in Botswana." Cape Town.

Chilisa, Bagele, Paul Bennell, and Karin Hyde. 2001. "The Impact of HIV/AIDS on the University of Botswana: Developing a Comprehensive Strategic Response." Education Research Paper No. 44, Department for International Development, London.

Clausen, Jens. 2008. "Calculating Sustainable Non-Mineral Balances as Benchmarks for Fiscal Policy: The Case of Botswana." IMF Working Paper No. 08/117, Washington, DC.

CSO (Central Statistics Office). 2005. *The Botswana AIDS Impact Survey II 2004*. Gaborone.

———. 2009. *Botswana AIDS Impact Survey III—Statistical Report*. Gaborone.

Cuddington, John T. 1993. "Modeling the Macroeconomic Effects of AIDS, with an Application to Tanzania." *World Bank Economic Review* 7 (2): 173–89.

Directorate of Public Service Management, Botswana. 2009. "Some Frequently Asked Questions ... Answered." Accessed May 1, http://www.dpsm.gov.bw/.

Ghys, Peter D., N. Walker, W. McFarland, and others. 2008. "Improved Data, Methods and Tools for the 2007 HIV and AIDS Estimates and Projections." *Sexually Transmitted Infections* 84 (Suppl. I): i1–i4.

Greener, Robert. 2004. "Impact of HIV/AIDS on Poverty and Inequality." In *The Macroeconomics of HIV/AIDS*, ed. Markus Haacker. Washington, DC: IMF.

Greener, Robert, Keith Jefferis, and Happy Siphambe. 2000. "The Impact of HIV/AIDS on Poverty and Inequality in Botswana." *South African Journal of Economics* 68 (5): 393–404.

Haacker, Markus. 2004. "The Impact of HIV/AIDS on Government Finance and Public Services." In *The Macroeconomics of HIV/AIDS*, ed. Markus Haacker. Washington, DC: IMF.

———. 2009. "Financing HIV/AIDS Programs in Sub-Saharan Africa." *Health Affairs* 28 (6): 1606–16.

Harling, Guy, Linda-Gail Bekker, and Robin Wood. 2007. "Cost of a Dedicated ART Clinic." *South African Medical Journal* 97 (8): 593–96.

IMF (International Monetary Fund). 2007. *Botswana: Selected Issues and Statistical Appendix*. IMF Country Report No. 07/228, Washington, DC.

———. 2010a. *World Economic Outlook Database*, October 2010 Edition. Washington, DC.

———. 2010b. *Botswana: 2010 Article IV Consultation—Staff Report and Supplement*. IMF Country Report No. 10/280, Washington, DC.

Jefferis, Keith, Happy Siphambe, and Anthony Kinghorn. 2006. *The Economic Impact of HIV/AIDS in Botswana*. Gaborone: Econsult.

———. 2010. HIV/AIDS Costs Projections. Unpublished estimates, provided by the author. Econsult, Gaborone.

Kinghorn, Anthony, Carol Coombe, Elaine McKay, and Saul Johnson. 2002. *The Impact of HIV/AIDS on the Education Sector in Botswana*. Sandton, South Africa: Abt Associates.

Kojo, Naoko C. 2010. "Diamonds Are Not Forever—Botswana Medium-Term Fiscal Sustainability." Policy Research Working Paper Series No. 5480, Washington, DC.

MacFarlan, Maitland, and Silvia Sgherri. 2001. "The Macroeconomic Impact of HIV/AIDS in Botswana." IMF Working Paper 01/80, Washington, DC.

Marlink, Richard. 2009. "Cost of HIV/AIDS in Botswana." Harvard School of Public Health.

Masha, Iyabo. 2004. "An Economic Assessment of Botswana's National Strategic Framework for HIV/AIDS." In *The Macroeconomics of HIV/AIDS*, ed. Markus Haacker. Washington, DC: IMF.

Matambo, Ontefetse K. 2010. *2010 Budget Speech*. Gaborone: Government Printing and Publishing Services.

Ministry of State President, and NACA (National AIDS Coordination Agency). 2008. *Progress Report of the National Response to the UNGASS Declaration of Commitment on HIV/AIDS*. Gaborone.

NACA (National AIDS Coordination Agency). 2003. *Botswana National Strategic Framework for HIV/AIDS 2003–09*. Gaborone.

———. 2008. *HIV/AIDS in Botswana—Estimated Trends and Implications Based on Surveillance and Modeling*. Gaborone.

NACA, and UNAIDS (Joint United Nations Programme on HIV/AIDS). 2007. *Botswana National AIDS Spending Assessment 2003/04–2005/06*. Gaborone.

———. 2009. "Botswana National AIDS Spending Assessment 2006 to 2008." Draft, Gaborone.

———. 2010. *Progress Report of the National Response to the 2001 Declaration of Commitment on HIV and AIDS: Botswana Country Report 2010*. Gaborone.

OECD (Organisation for Economic Co-operation and Development). 2010. Aid Activities (CRS) online database. Accessed August 15, 2010,http://stats.oecd.org.

Picazo, Oscar F., and Antonio C. David. 2008. *Financing and Delivery of HIV/AIDS Prevention, Treatment, and Social Support Services in Botswana: An Economic Analysis*. Washington, DC: World Bank.

Rasmussen, Tobias N. 2004. "Macroeconomic Implications of Natural Disasters in the Caribbean." IMF Working Paper No. 04/224, Washington, DC.

Richter Hume, Andrea. 2005. "The Indian Ocean Tsunami: Impact on South Asian Economies." In *World Economic Outlook*, April 2005 Edition. Washington, DC: IMF.

Rosen, Sydney, Mpefe Ketlhapile, Ian Sanne, and Mary Bachman DeSilva. 2007. "Cost to Patients of Obtaining Treatment for HIV/AIDS in South Africa." *South African Medical Journal* 97 (7): 524–29.

Rosen, Sydney, J. R. Vincent, W. MacLeod, and others. 2004. "The Cost of HIV/AIDS to Businesses in Southern Africa." *AIDS* 18 (2): 317–24.

Sackey, James, and Tejaswi Raparla. 2001. *Botswana—Selected Development Impact of HIV/AIDS*. World Bank Report No. 22043-BT, Macroeconomic Technical Group, Africa Region, Washington, DC.

SSA (U.S. Social Security Administration). 2009. *Social Security Programs throughout the World: Africa, 2009*. Baltimore, MD.

Stover, John. 2009. "Spectrum—Estimating the Need for ART and the Resources Required." Presented at Department of Health ART Costing Meeting, Pretoria, March 26–27.

Stover, John, Boga Fidzani, Batho Chris Molomo, and others. 2008. "Estimated HIV Trends and Program Effects in Botswana." *PLoS ONE* 3 (11).

UNAIDS (Joint United Nations Programme on HIV/AIDS). 2008. *2008 Report on the Global AIDS Epidemic*. Geneva.

———. 2010a. *HIV and AIDS Estimates and Data*. Accessed January 28, 2011, http://www.aidsinfoonline.org.

———. 2010b. *UNAIDS Report on the Global AIDS Epidemic 2010*. Geneva.

UNDP (United Nations Development Programme). 2009. *Human Development Report 2009*. New York.

United Nations Population Division. 2009a. *World Population Prospects: The 2008 Revision—Highlights*. New York: United Nations.

———. 2009b. *World Population Prospects: The 2008 Revision—Population Database*. New York: United Nations.

WHO (World Health Organization). 2010a. *Botswana—National Expenditure on Health 1995–2008*. Accessed April 29, http://www.who.int/nha/en/.

———. 2010b. *National Health Accounts 1995–2007*. Accessed April 29, http://www.who.int/nha/en/.

World Bank. 2010a. *World Development Indicators 2010*. Washington DC: World Bank.

———. 2010b. "Botswana Public Expenditure Review: Key Messages." Presented at Public Expenditure Review Workshop, Gaborone, August 24.

CHAPTER 3

South Africa

I. Introduction

The purpose of this study is to assess the fiscal dimension and repercussions of HIV/AIDS in South Africa. This study addresses HIV/AIDS as a complex challenge to public policy, with implications for some of the government's key policy objectives (notably health, education, and social policy) and impacts on public finance and civil servants. Unlike a costing study of an HIV/AIDS program, this analysis is embedded in a review of the state of public finance and covers a range of fiscal consequences resulting from HIV/AIDS beyond the costs of the policy response, such as payroll-related costs or the impacts on social grants. In light of the persistence of the fiscal costs incurred by HIV/AIDS, the study adapted tools developed for the analysis of long-term liabilities and the sustainability of public debt to assess the fiscal burden of HIV/AIDS.

This analysis sets out from the following observations:

- HIV/AIDS does have implications that could hinder the South African government from attaining some of its key policy objectives, particularly in the area of health, but also in social development.
- Even though South Africa is wealthier than many countries affected by HIV/AIDS, the very high level of prevalence translates into significant fiscal costs and thus affects the resources available for public policy.
- HIV/AIDS results in increased demand for public services and thus fiscal commitments that extend well into the future. In this regard, the cost of HIV/AIDS is similar to a fiscal liability.

Building on these observations, the analysis is divided into four main sections. Section II describes the impact of HIV/AIDS across major policy areas, such as health, education and social development, and reviews the macroeconomic effect of the epidemic. To prepare for the discussion of the fiscal repercussions of HIV/AIDS, section III provides a stocktaking of HIV/AIDS and public finance, covering the state of public finance in general; overall health spending and the public sector's role in health spending; and the role of HIV/AIDS line items in national and provincial budgets. Section III also discusses the fiscal impact of HIV/AIDS so far (including the costs of the HIV/AIDS response), repercussions in other areas of public policy (for example, social spending), and the costs of the impact of HIV/AIDS on civil servants.

Section IV introduces and summarizes the study's projections of the fiscal costs of HIV/AIDS. These projections were developed in tandem with the ongoing study "The Long Run Costs and Financing of HIV/AIDS in South Africa" (Guthrie and others 2010), and builds on the scenarios developed for that study. However, reflecting the fiscal perspective motivating this analysis, the projections in this study are wider in scope, capturing some fiscal costs of HIV/AIDS that are not directly linked to the national HIV/AIDS response, such as the impact of HIV/AIDS on civil servants and certain social grants.

Increased demand for public services caused by the impact of HIV/AIDS, and thus the fiscal commitments in response to the epidemic, are highly persistent. To understand the fiscal consequences of the epidemic, and the implications of different policy choices, it is necessary to take into account the persistence of fiscal costs, the long time lag (several decades) that can occur between policy actions, and the fiscal repercussions. For these reasons, this study developed an analysis of the fiscal costs of HIV/AIDS as a liability (section V), borrowing some tools commonly applied to assessing the sustainability of public debt, estimating the costs incurred by one infection over time, and providing a fiscal analysis on a "commitment basis," which assigns the fiscal costs to the period in which the underlying infections occur.

II. The Impact of HIV/AIDS in South Africa

In the 2010 budget speech, Minister of Finance Pravin Gordhan highlighted economic transformation and social cohesion as guiding principles of public

policy, and singled out as key policy challenges: high unemployment and high rates of inequality; the HIV and TB pandemic; unacceptably high crime rates; and angry communities and dysfunctional schools (Gordhan 2010). Against this background, the discussion here describes the HIV/AIDS epidemic as a complex policy challenge that—beyond the trade-offs implied by limited budget allocations—has created a more difficult environment for the attainment of key policy objectives. For example, in addition to its immediate health impacts, the epidemic creates challenges for expanding access to education. Meanwhile, impact of the epidemic and the ability of people to cope with HIV/AIDS across socioeconomic groups has implications for social and economic inequalities and poverty. In addition, these links mean that there are complementarities between the HIV/AIDS response and the attainment of the government's policy objectives in other areas and sectors.

With these considerations in mind, this discussion of the impact of HIV/AIDS begins with a summary of the evolution and the state of the epidemic, followed by a discussion of the impact of the epidemic, organized broadly along the lines of health, education, and social development—matching key budget categories. In the area of health, the impact of the epidemic on key outcomes is summarized and implications for the supply (for example, increased attrition) and demand of health services are reviewed. In education, evidence on the impact of HIV/AIDS on the capacities of the education sector and the consequences of increasing numbers of orphans are discussed. The analysis of the implications of HIV/AIDS for social development covers three topics: the extent to which exposure to HIV/AIDS (crudely measured by HIV prevalence) differs across population groups, the economic implications across households, and differences across population groups in access to health care. This section closes with a review of the macroeconomic impact of HIV/AIDS, which is relevant for public policy as an objective (raising material living standards), but also because HIV/AIDS affects the means of public policy through the domestic revenue base.

The course and state of the epidemic

The HIV epidemic in South Africa took off somewhat later than in some of its surrounding countries. The most substantial and widely used study of the state and evolution of the HIV epidemic in South Africa, ASSA (2006),[1]

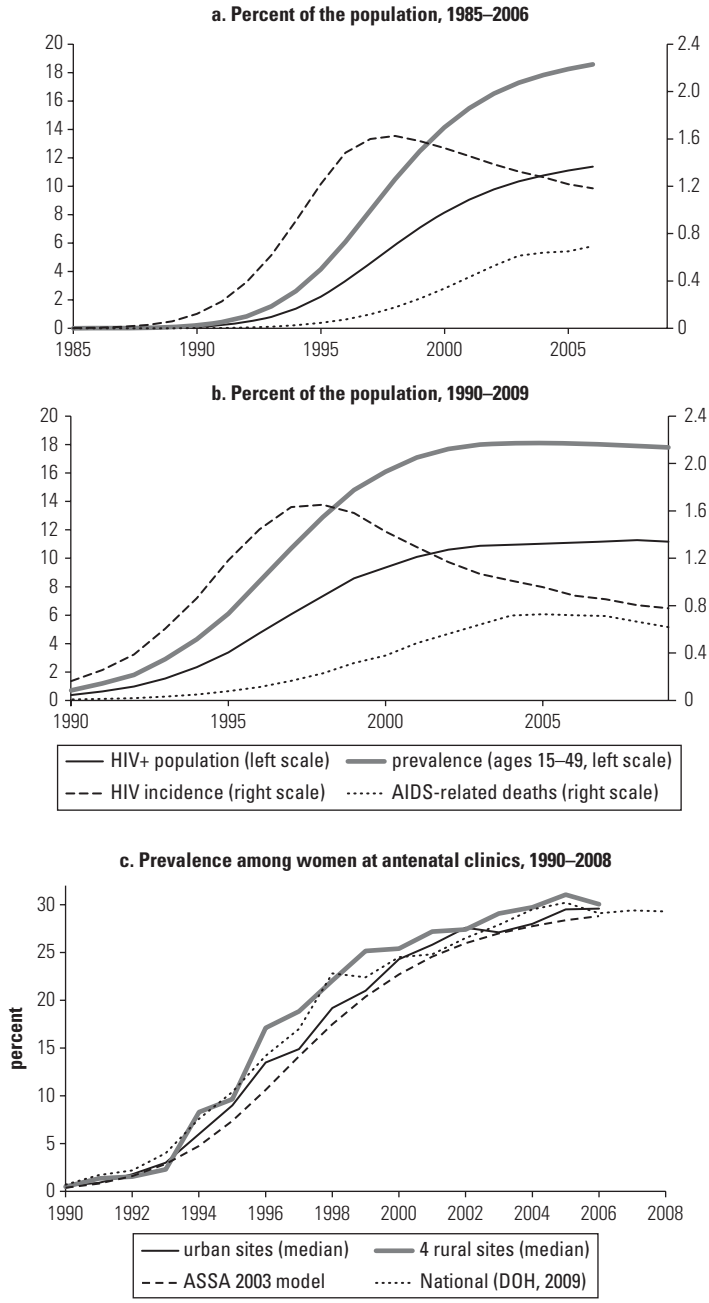
estimates that HIV prevalence exceeded 1 percent of the population aged 15–49 starting in 1993 (figure 3.1a). From that level, it escalated rapidly, reaching 10 percent just five years later (1998), and increased further to just below 19 percent by 2006. In absolute numbers, the number of people living with HIV/AIDS increased from below 100,000 in 1991, to 5 million by 2004, corresponding to 11.4 percent of the total population. The more recent estimates of the state of HIV/AIDS in South Africa are included in the UNAIDS Report on the Global AIDS Epidemic 2010 (UNAIDS 2010a, 2010b). According to UNAIDS (2010b), HIV prevalence peaked at 18.1 percent of the population aged 15–49 in 2008, declining somewhat to 17.8 percent by 2009. Data from antenatal clinics yield a picture very similar to population estimates on the escalation of the epidemic (figure 3.1c).

The drivers of HIV prevalence are the numbers of new infections, and survivals and deaths among people living with HIV/AIDS. In this regard, ASSA (2006) and UNAIDS (2010b) offer a similar picture. According to ASSA, HIV incidence peaked at 1.6 percent of the population in 1998, and declined to 1.2 percent by 2006. As the number of people living with HIV/AIDS increased, so did HIV/AIDS-related mortality. Crude mortality attributed to HIV/AIDS steadily increased from 0.1 percent in 1996 to 0.7 percent in 2006. UNAIDS (2010b) estimates a steeper decline in HIV incidence from 2000, reaching 0.9 percent by 2006 and 0.8 percent by 2009.

Already visible in figure 3.1a is the impact of increased access to antiretroviral treatment, from 325,000 people receiving treatment at end-2006 (WHO, UNAIDS, and UNICEF [2008]) to 728,000 in 2008 and 910,000 (834,000 adults and 86,000 children) by November 2009, corresponding to a treatment coverage rate of 55 percent for adults and 81 percent for children (DOH and SANAC 2010). Consequently, mortality slows down—this is already visible in the ASSA (2006) estimates through 2006, and the estimated number of HIV/AIDS-related deaths has declined from 350,000 in 2005 to 310,000 in 2009, according to UNAIDS (2010b), corresponding to a drop in HIV/AIDS-related morbidity from 0.73 percent in 2005 to 0.62 percent of the total population in 2009.[2]

One important aspect of the HIV epidemic in South Africa is the fact that HIV prevalence is distributed very unevenly across major population groups and regions.[3] HIV prevalence for the African population (which is about 80 percent of the overall population) is higher than for the other population groups (table 3.1). Relatedly, Shisana and others (2005) point at differences

Figure 3.1: Evolution of the HIV Epidemic



Sources: a. ASSA (2006); b. UNAIDS (2010b); United Nations Population Division (2009); c. WHO, UNAIDS, and UNICEF (2008); ASSA (2006); DOH (2009).

Table 3.1: HIV Prevalence across Population Groups

	AFRICAN	COLORED	INDIAN	WHITE	ALL
Age 15–49[a]	16.0	6.8	2.7	5.6	15.2
Age 2 and older, 2005[b]	13.3	1.9	1.6	0.6	10.8

Sources: a. Day and Gray (2008); b. Shisana and others (2005).

in HIV prevalence across regions, ranging (as of 2005) from over 15 percent in KwaZulu-Natal and Mpumalanga to around 5 percent or less in the Northern and Western Cape, and according to locality, with higher HIV prevalence in informal urban settings. Similarly, Day and Gray (2008) report HIV prevalence rates at antenatal clinics in 2007 ranging from over 30 percent (in the Free State, Gauteng, KwaZulu-Natal, and Mpumalanga) to 16 percent or less in the Northern and Western Cape.

Health

The most direct impacts of HIV/AIDS occur in the health sector. HIV/AIDS poses a serious health policy challenge and intersects with the key objectives of health policy, creating a fundamentally changed environment in which health policy takes place. This point is illustrated in a recent health budget speech (Motsoaledi 2010) in which the Minister of Health classified the government's policy objectives into four categories, each of which is affected by HIV/AIDS. These objectives are:[4]

- Combating HIV and AIDS.
- Increasing life expectancy. (HIV/AIDS has been the cause of declining life expectancy in South Africa, and a driver of maternal and child mortality.)
- Decreasing the burden of diseases from TB. (HIV/TB coinfections are a major cause of death among people living with HIV/AIDS, and HIV/AIDS contributes to the spread of TB.)[5]
- Improving the health system's effectiveness. (The demand for HIV/AIDS-related services absorbs significant financial and human resources and thus makes it more difficult to improve access to and the quality of health services across the board.)

This means that—while there are trade-offs between increased HIV/AIDS budget allocations and the attainment of other policy objectives

(within the health sector and beyond)—there are complementarities between the immediate objectives of the HIV/AIDS response and broader health or development policy objectives. For example, because HIV/AIDS has been the cause of the recent decline in life expectancy, the response is therefore crucial for reversing this decline. Increased allocations for services can also mitigate a crowding-out of health services across the board resulting from an increased demand for HIV/AIDS-related services.[6]

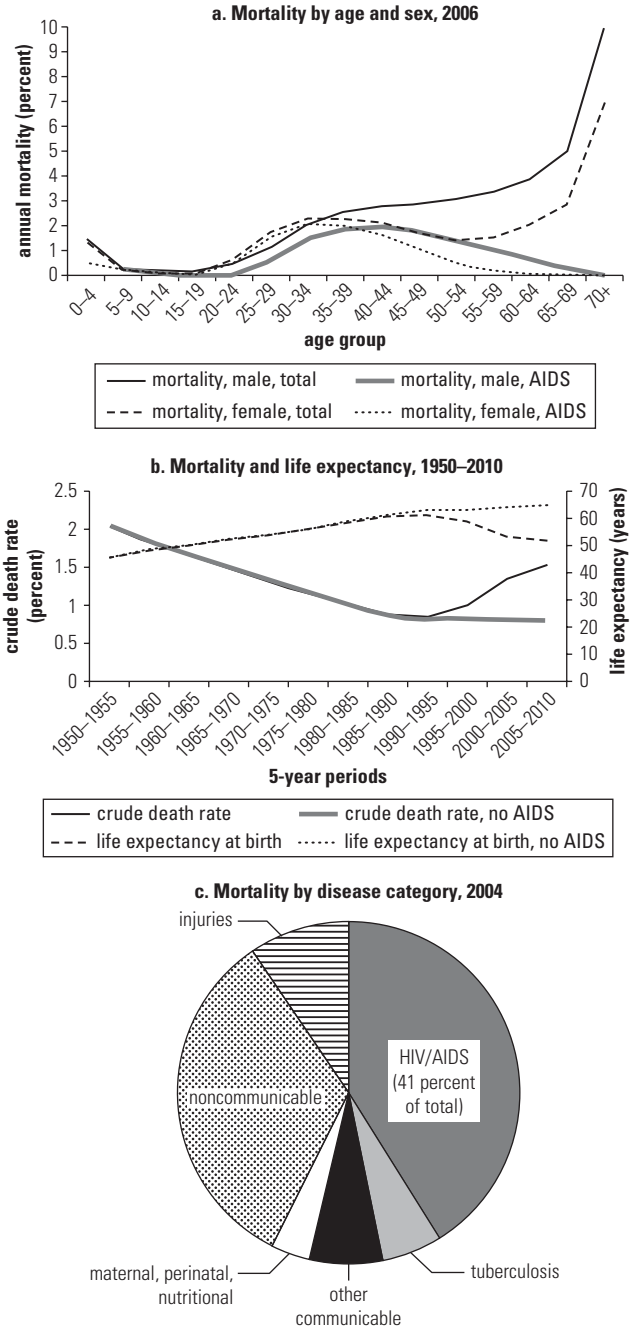
Implications of HIV/AIDS for health outcomes. To appreciate the magnitude of the impact of HIV/AIDS on mortality, it is important to place it in a broader demographic and health context. Figure 3.2 illustrates some of the impacts of HIV/AIDS, specifically its contribution to mortality (by age and over time). Figure 3.2a summarizes the estimates of mortality by age and sex in 2006. Overall, half of all female deaths and 40 percent of all male deaths in 2006 were attributed to HIV/AIDS. For women, mortality increases rapidly from about age 20, and peaks at 2.3 percent at age 32 (almost entirely accounted for by HIV/AIDS), a level that is surpassed later only from age 65.

Figure 3.2b traces the evolution of two summary health indicators (life expectancy and crude mortality) over time, and also shows estimates of outcomes that could have been achieved in the absence of HIV/AIDS. During 2005–10, crude mortality increased to a level last observed in the early 1960s. Similarly, life expectancy is 13 years lower than the level projected in a hypothetical "no-AIDS" scenario, and has fallen back to the level observed in the mid-1960s. Figure 3.2c places the impact of HIV/AIDS in the context of the overall disease environment. HIV/AIDS accounted for over 40 percent of deaths in South Africa in 2004, outweighing any other communicable disease by a factor of 3.[7]

Access to health services. The impact of HIV/AIDS[8] represents a large demand shock to the health system, and—at the same time—affects the supply of health services because HIV/AIDS results in increased mortality and morbidity among health professionals. Moreover, reallocations of resources (financial and/or personnel) to meet the pressing demands caused by HIV/AIDS may come at the expense of other objectives. The epidemic therefore impacts the government's ability to improve the quality of and equitable access to health services.

HIV/AIDS results in increased mortality and morbidity among health workers—as it does for other categories of government employees. However,

Figure 3.2: HIV/AIDS, Mortality, and Life Expectancy



Source: a. ASSA (2006); b. United Nations Population Division (2009); c. WHO (2009).

unlike other sectors, the health sector is facing a substantial increase in the demand for its services. Increased mortality and morbidity among health professionals therefore compounds the challenges the sector is facing. The available evidence in this area, however, is scarce. The most important study in this direction (Shisana and others 2003), preceding the scaling-up of antiretroviral treatment, highlights low morale and an increasing work load. Chirwa and others (2009) cover five countries in southern Africa (including South Africa), and identified HIV-related stigma as a major reason for low work morale. Pillay (2009) found high levels of dissatisfaction among nurses in the South African public sector.

However, the impacts of HIV/AIDS on the health system extend beyond the HIV/AIDS subsector. As some of the additional demand for HIV/AIDS-related health services is met by a reallocation of resources within the health sector, this may create or exacerbate shortages in other areas. This applies, in particular, to personnel—a point illustrated by van Rensburg and others (2008), who show that 80 percent of new posts for nurses in the antiretroviral therapy (ART) program of the Free State were filled by nurses transferring from other programs or facilities, and about half of the nurses entering the program secured a promotion.

One puzzling aspect of data on the use of health services is the perception of an increasing workload on the part of health personnel, while other indicators on the utilization of health services (for example, bed occupancy rates) have not changed correspondingly (Shisana and others 2003). This likely reflects that the unit costs of patients seeking HIV/AIDS-related care are higher than for other patient groups (Cleary and others 2008), and that some of the increased demand for HIV/AIDS-related services is being met by reduced care for other health conditions.

This would mean that, in addition to the direct health impact of HIV/AIDS (such as increased HIV/AIDS-related mortality), the reallocation of resources within the health sector to meet the increase in demand caused by the impact of HIV/AIDS could also affect health outcomes across the board. This, however, is difficult to measure because many of the most common health indicators are also directly affected by HIV/AIDS. In light of this, Case and Paxson (2009)—drawing on data from South Africa and a number of other African countries—focused on indicators like antenatal care, births attended by a trained professional, and immunization rates (all supposedly not directly affected by HIV/AIDS), and found that access to these services has deteriorated in regions with high HIV prevalence.

Education

Improving the quality of schooling and access to education is an important aspect of the government's development strategy. The impact of HIV/AIDS complicates these efforts: HIV/AIDS causes disruptions in schools because teachers are affected by HIV/AIDS and children living in households affected by HIV/AIDS may face obstacles or disadvantages in accessing education.[9] At the same time, education is an important channel of disseminating HIV prevention knowledge.

The impact of HIV/AIDS has the potential to disrupt the delivery of education. In light of the large weight of education in public services, and the role of education in public policy, HIV/AIDS impacts in the education sector have been the subject of several comprehensive studies.[10] Louw and others (2009), building on Shisana and others (2005), found HIV prevalence among teachers was 12.7 percent, somewhat less than that of the general population in the same age band, and that HIV/AIDS contributes to increased absenteeism (sick leave, funeral attendance) and low morale. The links between HIV/AIDS, increased absenteeism, attrition, and reduced morale have also been documented in questionnaire-based studies by Phaswana-Mafuya and Peltzer (2005, 2006).

Increased mortality and morbidity among teachers also means that larger numbers of new teachers need to be trained—if not absolutely (as HIV/AIDS also affects the demand of education) at least relative to the size of the cohort entering the labor market. Thus, the increased attrition resulting from HIV/AIDS complicates the task of overcoming existing human resource imbalances.

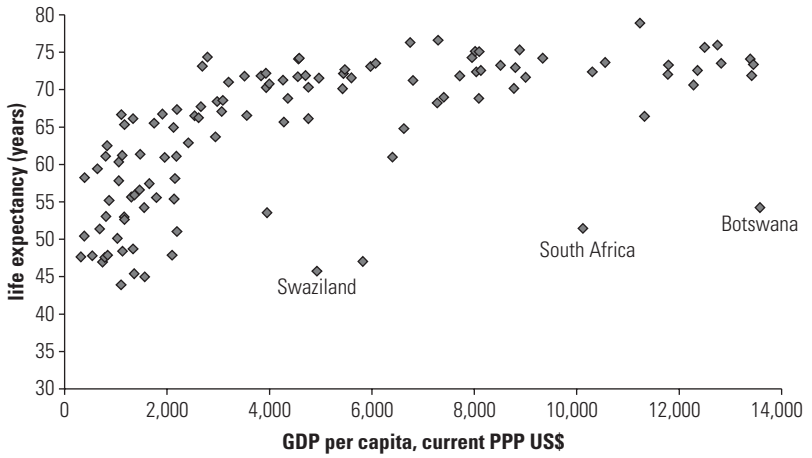
One important aspect of the impact of HIV/AIDS on education (and social development) is the increase in the number of orphans. ASSA (2006) estimated that over 20 percent of the young population were orphans (that is, had lost at least one parent) in 2006, and that about 10 percent of orphans had lost both parents (mainly from HIV/AIDS-related mortality). These numbers capture the impacts of HIV/AIDS on children only incompletely, because—in addition to orphans—many children are affected by the illness of one or both parents. In this regard, Case and Ardington (2006) found that "maternal orphans are significantly less likely to be enrolled in school and have completed significantly fewer years of schooling," and that "children whose mothers have died appear to be at an educational disadvantage when compared with nonorphaned children with

whom they live." The loss of a father was associated with lower socioeconomic status, but did not affect education other than through this economic effect. Ardington and Leibbrandt (2010) arrived at similar conclusions, and observed evolving patterns of caregiving for orphans, with an increasing role for grandparents.

Social development

At least two aspects of the impact of HIV/AIDS on social development are relevant for this fiscal and macroeconomic analysis. First, as a consequence of HIV/AIDS, the link between health outcomes and other development indicators (for example, GDP per capita) for living standards has been broken for South Africa and a number of other countries experiencing high rates of HIV prevalence. This is illustrated in figure 3.3, which shows recent data on life expectancy and GDP per capita. Whereas life expectancy and economic prosperity are closely correlated across countries, countries with high HIV prevalence, such as Botswana, South Africa, and Swaziland, are outliers by a large margin. For example, life expectancy in South Africa (52 years) is 20 years lower than in Brazil, although the level of GDP per capita is about the same. This gap has escalated from five years in 1990, obviously reflecting the impact of HIV/AIDS.[11] Comparing life expectancy

Figure 3.3: Life Expectancy and GDP per Capita, 2008



Source: World Bank (2010).

horizontally, South Africa therefore compares to countries like Cameroon and Niger, which have a much lower level of development.

Second, HIV/AIDS potentially has distributional implications that are not captured by aggregate measures of the impact of HIV/AIDS, such as GDP growth or life expectancy. Specifically, the epidemic may affect inequality and social cohesion to the extent that (i) HIV incidence and prevalence differ across socioeconomic groups, or by income and wealth; (ii) households differ in terms of their capability to cope with health shocks such as HIV/AIDS; and (iii) access to health services is correlated with socioeconomic characteristics of individuals or households. These impacts, in turn, are particularly relevant in South Africa where high rates of income inequality and economic vulnerability of households are at the heart of the policy agenda (see Gordhan [2010]).

HIV/AIDS across socioeconomic groups. The most common indicator used to assess differences in the impact of HIV/AIDS across population groups is HIV prevalence.[12] On the national level, data on HIV prevalence are available across ages, regions, and by population group, showing much higher HIV prevalence for the African population than for other population groups (see table 3.1).

Regarding the correlation between HIV prevalence and other factors, the evidence is weak.[13] An important source of data is workforce surveys, which tend to show large differences in HIV prevalence across skills. For example, Evian (2008)—based on data from one large company—found an HIV prevalence of 22.6 percent for the unskilled worker category, but only 3.6 percent for the upper-management category. Rosen and others (2004) found an HIV prevalence of between 4.2 percent and 8.2 percent for supervisors and managers and between 12.4 percent and 34.5 percent for unskilled workers across five South African companies around 2000.

Another important aspect of the impact of and vulnerability to HIV/AIDS across socioeconomic groups is the extent to which HIV awareness differs across population groups. This was documented by the Department of Health (DOH), Medical Research Council, and ORC Macro (2007), which found a large difference in awareness across education levels[14] and population groups. These data regarding education are consistent with findings by Bärnighausen and others (2007) and Hargreaves and others (2007), suggesting a negative link between an individual's education level and the risk of contracting HIV/AIDS. Furthermore, Dinkelmann, Lam,

and Leibbrandt (2007) suggest a negative link between risky behavior and household income.

Impact of HIV/AIDS on households. In addition to differences in exposure to HIV, households may differ in their ability to cope with the issues resulting from a household member being HIV positive. Naidu and Harris (2005) summarize earlier studies of the household impacts of HIV/AIDS, pointing out income losses incurred by households affected by HIV/AIDS, the role of funeral expenses, the household burden of care and treatment, and the adverse impacts on surviving family members.

Carter and others (2007) add an interesting perspective to this discussion, proposing that the

> Largest and most persistent effects were in the middle ranges of the South African income distribution, that is, households just above the poverty line. Households below that level seem less severely affected, whereas those above it seem to recover more quickly.

This suggests that HIV/AIDS increases the risk of poverty for the large number of South African households above but close to the poverty line. The impacts of HIV/AIDS on poverty are also the subject of a series of studies by Bachmann and Booysen (2003, 2006) aiming to capture the links between HIV/AIDS and poverty. They found that households affected by HIV/AIDS were poorer at the outset, and that expenditure and income decreased in households affected by HIV/AIDS, compared to households not affected. Collins and Leibbrandt (2007) focused on the impact of HIV/AIDS among a small sample of poor households. They found that most of these households are highly dependent on the recipient of the highest income, and would lose over half of their monthly income should he or she die. The majority of households in this group were underinsured against the cost of a funeral (which often costs up to seven months of income), although most of these households have some kind of insurance for funeral expenses.

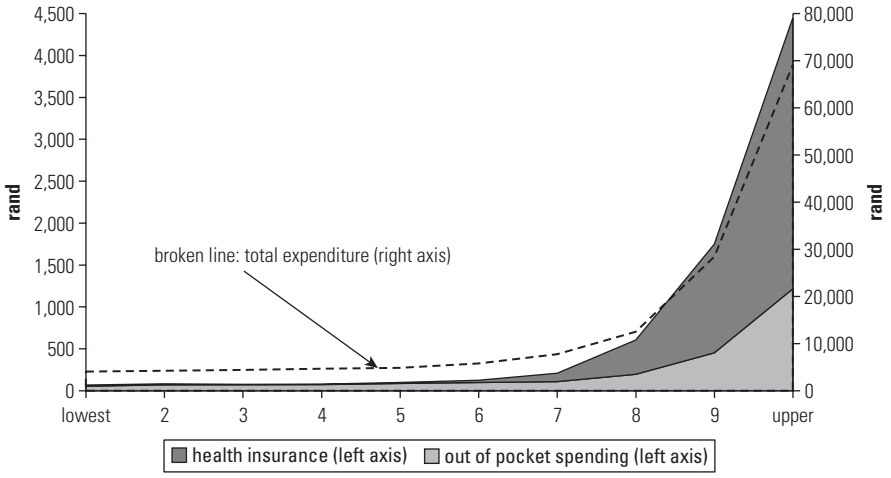
Inequality in access to health services. An important aspect of the impact of HIV/AIDS across households is access to health care. The section addressing the implications of HIV/AIDS for health services focused on the sector overall. This section will provide insight as to whether economic inequalities and inequalities in access to health care are related. And if so,

how much the health impact of HIV/AIDS and inequalities, in terms of a household's capability to address the health consequences, would exacerbate economic inequalities.

The high degree of economic inequality in South Africa also translates into a high degree of inequality in terms of resources that households devote to health care. This issue is well documented in the recent *Income and Expenditure of Households 2005/2006* (Statistics South Africa 2008b), and the relevant data are summarized in figure 3.4, plotting overall household expenditure and health expenditure per capita by decile.

Out-of-pocket spending as a percentage of total household expenditure is somewhat higher for wealthier households (1.8 of total expenditure for the highest income decile, 1.3 percent for the lowest). However, there are pronounced differences across expenditure deciles for health insurance spending, where the average share in household expenditure ranges from 0.3 percent for the lowest income decile to 4.7 percent for the highest. As a consequence, out-of-pocket spending accounts for more than three-quarters of health spending for the lowest six income deciles, but less than one-third for the top three deciles.[15] These numbers also need to be interpreted against the backdrop of a high degree of economic inequality. While expenditures per capita differ between the lowest and highest expenditure

Figure 3.4: Per Capita Private Health Expenditures by Expenditure Decile, 2005/06



Source: Authors' calculations, based on Statistics South Africa (2008b).

decile by a factor of 17, health expenditures differ by a factor of 66, and spending on health insurance differs by a factor of 232.

Public health expenditures, to some extent, compensate for the lack of private health insurance among poor households.[16] Ataguba and McIntyre (2009) estimated the distribution across households of the costs (through taxation) and benefits of public health expenditures and found that taxes attributed to health spending (total tax burden times share of health in government spending) range from the equivalent of 4 percent of household expenditure for the poorest quintile to 6 percent of household expenditure for the highest quintile. While the benefits from outpatient services were distributed fairly evenly across quintiles, the upper two quintiles absorbed just over half of the benefits of inpatient services.

Regarding the fiscal implications of HIV/AIDS, two conclusions can be drawn from this discussion on the distribution of household spending across income groups. First, for the majority of the population, antiretroviral treatment is unaffordable through the private sector. The unit costs of treatment through the private sector, estimated at about R15,000 (Meyer-Rath 2010), exceed total household expenditure per capita for all but the top two expenditure deciles. Even the costs of first-line treatment through the public sector, currently at R5,600 annually (Meyer-Rath 2010), would exceed total household expenditure per capita for half of the population. While lack of access to health insurance contributes to the inequities in risks associated with poor health across household, private insurance to cover the health costs of an HIV infection alone would multiply health expenditures for the lowest expenditure decile, exacerbating inequities and pressing needs in other areas.

Second, the public sector plays a crucial role in expanding treatment access in this setting, and—in addition to the consequences of increased treatment access for (average) population health—the scaling-up of treatment also has major consequences for social development, by mitigating the health consequences of economic inequalities.[17] Because of uneven access to health services, the benefit incidence of the public antiretroviral treatment program and the implied rationing of treatment become important issues both from a health and social policy perspective.[18]

At the same time, it is important to remember that differences in incomes and insurance access are not the only factors resulting in differences in use of health care across income groups. The differences in HIV awareness illustrated above also likely translate into differences in the awareness of

treatment options, in the use of health services, and in the propensity to seek treatment when ill (Statistics South Africa 2008a).

Macroeconomic impact

The overall macroeconomic impact of HIV/AIDS, summarized in variables like GDP or GDP per capita, is important for this analysis of the fiscal dimension of HIV/AIDS. Improving material living standards (GDP per capita, together with measures of the distribution of income) is an important objective of public policy, and GDP and government revenues—and thus the government's capabilities to attain certain policy objectives—are closely linked.

This analysis benefits from numerous studies that have attempted to estimate and project the macroeconomic impact of HIV/AIDS in South Africa,[19] including analyses focusing on broad macroeconomic aggregates in the neoclassical tradition; computable general equilibrium models aimed at capturing the impacts of HIV/AIDS across sectors; adaptations of large macroeconomic models designed for a sophisticated analysis of macroeconomic developments and economic policy; and models focusing on the long-term impacts of HIV/AIDS. The principal factor that results in lower growth in most of these studies is the slowdown in population growth caused by HIV/AIDS. Additionally, increased mortality and morbidity among the working population arguably result in lower productivity, and increased spending on health services could result in lower investment. However, increased mortality also results in an increase in the capital-labor ratio and thus higher output per worker, offsetting some of the negative effects of HIV/AIDS on GDP per capita.

Roe and Smith (2008), using a highly aggregated model, estimated that in 2003–07, South African GDP was about 15 percent smaller, and GDP per capita about 4.5 percent smaller than the levels that the economy would have attained without the impacts of HIV/AIDS. In the long run, the impact on GDP per capita is partly reversed (to only 1 percent by 2050), even though GDP—reflecting the slowdown in population growth—is 60 percent lower than otherwise because of the impact of HIV/AIDS.

Regarding sectoral impacts, Arndt and Lewis (2001) project a disproportionate impact of HIV/AIDS on sectors supplying investment commodities (because of a shift in demand to health services) and—reflecting the assumption that HIV/AIDS has a disproportionate impact on unskilled labor—on

sectors that disproportionately use unskilled labor.[20] Thurlow, Gow, and George (2009) adopted a similar macroeconomic model, but also simulated the impact of HIV/AIDS across households. They suggested that the impact of HIV/AIDS on poverty and inequality is small.[21]

Among the most influential contributions to the analysis of the macroeconomic repercussions of HIV/AIDS in South Africa are a number of reports that adapt complex models designed for economic policy analysis to estimating the impact of HIV/AIDS, capturing a number of short-term effects absent from the more focused growth models. For example, ING Barings South African Research (2000), utilizing the Wharton Econometric Forecasting Associates (WEFA) macroeconomic model of the South African economy, pointed out the increase in aggregate demand associated with HIV/AIDS (and its inflationary implications). Ellis, Laubscher, and Smit (2006), following up on Laubscher, Visagie, and Smit (2001), adapted the macroeconomic model maintained by the Bureau for Economic Research at the University of Stellenbosch. Their study includes the most substantial discussion of the macroeconomic repercussions of increased treatment access so far, reducing the impact of HIV/AIDS on GDP growth from 0.5 percent annually to 0.4 percent through 2020.

While most observers broadly agree on the short- to medium-term impacts of HIV/AIDS on economic growth, this does not apply to the long-term macroeconomic consequences. This partly reflects that some of the postulated macroeconomic effects of HIV/AIDS (for example, those regarding access to and the quality of education) materialize over long periods and—if valid—have not fully materialized yet.[22] Meanwhile, the empirical growth literature frequently suggests considerable impacts on growth from health-related variables like life expectancy, although these findings are difficult to interpret without a theoretical underpinning, and may reflect trends or relationships quite different from those relevant in the context of HIV/AIDS, a health shock with a very specific profile.[23]

III. Stocktaking: HIV/AIDS and Public Finance

To appreciate the fiscal repercussions of HIV/AIDS, it is necessary to not only assess the fiscal costs of the epidemic, but also to place them in a fiscal context. The stocktaking therefore begins with a review of the state of public finances, including a discussion of the impact of the global financial crisis.

Following is a review of health financing and a summary of HIV/AIDS line items in the national and provincial budgets. The following three subsections lay the ground for the study's estimates and projections of the fiscal costs of HIV/AIDS. The latest estimates of the costs of the HIV/AIDS program[24] are then summarized, and the indirect fiscal costs of HIV/AIDS are reviewed (notably payroll-related costs and social expenditures). A brief concluding subsection summarizes the evidence on the fiscal costs of HIV/AIDS so far, and connects the backward-looking stocktaking with the forward-looking analysis offered in section IV.

The state of public finances

To assess the fiscal implications of HIV/AIDS and the national HIV/AIDS program, and appreciate the fiscal challenges posed by the response to the epidemic, it is necessary to interpret the fiscal costs of HIV/AIDS in the context of the government's fiscal capacities. Therefore, this analysis starts with a brief review of the fiscal situation, focusing on the consolidated government budget, which summarizes the national, provincial, and local government budgets (table 3.2).

In 2006/7 and 2007/8, government revenues accounted for about 30 percent of GDP, and the budget returned a surplus (1.2 percent and 1.7 percent of GDP, respectively). However, the impact of the global crisis has resulted in a deterioration of the fiscal situation and outlook. GDP growth declined from over 5 percent in 2006/7 to –2 percent in 2009, and is expected to recover only slowly. Meanwhile, government revenues have dropped by about 3 percent of GDP, and expenditures increased by over 5 percent of GDP, so that the fiscal balance deteriorated to –7 percent of GDP by 2009/10.

For financing the national HIV/AIDS program, as for other categories of public spending, this means that the available fiscal resources are tighter than what might have been expected two years ago. GDP is expected to recover only slowly, and may remain lower than earlier expected, and the government expects that by 2012/13 it will have accumulated additional public debt (compared to 2008/9) equivalent to 15 percent of GDP (National Treasury 2010).

Two further points are worth noting regarding table 3.2 that are relevant to this discussion of HIV/AIDS-related spending and the financing of the national HIV/AIDS response. First, a substantial share of public

Table 3.2: Consolidated Government Budget, 2006/7–2012/13

	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13
	(RAND BILLIONS)						
Total receipts	541.2	627.7	689.7	657.6	738.3	827.7	922.3
Total payments	518.4	593.3	713.9	835.3	907.0	977.4	1,058.6
Current expenditures	317.3	353.8	416.0	480.4	527.9	580.1	623.7
o/w: compensation of employees	170.3	195.0	232.6	270.9	294.4	315.8	332.3
Transfers and subsidies	171.2	204.3	237.5	268.6	284.0	315.0	337.3
o/w: Households	84.9	96.7	112.2	129.9	139.3	155.4	167.9
Other	29.9	35.1	60.4	86.3	95.1	82.2	97.6
Fiscal balance	22.8	34.4	–24.2	–177.8	–168.6	–149.6	–136.3
Memorandum items: Selected expenditures (functional classification)							
Health	59.0	68.8	82.2	98.0	104.6	113.4	120.5
Education	94.5	106.0	129.1	148.9	165.1	179.9	189.7
Social protection	78.8	88.6	102.8	118.2	128.4	142.1	155.1
Central government expenditure	470.2	541.5	636.1	748.8	818.1	888.3	964.3
o/w: transfer to provinces	178.9	205.8	245.3	295.0	322.9	350.5	369.3
o/w: transfer to local government	26.5	37.3	44.0	50.1	58.8	66.6	73.2
Public debt	553.7	577.0	627.0	796.4	1,001.2	1,214.0	1,419.0
Domestic	471.1	480.8	529.7	702.4	894.9	1,085.6	1,266.1
Foreign	82.6	96.2	97.3	94.0	106.3	128.4	153.0
	(PERCENT OF GDP, UNLESS INDICATED OTHERWISE)						
Total receipts	29.5	30.2	29.7	26.8	27.3	27.9	28.0
Total payments	28.3	28.5	30.8	34.1	33.6	32.9	32.1
Fiscal balance	1.2	1.7	–1.0	–7.3	–6.2	–5.0	–4.1
Public health expenditures	3.2	3.3	3.5	4.0	3.9	3.8	3.7
Public debt	30.2	27.7	27.0	32.5	37.1	40.9	43.1
GDP	1,833.2	2,081.6	2,320.1	2,449.9	2,699.9	2,967.6	3,295.7
Real GDP growth (calendar year, percent)	5.6	5.5	3.7	–1.8	2.6	3.6	4.0

Source: National Treasury (2010), except for real GDP growth (IMF 2010).
Note: o/w = of which.

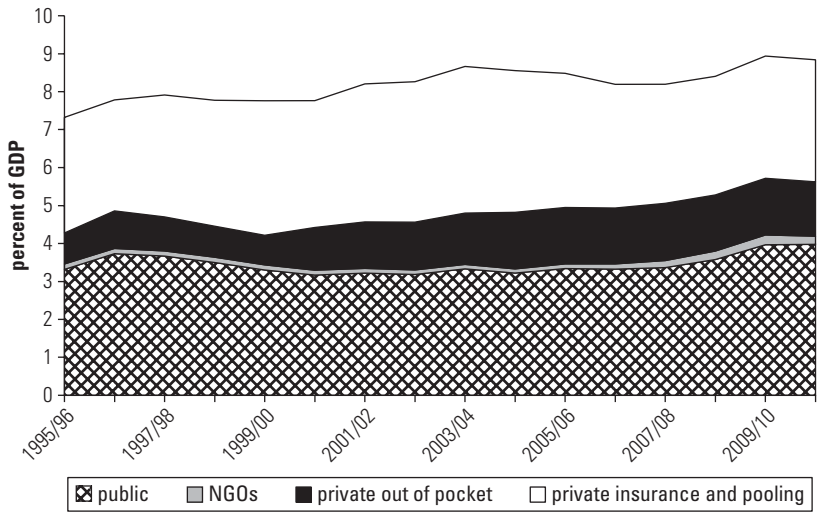
expenditures (over one-third), particularly health expenditures, is administered through provinces and local governments. The increasing costs of the HIV/AIDS response and the fact that the burden is distributed unevenly across provinces therefore have implications for the required distribution of fiscal resources between the national budget and provincial budgets. Second, the national budget does not identify external grants (in light of the small role they play in South Africa). However, the role of external grants has been increasing in recent years, largely reflecting external support for the country's HIV/AIDS program.[25]

Health spending and financing

Although HIV/AIDS is described here as a development and policy challenge in South Africa with implications "across the board," the most pressing policy challenges associated with HIV/AIDS occur in the health sector. This section provides a summary analysis of health spending and financing in South Africa, and places total and private health expenditure in an international context.

Health spending in South Africa is dominated by private spending, which accounted for 56 percent of total health spending as of 2009/10. Considered with the data on health spending across households discussed earlier (figure 3.4), the aggregate data presented in figure 3.5 illustrate the inequalities in access to private health care. While access to private insurance is concentrated among the top three deciles of households (sorted by expenditure), and only 14 percent of the population benefited from medical coverage (Statistics South Africa 2008a), private insurance accounted for the bulk of private health spending (two-thirds of private spending in 2008, and a higher rate in earlier years). The role of external financing is very limited, 0.1 percent of GDP in 2008, according to WHO (2010a), but has increased substantially over the last years, largely reflecting external

Figure 3.5: Health Expenditures by Source, 1995–2008



Source: Data provided by National Treasury.

support for South Africa's HIV/AIDS program. The limited role for out-of-pocket health spending relative to private insurance, from a macroeconomic perspective, accentuates the earlier discussion of inequities in health spending and access to insurance (see figure 3.4).

Total health expenditure increased from 7.3 percent of GDP in 1995/96 to 8.8 percent of GDP in 2010/11. The share of public health expenditures (45 percent of total health expenditures) declined to 38 percent of total by 2003/4, but has since reverted to 45 percent of total health expenditures. This increase in health expenditures relative to GDP has taken place during a period of economic expansion, with real GDP increasing by over 60 percent, and GDP per capita by about one-third. This means that in real terms, resources absorbed by the health sector have increased by 60 percent per capita between 1995 and 2010.[26]

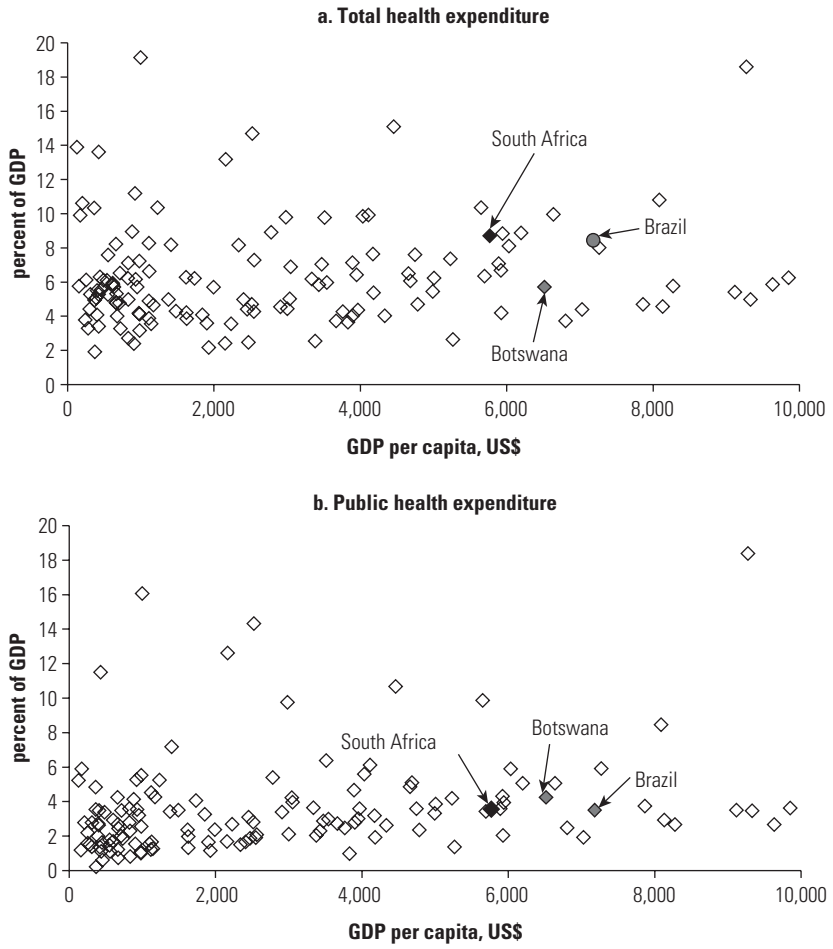
Higher spending on public health, however, does not necessarily translate into increased health resources on the ground, because the prices of health services may not change in line with GDP or the consumer price index (CPI) deflator. A price index for health spending overall is not available; as a crude measure (because the equivalent series for public health spending was not available), the subindex for "Medical care and health expenses" from the consumer price index was considered, which has grown by 230 percent between 1995 and 2008, whereas the overall CPI has grown by only 120 percent.[27] Equivalently, the prices for health services included in the CPI have grown 50 percent faster than the CPI overall, and 60 percent faster than the GDP deflator. It therefore appears that the increase in resources absorbed by the health sector between 1995 and 2010 was largely absorbed by higher inflation in the prices of health services, and does not represent a real increase in health resources on the ground.

Regarding the role of HIV/AIDS, Guthrie and others (2010) estimated HIV/AIDS-related public spending at about 0.3 percent of GDP in 2008, and the costs of antiretroviral treatment through the private sector at 0.04 percent of GDP. The increase in spending on HIV/AIDS, which occurred only in the later years of the period (1995–2008), may explain the increasing role of public health spending over the last years, and—on this aggregate level—it seems that the increasing costs of HIV/AIDS in the health sector have been met by increased allocations to health, rather than reallocations within the health sector.

Data on the magnitude and financing of health spending are compiled by the World Health Organization (WHO 2010b) for almost all countries

worldwide. This provides an opportunity to place the level of total and public health spending in South Africa in an international context (figure 3.6). Total health spending in South Africa is somewhat higher than for other economies with similar levels of economic development, about the same level as Brazil (relative to GDP).[28] This, however, reflects high private spending, whereas public health expenditure is broadly in line with countries with a similar level of economic development. It is important to note

Figure 3.6: Health Expenditures across Countries, 2007



Source: World Health Organization (2010a).

that these comparisons do not reflect differences in the burden of disease across countries. It can therefore be argued that total and public health spending in South Africa are relatively low in light of the serious health challenges South Africa is facing, compared to other countries with similar GDP per capita (recall figure 3.3).

HIV/AIDS line items in national and provincial budgets

The most important sources of data on the fiscal dimension of HIV/AIDS are the data on HIV/AIDS-related expenditures from national and provincial budgets, summarized in table 3.3. HIV/AIDS-related line items occur in the budgets of the Department of Health, the Department of Education, and the Department of Social Development. The largest item is the "HIV/AIDS and STDs" in the Department of Health, which—by 2008—was the largest item under the Department's "Strategic Health Programmes." Expenditures increased from R181 million in 2000/2001 to R4.8 billion in 2009/10 (or from US$25 million to US$473 million) and are expected to rise to R9.3 billion by 2012/2013. The structure of expenditures changed over this period. Health services are administered through the provincial budgets. Because of the expansion of HIV/AIDS-related health services, an increasing share of HIV/AIDS-related allocations under the Department of Health are accounted for by specific allocations to provinces ("conditional grants").

Overall, HIV/AIDS-related line items under the Department of Health accounted for 0.2 percent of GDP and 5.6 percent of total health expenditures in 2009/2010. However, the explicitly HIV/AIDS-related fiscal allocations most likely cover only part of HIV/AIDS-related spending in the health sector, so that the budget figures provide an incomplete picture (see the following section on the costs of the national HIV/AIDS program).

The other two HIV/AIDS-related line items occur in the budgets of the Department of Education and the Department of Social Development and represent conditional grants to provinces toward "life skills education" and community-based care. These two programs, however, account for only about 10 percent of HIV/AIDS-related allocations under the national budget, and a small proportion of public expenditures in these categories. Additionally, it is important to point out the increases in certain social grants that have occurred over the last years, at least some of which are

Table 3.3: South Africa: HIV/AIDS Line Items in National and Provincial Budgets, 2006–12

LINE ITEMS (BILLIONS OF RAND, UNLESS OTHERWISE SPECIFIED)	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
Health	2.7	3.5	4.5	5.1	6.0	6.5
(percent of GDP)	0.1	0.2	0.2	0.2	0.2	0.2
(percent of national and provincial health spending)	5.0	5.5	5.9	5.6	6.0	6.0
National budget: "HIV/AIDS and STDs" subprogram	2.0	2.5	3.4	4.0	4.8	5.2
Department of Health "own" spending	0.4	0.5	0.5	0.5	0.5	0.6
Conditional grants to provinces	1.6	2.0	2.9	3.5	4.3	4.6
Provincial health spending	2.3	3.1	4.0	4.6	5.5	5.9
Conditional grants from national government	1.6	2.0	2.9	3.5	4.3	4.6
Other HIV/AIDS spending	0.8	1.1	1.1	1.1	1.2	1.3
Memorandum items:						
Total public health spending	60.1	69.6	83.0	97.2	107.4	116.1
(percent of GDP)	3.3	3.3	3.6	4.0	4.0	3.9
National government (excluding transfers)	1.1	1.2	1.4	1.7	1.6	1.7
Provinces	53.6	62.6	75.1	88.6	98.3	106.4
Other	5.3	5.8	6.5	6.9	7.5	8.0
Education						
HIV and AIDS conditional grant	0.1	0.2	0.2	0.2	0.2	0.2
(percent of national and provincial education spending)	0.2	0.1	0.1	0.1	0.1	0.1
Social development						
HIV and AIDS conditional grant	0.3	0.5	0.6	0.7	0.8	0.8
(percent of national and provincial social spending)	0.4	0.5	0.6	0.6	0.6	0.6
Total HIV/AIDS line items						
HIV/AIDS spending: health, education, and social development	3.2	4.1	5.3	5.9	7.0	7.5
(percent of government expenditures)	0.7	0.7	0.8	0.8	0.8	0.8
(percent of GDP)	0.2	0.2	0.2	0.2	0.3	0.3
Memorandum items: selected social expenditures						
Disability grants	14.3	15.3	16.5	16.9	17.4	18.0
(number of beneficiaries)	1,422,808	1,413,263	1,371,712	1,310,761	1,295,365	1,321,272
Foster care	2.9	3.4	3.9	4.4	5.2	6.2
(number of beneficiaries)	400,503	443,191	476,394	569,215	626,137	688,751

Sources: National Treasury and provincial budget statements.

likely due to the impact of HIV/AIDS. In light of the large weight of social grants in government expenditures (exceeding 3 percent of GDP, and 10 percent of total government expenditures), this could be a significant aspect of the fiscal impact of HIV/AIDS, and this point is discussed further in the next section.

Costs of national response to HIV/AIDS

The national HIV/AIDS response is guided by the *HIV & AIDS and STI Strategic Plan for South Africa, 2007–2011* (SANAC 2007) and organized around the goals of (i) reducing the rate of new HIV infections by 50 percent by 2011 and (ii) reducing the impact of HIV and AIDS on individuals, families, communities, and society by expanding access to appropriate treatment, care, and support to 80 percent of all HIV-positive people and their families by 2011. A costing analysis of the plan was undertaken by Cleary (2007), who estimated the costs of the plan would be 0.3 percent of GDP in 2007, rising to 0.7 percent by 2011.

Most recently, Guthrie and others (2010)—in close cooperation with the Department of Health and other government units—have provided new estimates of the costs of the HIV/AIDS program.[29] Their study not only updated the earlier costing (for example, in terms of coverage rates of treatment), it also provided a more comprehensive analysis of the costs of HIV/AIDS, for example, the costs of HIV/AIDS-related health services other than antiretroviral treatment were neglected in the earlier study. For this reason, the latest estimates of the costs of the HIV/AIDS response come out higher than the previous estimate, at 0.49 percent of GDP in 2007, rising to 0.64 percent of GDP by 2009, of which the bulk occurs in the public sector.[30]

Indirect fiscal costs of HIV/AIDS

The fiscal impact of HIV/AIDS extends beyond the costs of the national HIV/AIDS program, to the extent that it affects certain categories of expenditures that serve purposes not directly linked to the impact of HIV/AIDS.[31] At the same time, the national HIV/AIDS program could mitigate some of these costs, so that—from a fiscal perspective—there are certain savings in other areas that need to be taken into account for a full assessment of the fiscal costs of HIV/AIDS and the government's response. This analysis focuses on two categories of expenditures that arguably reflect the impact of HIV/AIDS: social expenditures and the government's payroll expenses across the board.

Social expenditures. South Africa has established a fairly extensive public social security system, accounting for 12 percent of total government expenditures (3.5 percent of GDP) in 2009/10 (National Treasury 2010). Even

Table 3.4: Estimated Costs for National Response to HIV/AIDS, 2007–09

	2007	2008	2009
	(PERCENT OF GDP)		
Total	0.49	0.55	0.64
Prevention	0.17	0.17	0.19
Youth-focused interventions	0.03	0.03	0.03
Workplace	0.05	0.05	0.06
Men who have sex with men	0.00	0.01	0.01
Community mobilization	0.05	0.04	0.04
Voluntary counseling and testing	0.01	0.01	0.01
Prevention of mother-to-child transmission	0.01	0.02	0.02
Other	0.01	0.01	0.01
Care and treatment	0.31	0.35	0.41
Antiretroviral treatment	0.16	0.21	0.28
Public sector	0.13	0.16	0.22
Private sector	0.04	0.05	0.06
Care and prophylaxis without antiretrovirals	0.04	0.04	0.04
Palliative care	0.01	0.01	0.01
Home-based care	0.02	0.02	0.03
Tuberculosis (exclurding antiretrovirals)	0.06	0.05	0.05
Other	0.01	0.02	0.02
Mitigation	0.02	0.03	0.04
o/w: family/home support	0.01	0.02	0.03
Program costs (overhead)	0.03	0.03	0.04
Memorandum items			
Public health expenditure (fiscal year)	3.3	3.5	4.0
GDP (rand billions)	2,017.1	2,283.8	2,423.3
GDP (US$ billions)	285.9	276.8	287.2

Sources: Guthrie and others (2010); IMF (2010); and National Treasury (2010).
Note: o/w = of which.

though most of these expenditures do not directly target the consequences of HIV/AIDS, HIV/AIDS does affect the incidence of the conditions targeted by social grants, such as orphanhood and disability. Indeed, the increase in the number of recipients of certain grants in recent years is striking—grants in support of foster care rose from 276,000 in 2000/01 to 569,000 in 2009/10 (and are expected to rise to 758,000 by 2012/13), while the number of beneficiaries of disability grants increased from 613,000 in 2000/01 to 1,423,000 in 2006/7 (and declined somewhat from this peak over the following years, to 1,311,000 in 2009/10). Conversely, certain categories of social grants (for example, old-age pensions) are likely to decline as a result of HIV/AIDS-related mortality; fewer citizens will reach the age threshold for such grants

(60 years). The scale of social spending—much higher than spending targeting the impact of HIV/AIDS directly—implies that even moderate changes in the incidence of certain grants could have fiscal consequences that are significant relative to the costs of the HIV/AIDS program. Therefore, this study includes an analysis of the impact of HIV/AIDS on general social spending—beyond measures programmed under the umbrella of the National Strategic Plan—in its assessment of the fiscal consequences of HIV/AIDS.

Old-age pensions are the largest expenditure item under social grants, accounting for R26.4 billion, or 37.5 percent of the total costs of social grants in 2009/10. Old-age pensions pay up to R1,080 per month to eligible citizens from age 60 with income below R31,296 per year and assets of less than R518,400 (these thresholds are doubled for married couples). Because of increased mortality resulting from HIV/AIDS, the number of beneficiaries of old-age grants declines or grows more slowly. For example, the United Nations Population Division (2009) estimated that, based on mortality rates in the 2005–10 period, the probability of reaching age 60 (from age 0) had fallen to 38 percent for men and 45 percent for women, which compares to 63 percent for men and 78 percent for women in a no-AIDS scenario. To determine the impact of HIV/AIDS on the costs of old-age pensions, the impact of additional HIV/AIDS-related mortality on the number of people reaching age 60 is estimated, and then a survival curve from age 60 is applied to estimate the impact of HIV/AIDS on the number of people eligible for old-age pensions. Uptake rates of old-age grants are based on observed population averages through 2010.

Disability grants account for about 20 percent of expenditures on social grants (R16.6 billion in 2009/10) and are arguably affected by HIV/AIDS. In 2009/10, 1.3 million people (3.7 percent of the total population) received disability grants. Explicit data on the link between HIV/AIDS and the number of disability grants are unavailable. Estimates are based on the assumption that 20 percent of disability grants accrue to people living with HIV/AIDS. This implies an incidence of disability grants of 4.4 percent among people living with HIV/AIDS, and 3.4 for HIV-negative people as of 2009. To calculate the impact of HIV/AIDS, it is assumed that people living with HIV/AIDS are relatively young, and would be less likely to qualify for disability grants without this disease, and a counterfactual incidence rate of disability of 2 percent is used. The number of people accessing disability grants because of HIV/AIDS in this crude calculation is

therefore 2.4 percent (4.4 percent minus 2 percent) of people living with HIV/AIDS. Similar to disability grants, HIV/AIDS may affect the incidence of **care dependency grants** in support of "care of a child who has a severe disability and is in need of full-time and special care." These grants are not included in this study's estimates because they account for only 2 percent of the costs of social grants, and because HIV prevalence among the youth population (aged 0–17) is 2.5 percent or less throughout the projection period.

Child support grants account for about one-third of social grants expenditure: R23.3 billion, or 34.5 percent of total social grants expenditures in 2009/10. Child support grants amount to R250 per month, and are paid to the principal caregiver provided that his or her income is below R30,000 (or R60,000 for married couples). The impact of HIV/AIDS on the costs of child support grants depends on three factors: (i) the impact of HIV/AIDS on the number of births; (ii) survival rates among children living with HIV/AIDS; and (iii) the probability that a caregiver qualifies for and applies for a child support grant.

Regarding the impact of HIV/AIDS on the number of births, a recent survey (Pamuleni, Kalule-Sabiti, and Makiwane 2007) points to estimates that HIV/AIDS reduces fertility by 20 percent in South Africa (Camlin, Garenne, and Moultrie 2004). However, the available evidence of the impact of HIV/AIDS on fertility precedes the scaling-up of antiretroviral treatment, and the latter may reduce the impact of HIV/AIDS on fertility. For this study, it is assumed that the decline in fertility among women receiving ART is 10 percent. The decline in the number of births due to HIV/AIDS is estimated as a mark-up on the available estimates of births from HIV-positive mothers.[32] Survival rates among children from HIV-positive mothers depend on the rates of mother-to-child transmission of HIV (much reduced as a result of prevention measures) and the rate of access to pediatric antiretroviral treatment. Finally, the impact of HIV/AIDS on the number of households qualifying and applying for child support grants is related to the impact of HIV/AIDS on poverty rates. As a memorandum item, this analysis assumes that an HIV prevalence of 10 percent among the population of aged 15+ increases access to child support grants by 1 percent.[33]

Foster care grants account for only about 5 percent of social grants as of 2009/10 (R4.3 billion), but these are the social grants that have increased the most over the last years, and where the impact of HIV/AIDS is

arguably most pronounced (in relative terms). Foster care grants amount to R710 per month per child, accrue to the custodian of a child, and are not means tested. The analysis assumes that 80 percent of foster care grants are health related, and uses the number of orphans (and the share of children orphaned by HIV/AIDS) to estimate and project the impact of HIV/AIDS on the costs of foster care grants.[34]

While **grant in aid**, **relief of distress**, and **pensions for war veterans** are also arguably affected by the impact of HIV/AIDS, the amounts involved are small (0.3 percent of social grants in 2009), and therefore they are excluded from this analysis of the impact of HIV/AIDS on social spending.

The estimates of the impact of HIV/AIDS on social grants are summarized in table 3.5. Overall, the analysis estimates that HIV/AIDS has resulted in an increase in social grants equivalent to 0.05 percent of GDP so far, a small number compared to the overall costs of social grants (over 3 percent of GDP) and the estimated costs of the HIV/AIDS response, about 0.6 percent of GDP in 2009 (according to Guthrie and others [2010]).

Another noteworthy aspect of these estimates of the HIV/AIDS impacts on the costs of social grants is that these estimates reflect different factors working in opposite directions—while the incidence of disability and orphanhood increases, the incidence of child support (fewer children are born or survive) and old-age pensions declines. Looking ahead, these costs are likely to evolve, because the number of orphans is increasing, while the impact of HIV/AIDS on the cohorts that have already reached age 60 and therefore already on old-age pension grants has been limited so far.

The impact on government employees. Increased morbidity and mortality among government employees also contribute to the fiscal costs of HIV/AIDS, through increased costs of absenteeism and sick leave, increased staff

Table 3.5: Impact of HIV/AIDS on Social Grants, 2009

TYPE OF GRANT	RAND (MILLIONS)	% OF GDP
Total impact on social grants	1,266	0.05
Disability grants	1,852	0.08
Foster child grants	1,828	0.08
Child support grants	–1,826	–0.02
Old-age pension grants	–588	–0.08

Sources: Author estimates based on Guthrie and others (2010); IMF (2010); and National Treasury (2010).

turnover, and rising medical and death-related benefits. For several reasons these costs are generally more difficult to quantify than the expenditures discussed above. First, data on increased mortality and morbidity among government employees are rarely available in the public domain. Second, some of the employment-related "costs" of HIV/AIDS take the form of additional expenditures, some result in productivity losses. Unlike in the private sector, it is difficult to measure reduced productivity in government. Third, some categories of costs (for example, increased absenteeism, benefits) are based on complex rules and are difficult to model.

To estimate the costs of HIV/AIDS on government employees so far, a number of assumptions must be made. In the absence of data on the impact of HIV/AIDS on government employees, analysts sometimes use population averages (for the working-age population) as a proxy for the impact of HIV/AIDS on government employees. This, however, can be very misleading because government employees may have demographic and socioeconomic characteristics different from the rest of the population.

In the case of South Africa, however, it appears that it is legitimate to use population averages as indicators for the prevalence and impact of HIV/AIDS among government employees. One important determinant of the impact of HIV/AIDS in the public service is the racial composition of the public service. In this regard, the Public Service Commission (2008) observes that the "racial composition of the Public Service now largely mirrors the country's demography," with 80 percent of employees at national level, and 71 percent of employees at provincial level, being categorized as "African" in 2007, very close to the share of this group in the general population (79 percent as of mid-2008, according to Statistics South Africa [2008a]). Moreover, available studies of large groups of government employees suggest that HIV prevalence among government employees is similar to that observed in the general population.[35]

To estimate the costs of sick leave, this analysis uses data from the Public Service Commission (2002). Based on a sample of 370,000 employees, sick leave accounted for 4.5 working days per employee in one year, and 0.9 percent of the costs of wages and salaries. To estimate and project the impact of HIV/AIDS, because of limited available data, mortality is used as a scale variable.[36] Assuming that two-thirds of sick leave taken moves in line with mortality, and considering the role of HIV/AIDS in mortality in 2000, this study estimates that the costs of HIV/AIDS-related mortality in 2000 (0.45 percent of the population of aged 15–49) incurred

costs of sick leave corresponding to 0.26 percent of the government's wages and salaries in that year.[37] Consequently, to estimate the costs of sick leave (percent of wages and salaries) for different years, a factor of 0.58 (=0.26/0.45) is applied to estimated mortality rates.

A second important aspect of the costs of increased mortality and morbidity is the impact on the cost of pensions and related benefits. Public sector pensions are administered through the Government Employees Pension Fund (GEPF), and financed through employee contributions (7.5 percent of salary) and employer contributions (between 13 and 16 percent of salary). Any changes in the balance of the GEPF resulting from the impact of HIV/AIDS could therefore have a large impact on payroll-related expenses. A full analysis of the implications of HIV/AIDS on pension costs is highly complex and beyond the scope of this study. However, the estimates of the HIV/AIDS impact on payroll expenses do include an allowance for funeral grants, based on payouts of funeral benefits from the GEPF, which correspond to about one monthly salary per death of a government employee.

Finally, increased mortality and morbidity result in increased attrition and turnover among government employees. This incurs costs of administering the exit—by death or retirement—of employees, advertising and filling a position (including financial costs such as advertising, and also staff time for selecting candidates and processing appointments), and productivity losses as new employees (or people moving to a new assignment) are learning on the job. While there are considerable data on these types of costs for South Africa (more than for any other country), most data are for the private sector and do not necessarily translate to the public sector.

To estimate the magnitude of the costs of increased attrition in the public sector, the analysis starts with the following assumptions: For the costs of administering the exit of an employee and filling a vacancy, there is an allowance of one month of salary of the position filled.[38] Regarding the costs of learning on the job, it is assumed that the productivity of a new employee is 25 percent lower during the first year on the job, which is at the lower end of the range reported by Rosen and others (2004) for the private sector.[39]

In addition to learning on the job, higher mortality among government employees may result in additional training costs. For example, if a job requires one year of training, and an agency employs 1,000 people, and the time a newly trained employee can be expected to stay on the job declines from 10 years to 9 years because of increased mortality or morbidity, then the number of people that needs to be trained annually increases from 100

to 111 in order to fill all positions.[40] As a memorandum item for the costs of training, a training cost of half a year of working time is included in the estimates of the costs of increased attrition.

Table 3.6 summarizes the partial estimates of the costs of HIV/AIDS impacts on government employees. The subset of costs identified by this study (not including the potentially large changes in the costs of pensions and related benefits) accounts for about 1 percent of wages and salaries, or 0.1 percent of GDP in 2009, mainly reflecting the costs of increased sick leave and training. This corresponds to about 15 percent of the costs of the national HIV/AIDS response identified in table 3.4.

Review of fiscal impact of HIV/AIDS so far

Several insights emerge from this discussion of the fiscal impact of HIV/AIDS and the costs of the national HIV/AIDS program so far. First, the fiscal burden of HIV/AIDS (about 0.7 percent of GDP annually) has been substantial over the last three years, absorbing about 3 percent of fiscal resources. The fiscal costs of HIV/AIDS identified in this analysis are significantly larger than the HIV/AIDS line items in the national budget (or provincial budgets)—by a factor 5 in 2007, and a factor 3.5 in 2009. These discrepancies largely reflect that the costs of HIV/AIDS-related services are subsumed under certain general public services (notably health and social services), and not fully captured by HIV/AIDS budget allocations. To effectively plan the national HIV/AIDS response, it is therefore necessary to translate the cost estimates into the corresponding budget categories (especially as the impact of HIV/AIDS differs considerably across provinces) to prevent budget shortfalls or inequities in access to services.

Table 3.6: Costs of Impact of HIV/AIDS on Government Employees, 2009

	IN PERCENT OF . . .		
TYPE OF COST	WAGES AND SALARIES	GOVERNMENT EXPENDITURES	GDP
Total (excluding medical costs)	1.10	0.32	0.09
Sick leave and funeral attendance	0.48	0.14	0.04
Funeral grants	0.06	0.02	0.01
Increased turnover	0.19	0.05	0.02
Training	0.37	0.11	0.03

Source: Authors' estimates.

A second insight is that while much of the costs of the HIV/AIDS response are not captured by specific HIV/AIDS line items, certain categories of government expenditures reflect the impact of HIV/AIDS, even though they do not form part of the HIV/AIDS response. The most important categories of such expenditures are social grants and the impact of HIV/AIDS on payroll expenses and related benefits. These costs (0.05 percent and 0.09 percent of GDP, respectively) added about one-quarter to the estimated fiscal cost of the HIV/AIDS program in 2009 (and a higher rate in earlier years), and therefore represent a significant share of the fiscal burden of HIV/AIDS (table 3.7).

Regarding the fiscal burden of HIV/AIDS, however, there are two aspects that the study's stocktaking did not capture. First, the fiscal costs of HIV/AIDS are persistent and expected to grow over the coming years. For fiscal planning purposes, and to assess the overall fiscal burden of HIV/AIDS, it is therefore necessary to project the fiscal costs of HIV/AIDS over time. Second, the state of the epidemic and the impact of HIV/AIDS are policy dependent, and certain HIV/AIDS spending categories are interdependent. For example, successful prevention reduces the incidence of certain HIV/AIDS-related services later on, and treatment mitigates or delays other types of HIV/AIDS-related expenditures. For fiscal planning, it is necessary to capture these interdependencies. Over the following sections, these two issues will be further analyzed.

Table 3.7: Estimated Fiscal Costs of HIV/AIDS, 2007–09
(percent of GDP)

	2007	2008	2009
Total fiscal costs of HIV/AIDS	0.66	0.67	0.72
Costs of national response to HIV/AIDS (public sector)	0.47	0.50	0.57
Prevention	0.18	0.18	0.19
Care and treatment	0.25	0.27	0.32
of which: antiretroviral therapy (public sector only)	0.11	0.14	0.19
Mitigation	0.02	0.03	0.03
Program costs (overhead)	0.02	0.03	0.03
Social grants attributed to HIV/AIDS (fiscal year)	0.07	0.06	0.05
Impact on public servants	0.12	0.11	0.09
Memorandum item:			
HIV/AIDS line items in national budget (fiscal year)	0.13	0.15	0.21

Sources: Guthrie and others (2010); IMF (2010); National Treasury (2010); and authors' calculations and estimates.

IV. Projecting the Fiscal Costs of HIV/AIDS

This analysis has been conducted in tandem with the ongoing analysis of the long-term costs and financing of HIV/AIDS in South Africa (Guthrie and others 2010), and builds on the four scenarios developed there (summarized in this section). However, there is one important difference between the approach taken here and the one adopted by Guthrie and others (2010). Whereas the latter focuses on the costs and the financing of the HIV/AIDS program, this study is more broadly interested in the fiscal repercussions. For this reason, the projections of this study, presented in this section, also include allowances for payroll-related costs and an analysis of HIV/AIDS impacts on the costs of social grants. Two components of the fiscal costs of HIV/AIDS turn out to be particularly important for understanding the long-terms costs of HIV/AIDS in South Africa—the costs of treatment and care, and the costs of social grants.

Description of scenarios

The analysis by Guthrie and others (2010) is organized around four scenarios.

- A "baseline scenario," which simply assumes that the coverage rates in 2009 are maintained and no additional scale-up is achieved. This scenario serves as a point of reference for measuring the outcomes of the other three scenarios and is not intended as a valid policy scenario.
- A "narrow NSP" scenario, which is based on the National Strategic Plan 2007–11 (NSP). It envisages that targets under the plan are met by 2011 and maintained thereafter.
- A "hard choices" scenario in which treatment coverage rates are the same as in the narrow NSP scenario. It envisages increased coverage of certain prevention measures, but expenditure cuts in certain areas of care and impact mitigation.
- An "expanded NSP" scenario that envisages enhanced eligibility for treatment[41] and higher treatment coverage rates (attained by 2015), and a scaling-up of certain interventions through 2021.

Figure 3.7 summarizes the outcomes of the four scenarios in terms of key indicators of the course and state of the HIV epidemic in South Africa. Figure 3.7a illustrates the profiles of the different scenarios in terms of HIV

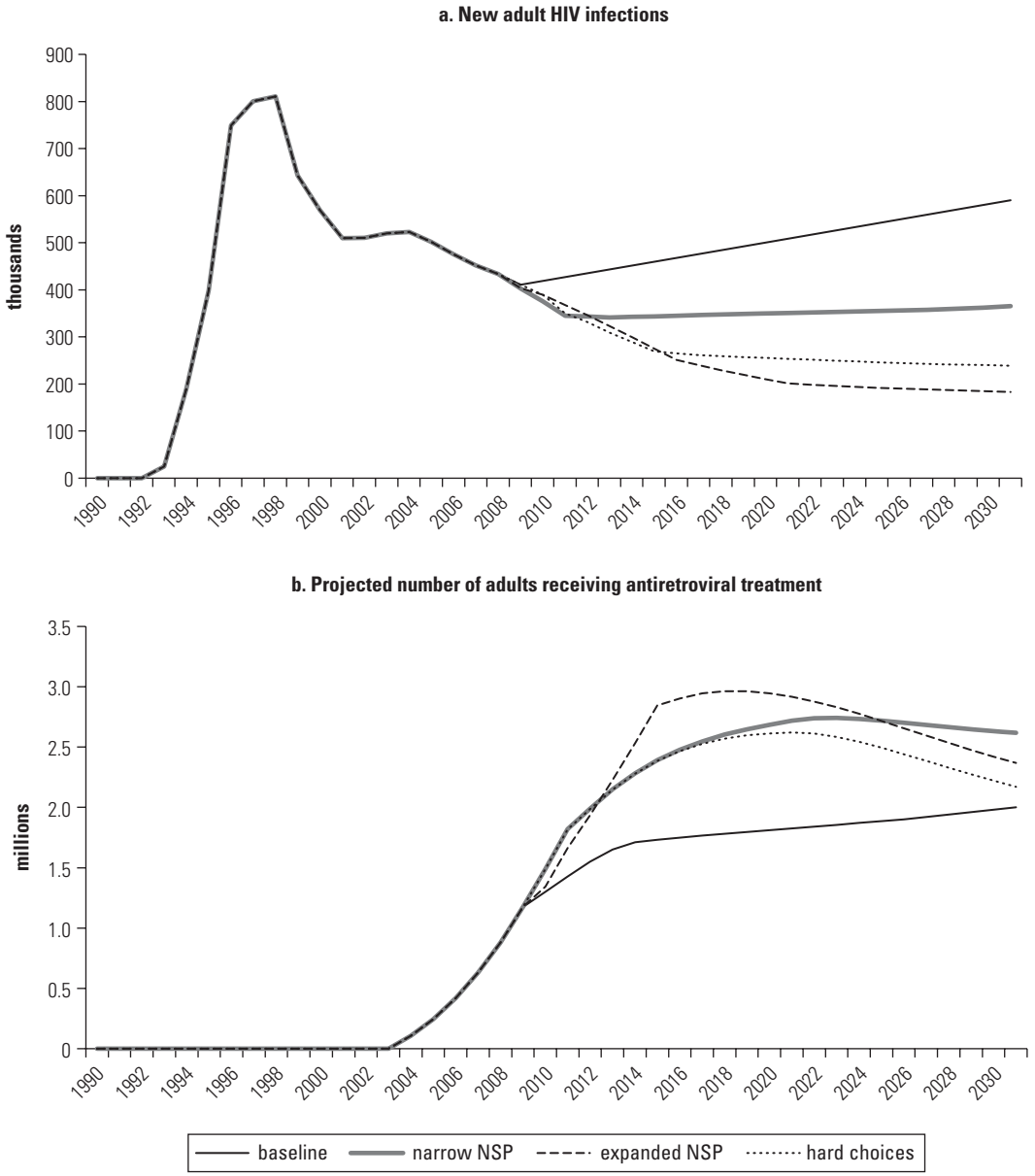
incidence, largely reflecting different prevention strategies. For the baseline scenario, incidence rates are assumed constant from 2009, and the number of new infections increases in proportion with the size of the population. Under the narrow NSP scenario, incidence rates decline in line with the targets of the NSP 2007–11, and remain constant thereafter (so that new infections increase in line with population growth). The hard choices scenario envisages a reallocation of resources from care and mitigation to the most cost-effective prevention measures, reflected in declining HIV incidence rates through 2015. Under the expanded NSP, the number of new infections continues to decline (to about half the level of 2009 by 2020), because of expanded prevention programs and investments in certain social programs aimed at reducing vulnerabilities to HIV/AIDS.

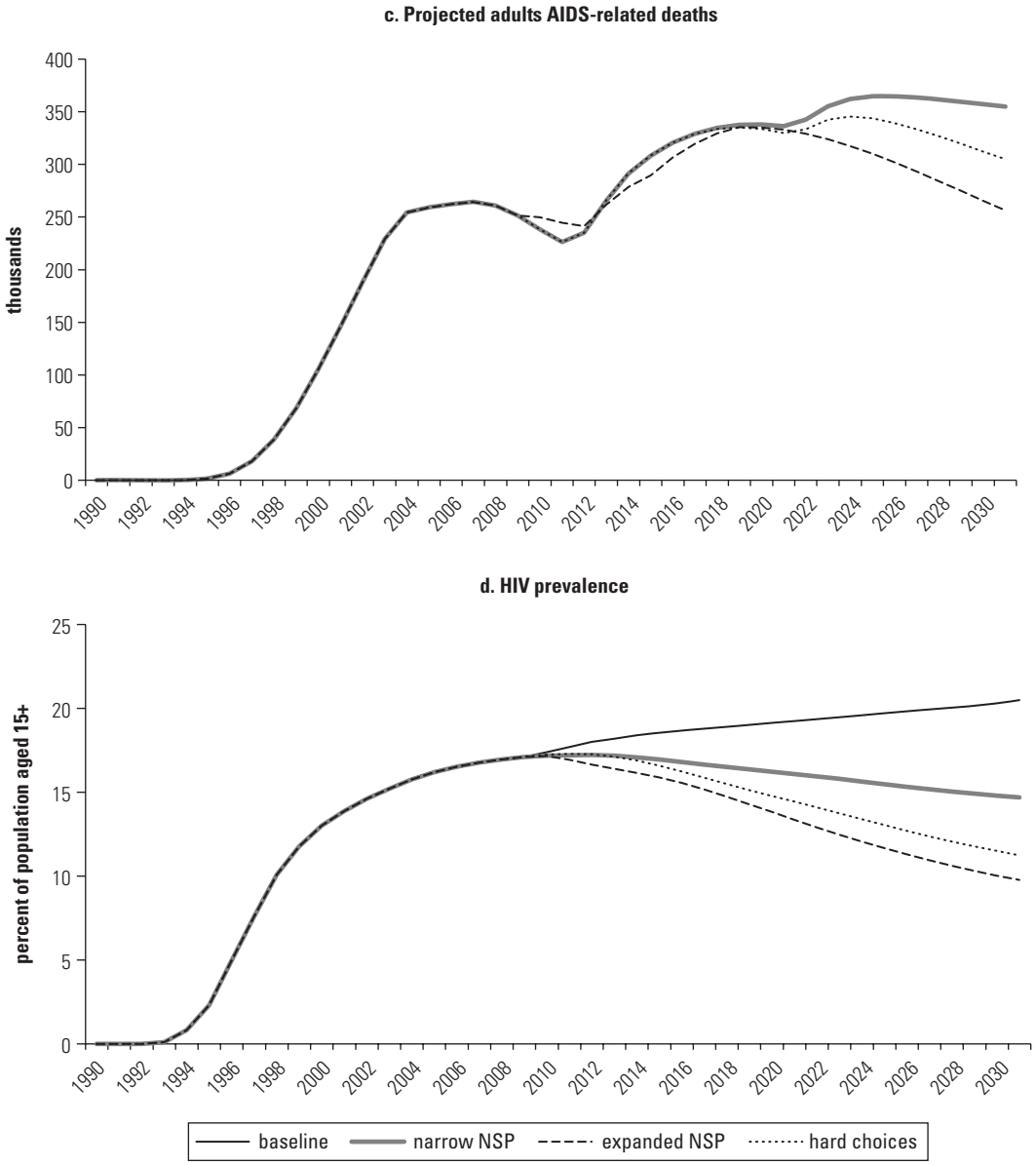
Regarding treatment access (figure 3.7b), the assumption underlying the narrow NSP and the hard choices scenarios is very similar (treatment coverage at 80 percent by 2011); the differences in the outer years are therefore driven by the consequence of lower HIV incidence assumed in the hard choices scenario earlier on. Meanwhile, the expanded NSP envisages a larger number of people receiving treatment early on (because of higher treatment coverage and enhanced eligibility), but eventually the number receiving treatment falls below the narrow NSP scenario resulting from lower HIV incidence. The projected decline in the number of deaths (figure 3.7c) largely mirrors the targeted increases in treatment access. Figure 3.7d presents projections for HIV prevalence (ages 15+). HIV prevalence in the hard choices scenario is lower than in the narrow NSP scenario, because while treatment coverage rates are the same, expenditures under the hard choices scenario are more aggressively targeting prevention. The results of the improved prevention outcomes targeted under the expanded NSP dominate the effects of increased survival, so that HIV prevalence (ages 15+) is lower than in the other scenarios, declining from 17 percent in 2011 to 10 percent by the end of the projection period.

Fiscal costs of HIV/AIDS across scenarios

This analysis of the fiscal costs of HIV/AIDS builds on the very comprehensive and detailed effort to estimate and project the costs of the different scenarios described above. To place these costs in a fiscal context, this study has expanded the analysis in two directions. First, in the stocktaking of the fiscal costs of HIV/AIDS, certain government expenditures were identified

Figure 3.7: The Course of the Epidemic under Four Scenarios, 1990–2031





Source: Guthrie and others (2010).

that do not form part of the HIV/AIDS response: social grants, which reflect broad social development objectives, but the incidence of which is arguably affected by the impact of HIV/AIDS; and the costs of the HIV/AIDS impact on public service. The costs of privately financed treatment are excluded.[42] Second, the costs of HIV/AIDS are interpreted in relation to available resources, such as the level of GDP or domestic government revenues. To this end, a simple macroeconomic model was used to capture the economic consequences of changes in population growth, savings rates, or changes in mortality and morbidity (as explained in the appendix). Regarding government revenues, the figures used are from the National Treasury (2010) through 2013, and it is assumed that revenues will remain at 28 percent of GDP beyond 2013. All nominal numbers quoted below are expressed at constant 2009 prices.

The estimates of the fiscal costs of HIV/AIDS under the different scenarios are summarized in figure 3.8. Under the narrow NSP, the fiscal costs almost double from R18.4 billion in 2009 to R32.8 billion in 2017 (just over 1 percent of GDP), but subsequently decline to R19.1 billion (0.4 percent of GDP) by the end of the projection period (figures 3.8a and 3.8d). The largest component of the fiscal costs of HIV/AIDS are the costs of care and treatment, exceeding half of the total costs throughout the projection period. Remarkably, the impact of HIV/AIDS on the costs of social grants turns negative toward the end of the projection period, offsetting much of the fiscal costs of HIV/AIDS in other categories at that time. This largely reflects that increased mortality at mid-age reduces the number of people reaching retirement age, as the first cohorts highly affected by HIV/AIDS reach retirement age, the costs of old-age grants are therefore reduced. The fiscal costs of HIV/AIDS relative to government revenues (figure 3.8g) rise faster than the fiscal costs relative to GDP, reflecting the slump in government revenues (in percent of GDP) during and following the 2009 recession (see table 3.2), and peak at 3.7 percent of government revenues in 2014.[43]

Under the expanded NSP scenario, the build-up in costs is somewhat faster and also more sustained, reaching R33.9 billion by 2017 (figure 3.8b), and rising to R35.1 billion by 2020. However, the fiscal costs substantially decline over the last decade of the projection period, as a consequence of lower HIV incidence earlier on, and by 2031—at R14.9 billion—are projected to be lower than in the narrow NSP scenario.

Finally, in the hard choices scenario, the initial build-up in costs (figure 3.8c) is similar to the one assumed in the narrow NSP scenario, with

Figure 3.8: Fiscal Costs of HIV/AIDS under Different Scenarios, 2007–31

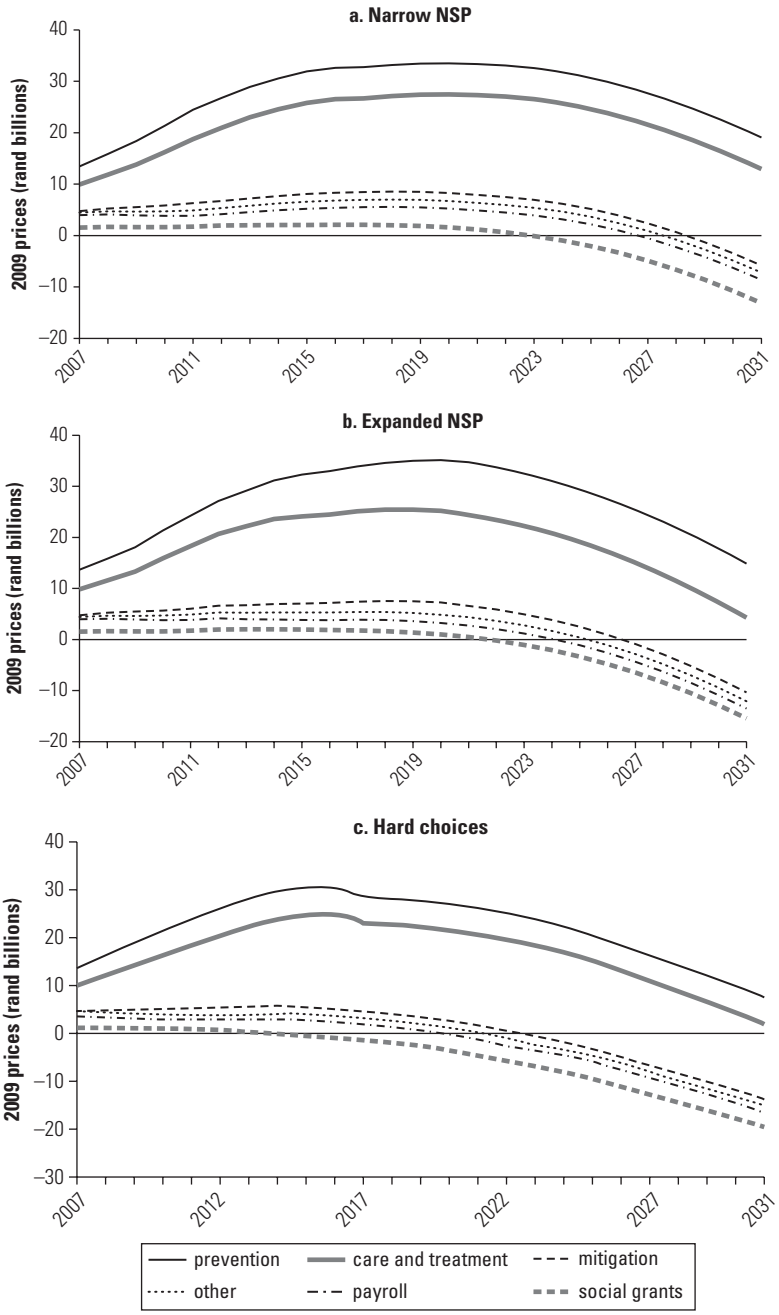


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Figure 3.8: Fiscal Costs of HIV/AIDS under Different Scenarios, 2007–31 (*continued*)

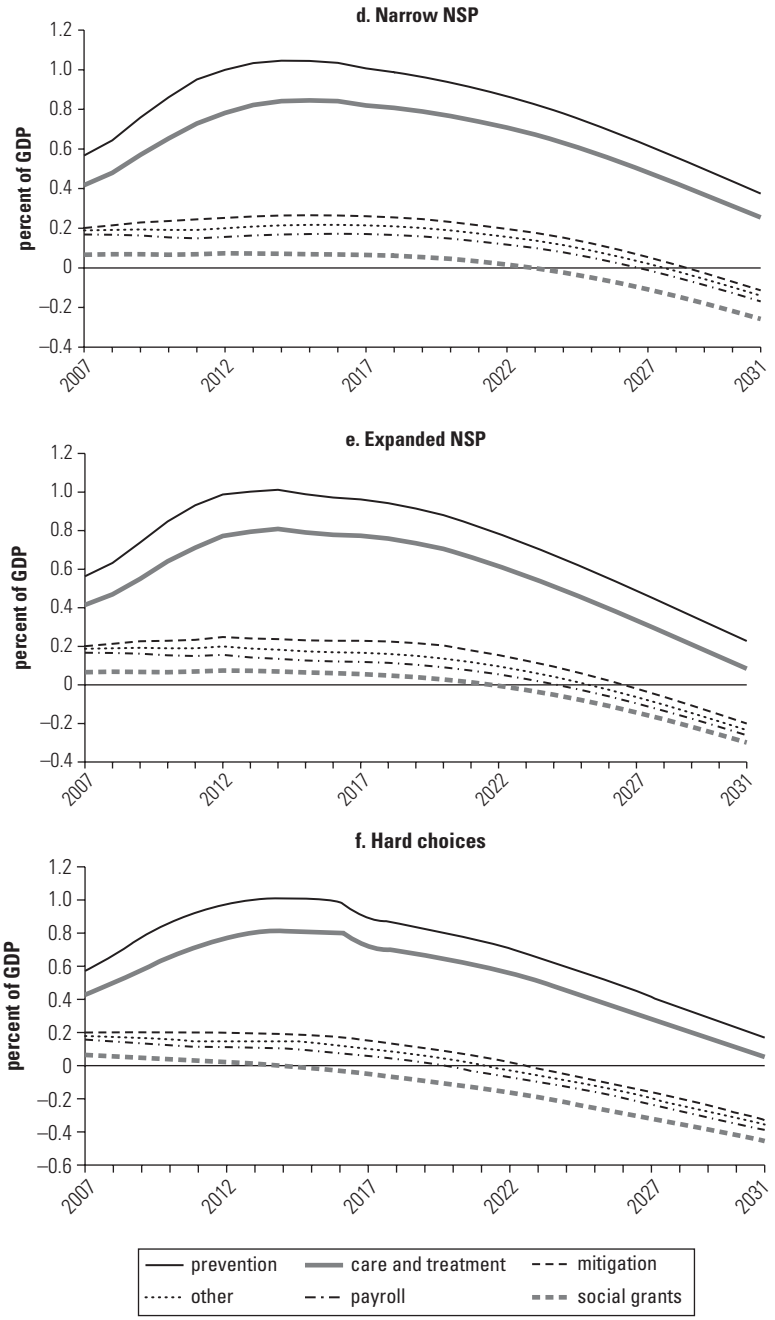

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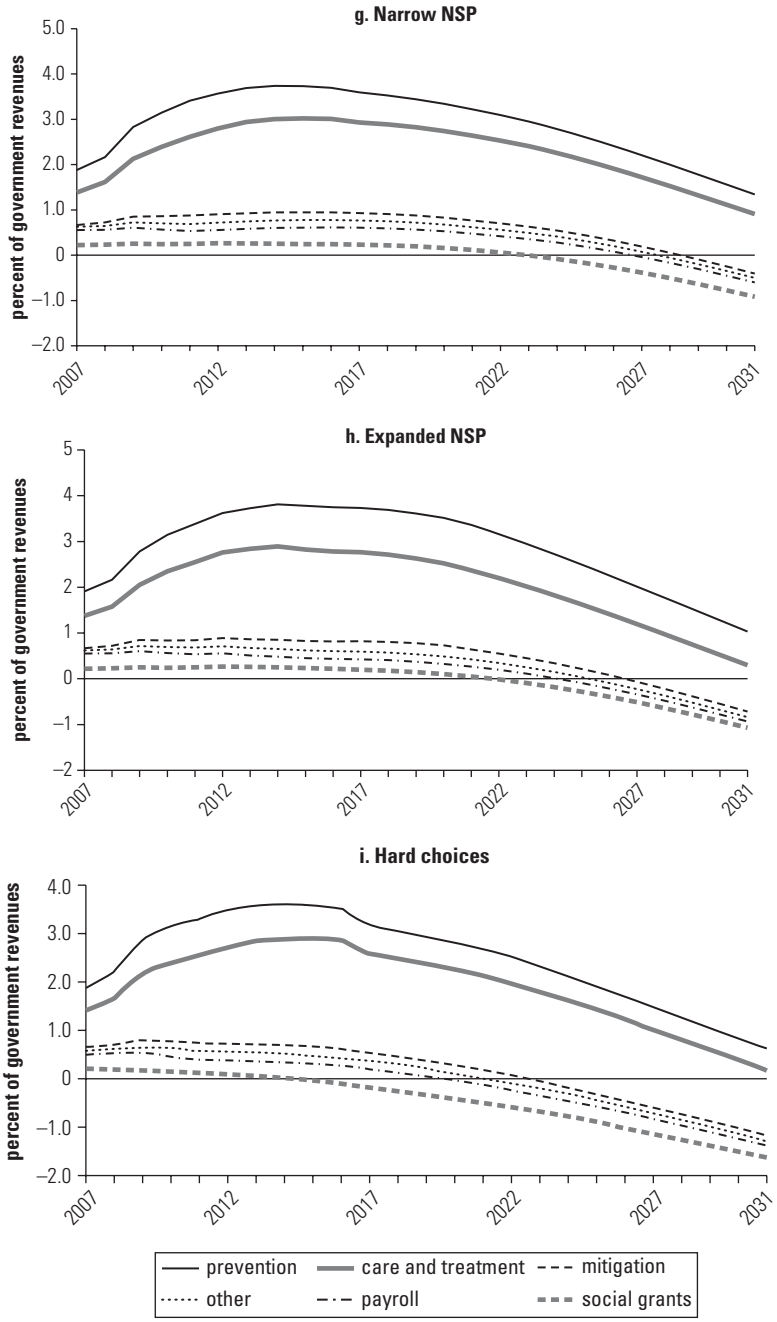
Figure 3.8: Fiscal Costs of HIV/AIDS under Different Scenarios, 2007–31 (*continued*)



Sources: Guthrie and others (2010); authors' calculations.

total costs peaking at R30 billion in 2016. However, there is some reallocation of resources within the program, from mitigation to prevention. In the outer years of the projection horizon, the projected costs under the hard choices scenario decline, as lower HIV incidence eventually results in lower costs of treatment (in this regard, the hard choices scenario resembles the expanded NSP scenario). For this reason, the fiscal costs of HIV/AIDS in 2031 in the hard choices scenario (R10.5 billion) are much lower than in the other scenarios.

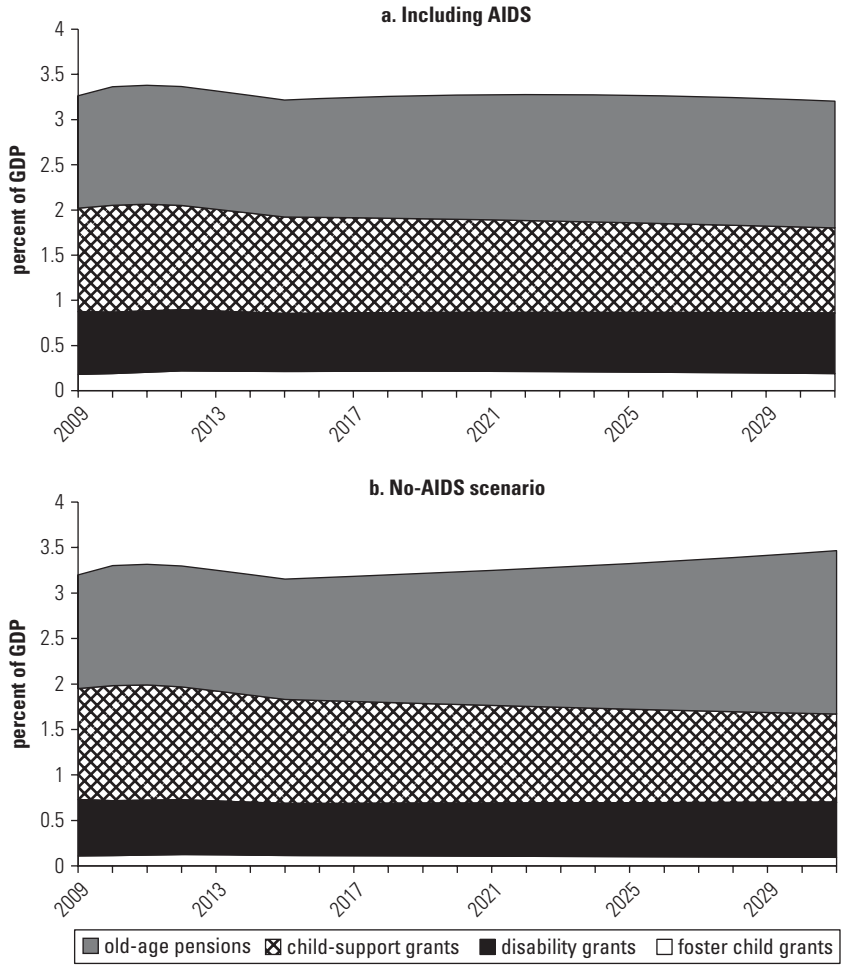
From figure 3.8 there are two factors that appear to be particularly important for understanding long-term trends in the fiscal costs of HIV/AIDS: first, the interplay between prevention efforts and the costs of other program categories, notably the costs of care and treatment, and second, the costs of social grants. Regarding the interplay between prevention efforts and the costs of other program categories, in the expanded NSP, an enhanced prevention program, through reduced HIV incidence, eventually results in lower costs of HIV/AIDS in other program categories, notably in the costs of treatment. However, these savings materialize only over long periods of time. This issue is discussed further in section V, which interprets the costs of HIV/AIDS (for one individual infection, or on the program level) as a liability that commits fiscal resources over time.

The impact of HIV/AIDS on the costs of social grants warrants further comment. These grants are not normally included in the costing of an HIV/AIDS program (with the exception of orphan support). However, the level of social grants in South Africa is large from a fiscal perspective (3.3 percent of GDP in 2009/10), and the impact of the epidemic affects the incidence of conditions targeted by social grants, making the impact of HIV/AIDS on social grants a significant aspect of the fiscal dimension of HIV/AIDS.

To illustrate the role of HIV/AIDS in social spending, figure 3.8 shows projected spending on four main categories of social grants. [44] In addition to the impact of HIV/AIDS, there are several broad trends that need to be considered here. First, the demographic transition—the cohorts moving into retirement age today and over the coming years were born at a time when birth rates were much higher than today (or over the next two decades). Second, due to improvements in public health (aside from the impact of HIV/AIDS), people tend to live longer. Third, birth rates continue to decline, affecting the incidence of social grants targeting children.

This study estimates that the costs of social grants will remain fairly constant (figure 3.9a), around 3.2 percent to 3.3 percent of GDP throughout the projection period. Without the impact of HIV/AIDS, the spending on social grants is estimated to be marginally lower in the first years of the projection period, but then rise to 3.5 percent of GDP by 2031 (figure 3.9b). Underneath these aggregates, there are several significant trends regarding the impact of HIV/AIDS. As observed earlier, the impact of the epidemic initially increases the costs of disability grants and foster child grants, while

Figure 3.9: Social Expenditures, 2009–31



Source: Authors' projections.
Note: Estimates relate to narrow NSP.

reducing the incidence (and duration) of child support. Over the projection period, these impacts decline, as a result of the increased availability of antiretroviral treatment. The factor that dominates the impact of HIV/AIDS on social expenditures in the outer years is the slowdown in the cost of old-age grants, which would increase from 1.3 percent of GDP to 1.8 percent of GDP without the impact of HIV/AIDS, but remains at 1.4 percent of GDP instead.

Underlying the slowdown in the cost of old-age grants is the fact that increased mortality among young adults means that the probability of reaching age 60 (when citizens may become eligible for old-age grants) declines. For example, the United Nations Population Division (2009) estimates that, based on mortality rates over the 2005–10 period, the probability for a 20-year-old South African of reaching age 60 has been reduced from 69 percent to 43 percent for men and from 82 percent to 50 percent for women. Moreover, while increased access to treatment increases the life expectancy of people living with HIV/AIDS, most of them nevertheless die before reaching age 60.

V. HIV/AIDS as a Fiscal Liability

As noted throughout this study, the fiscal costs of HIV/AIDS persist over long a period, and there are certain interactions between different elements of the programs described under the three scenarios previously discussed. In this section, these observations will be discussed further, and a more specific analysis will be developed of HIV/AIDS as a highly persistent fiscal shock that incurs expenditure commitments over time that can be compared to (and analyzed as) a fiscal quasi-liability. Second, an explicit analysis of the interactions between some program components will be provided, specifically the impact of scaling-up of treatment on the costs of other program components, and the incremental costs incurred over time by one additional infection. Third, drawing on strands of the preceding discussion, the links between prevention and the costs of the HIV program from an overall fiscal perspective will be explored. Starting from the observation that the costs of an infection are ultimately caused at the point in time the infection incurs (and subsequent expenditures are addressing the consequences), incremental analysis of the costs of an additional infection will be used to attribute the costs of the HIV/AIDS program to the

points in time at which the infections occur. From this, the fiscal costs that are incurred over time (but generally not paid at the same point in time) can be estimated under the different scenarios.

HIV/AIDS as a highly persistent fiscal shock

An important aspect of the fiscal costs of HIV/AIDS is the fact that the costs of HIV/AIDS impacts and its national response are highly persistent—not only absorbing a considerable share of fiscal resources at present, but projected to continue doing so over many years. This means that HIV/AIDS costs, and implications for the government's fiscal position, can be analyzed as a quasi-liability, similar to pension or social security fiscal obligations, which do not take the form of a formal debt, but of a firm political commitment. Furthermore, different policies have implications for HIV/AIDS fiscal costs over time, and an assessment of the fiscal consequences of policy choices requires capturing not only the current costs, but also the implications for future spending needs.

The present discounted value (PDV) of costs committed by the response to HIV/AIDS is a measure that captures the fiscal burden of HIV/AIDS in a particular year and accounts for the fact that the costs extend over many years. The PDV can be interpreted in a number of ways. It represents the amount that would need to be put aside now to cover the anticipated fiscal costs of HIV/AIDS indefinitely (that is, the value of the quasi-liability), after discounting future costs with the applicable interest rate;[45] the overall costs of a policy change (with consequences over time) could be measured by the change in the PDV; and the fiscal gains from a drop in HIV incidence can be measured by the PDV of the reduced costs of HIV/AIDS-related services and other costs in the future. This study's estimates are summarized in table 3.8 for the three scenarios discussed earlier, augmented by estimates of the impact of HIV/AIDS on social expenditures and payroll-related costs. Two different measures of the fiscal costs of HIV/AIDS are singled out: the fiscal costs that have been committed, under the different policy scenarios, as a consequence of infections that have occurred through 2010, and the fiscal costs including the costs of projected future infections.

To understand the differences between the three scenarios, it is useful to start from the costs already incurred, because these largely reflect the quality of services expected by people currently living with HIV/AIDS (as of 2010) under the different scenarios. Program costs are highest under the

Table 3.8: Fiscal Costs of HIV/AIDS as a Quasi-Liability

	INCURRED BY HIV INFECTIONS THROUGH 2010		INCLUDING PROJECTED HIV INFECTIONS	
SCENARIO/COSTS	RAND BILLIONS	% OF 2010 GDP	RAND BILLIONS	% OF 2010 GDP
Narrow NSP scenario				
Total fiscal costs	121,089	4.9	451,179	18.1
Program costs	543,852	21.9	909,050	36.6
of which antiretroviral treatment	198,445	8.0	451,419	18.2
Social grants	–454,393	–18.3	–576,265	–23.2
Payroll related	31,630	1.3	118,394	4.8
Expanded NSP scenario				
Total fiscal costs	230,115	9.3	413,238	16.6
Program costs	674,496	27.1	920,632	37.0
of which antiretroviral treatment	182,655	7.3	355,520	14.3
Social grants	–471,735	–19.0	–574,407	–23.1
Payroll related	27,354	1.1	67,014	2.7
Hard choices scenario				
Total fiscal costs	49,198	2.0	234,124	9.4
Program costs	456,186	16.3	688,501	27.7
of which antiretroviral treatment	184,162	6.6	353,436	14.2
Social grants	–438,485	–15.7	–543,687	–21.9
Payroll related	31,498	1.1	89,310	3.6

Source: Authors' estimates.

Note: The value of the quasi-liability (measured by the PDV of the projected costs) is based on a discount rate of 3 percent.

expanded NSP scenario (27.1 percent of GDP), followed by narrow NSP and the hard choices scenarios. In addition to the coverage rates of HIV/AIDS-related services, the three scenarios differ in terms of prevention policies, and consequently in terms of the projected number of and costs incurred by new HIV infections. If the costs of these infections are included, the program costs under the narrow NSP scenario (36.6 percent of GDP) and the expanded NSP scenario (37 percent of GDP) are about the same, which means that the expanded NSP scenario achieves a higher quality of services, and a reduced number of new HIV infections, essentially at the same macroeconomic costs as the narrow NSP scenario.

The other major finding from the analysis of the fiscal costs of HIV/AIDS as a quasi-liability regards the costs of social grants, which play a major role in the analysis of the overall fiscal costs of HIV/AIDS. These grants offset much of the costs of HIV/AIDS-related services, especially when only the costs already committed by HIV infections through 2010 are

considered.[46] However, as noted earlier, these savings are not readily available for the financing of the HIV/AIDS program, because they take place in a context of demographic trends that would otherwise result in a steeper increase in the costs of old-age grants. According to the projections of this study, the costs of social grants will remain flat relative to GDP as a consequence of HIV/AIDS, rather than increasing, and therefore the HIV/AIDS program cannot be financed by a reallocation across budget categories.

The fiscal costs of one additional HIV infection

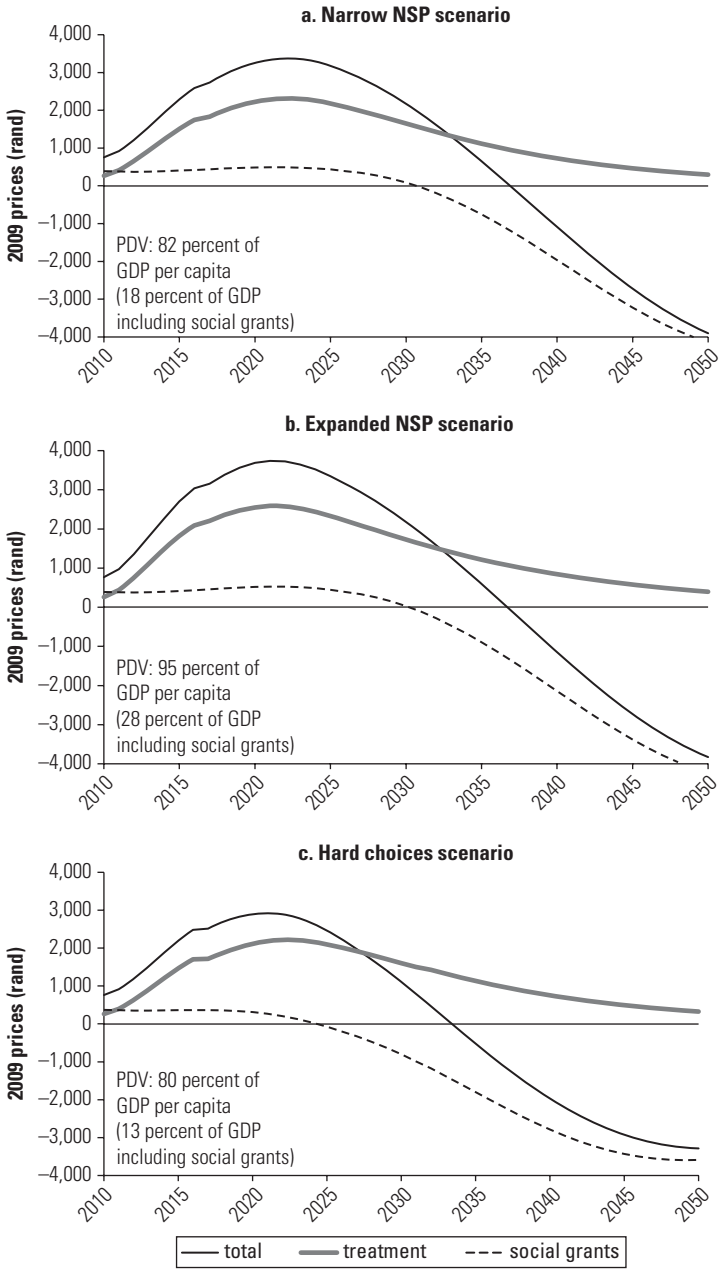
In the previous section, and in the preceding discussion of the three scenarios, the issue of the interaction between different program categories was explored, most notably the link between more ambitious and expensive prevention programs and the costs of treatment. Operating with an even longer time lag, the link between HIV incidence and the costs of social services, particularly old-age grants, was also discussed. This section takes these points further by adding a microeconomic perspective, estimating the costs that are incurred under the different scenarios by one additional HIV infection occurring in 2010.[47]

The estimates are summarized in figure 3.10, highlighting the role of "care and treatment" and "social grants"—two factors identified earlier as key drivers of the fiscal consequences of HIV/AIDS. Because the estimates of the costs incurred by one additional infection over time are much less sensitive to global assumptions (for example, regarding the course of the epidemic) than the aggregate estimates, the estimates of the costs incurred by one infection over a longer time period are presented through 2050.

The three scenarios accentuate the role of treatment as the major driver of fiscal costs of HIV/AIDS over the 20 years following an infection, peaking at an average of R2,800 annually in the expanded NSP scenario, and at about R2,200 in the other two scenarios (which make similar assumptions regarding treatment access, but reallocate expenditures in other areas).[48] However, after about 20–25 years, the reduced costs of social grants become the main driver of the fiscal costs of one additional infection, because people living with HIV/AIDS are unlikely to reach retirement age and thus to benefit from old-age grants.[49]

As in the discussion of the overall fiscal costs of HIV/AIDS, the PDV can be used to estimate the quasi-liability incurred by one additional infection. Using a discount rate of 3 percent, the costs of one additional infection

Figure 3.10: Costs Incurred by One Additional Infection, 2010–50



Source: Authors' calculations.

come out at R39,600 (82 percent of GDP per capita) for the narrow NSP (or R8,800, 18 percent of GDP per capita, when savings in social grants are included), R45,800 or 95 percent of GDP per capita for the expanded NSP (or 28 percent of GDP per capita including social grants), and R38,600 (80 percent of GDP per capita) for the hard choices scenario (13 percent of GDP including social grants).

These estimates also provide some information relevant to the evaluation of the cost-effectiveness of HIV/AIDS programs, because they can be interpreted as estimates of the fiscal gains from infections prevented. However, the distinction in evaluations of prevention measures between HIV infections prevented altogether and infections delayed is not always clear. For example, if an evaluation of an intervention among young students finds that after a year, HIV incidence has been significantly lower as a result of the intervention, one can be confident that a certain number of infections have been delayed by at least a year. However, in many cases, the students who did not contract HIV during the study period may do so later on. For this reason, the estimates of the fiscal costs of infections prevented altogether would exaggerate the fiscal benefits from a prevention measure.

In addition to the estimates of the fiscal gains arising from HIV infections prevented altogether, it is therefore important to have a measure of the value of infections delayed. For the fiscal costs (gains) in terms of HIV/AIDS program expenses of one additional infection (from an additional infection prevented altogether) of R36,800, R42,500, and R34,700, respectively, under the different scenarios, the fiscal gains from one infection delayed by one year come out at about R1,100, R1,280, and R1,040.[50] Based on estimates of the effectiveness over time of a prevention intervention, the estimates of the savings from infections prevented altogether or delayed can be used to assess the cost-effectiveness of prevention programs or of allocations between prevention and other program categories.

HIV incidence and the fiscal costs of HIV/AIDS

One of the recurrent findings of this study so far is the observation that HIV/AIDS is a highly persistent shock, and that the fiscal burden (overall, or in terms of one additional infection) is changing considerably over time. This implies that the fiscal costs of HIV/AIDS at a point in time can give a very misleading picture of the fiscal burden associated with the impact of

and the response to HIV/AIDS. For example, enhanced—and expensive—prevention efforts may increase the fiscal costs in the short run, while reducing the fiscal burden overall. Because of the well-known long lags between infection and treatment need, a costing analysis does not fully capture these effects. For example, the expanded NSP scenario described earlier in this study envisages ambitious prevention measures, contributing to the costs of the program, but much of the savings (reduced treatment need) occurs after the projection period.

For this reason, this analysis of the fiscal costs of HIV/AIDS on a cash basis is complemented with an analysis on a "commitment" basis. This analysis is based on the observation that most of the needs for HIV/AIDS-related services are ultimately caused at the time an infection occurs. From the perspective of public finance, under the targets formulated as part of the HIV/AIDS program, each HIV infection therefore corresponds to a commitment of future public spending, the costs of which can be summarized by the PDV of these spending commitments (as calculated above for a single infection occurring in 2010). As a next step, the estimate of the cost of one additional infection is adapted to assess the evolving fiscal burden of HIV/AIDS at the macroeconomic level. The analysis proceeds in three steps. First, the costs of HIV/AIDS are divided into two categories—prevention and population-based spending that is not directly linked to HIV incidence or prevalence, and the costs incurred by new infections.[51] Second, the PDV of the costs incurred by one new infection for each year over the projection period (as above for 2010) is calculated. Third, the fiscal burden of HIV/AIDS incurred at a point in time, as the sum of prevention and population-based spending and the costs incurred by new infections (the costs incurred by one infection, multiplied by the number of new infections), is calculated.

Estimates of the fiscal costs of HIV/AIDS on a commitment basis are summarized in figure 3.11.[52] In all scenarios, the fiscal costs of HIV/AIDS decline relative to GDP throughout the projection period: from 0.8 percent of GDP to 0.4 percent of GDP in the narrow NSP scenario, from 0.9 percent of GDP to 0.4 percent of GDP in the expanded NSP scenario, and from 0.7 percent of GDP to 0.3 percent of GDP in the hard choices scenario. A major driver of the decline in the fiscal costs is reduced HIV incidence, resulting in steeper declines in the fiscal costs in the expanded NSP and hard choices scenarios, as compared to the narrow NSP scenario where the HIV incidence rate declines very slowly during most of the projection

Figure 3.11: Fiscal Costs of HIV/AIDS, "Commitment" Basis, 2010–31

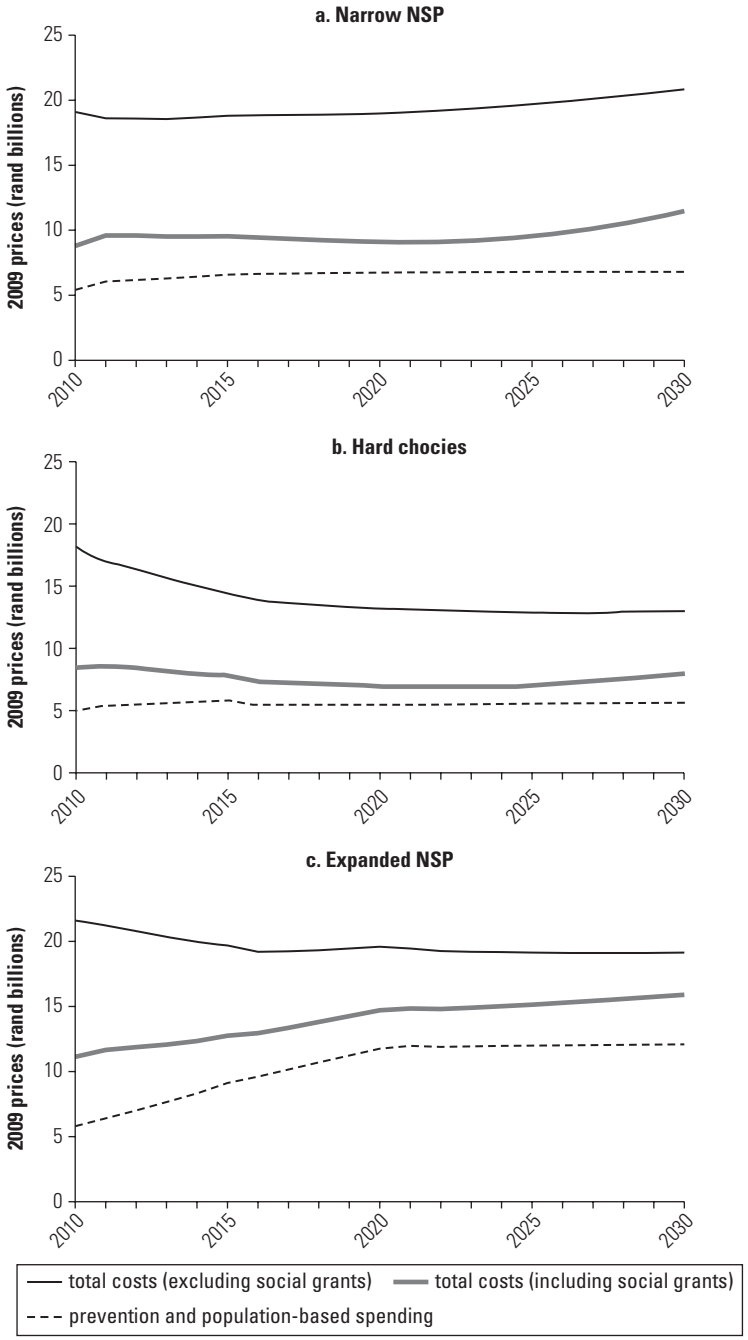


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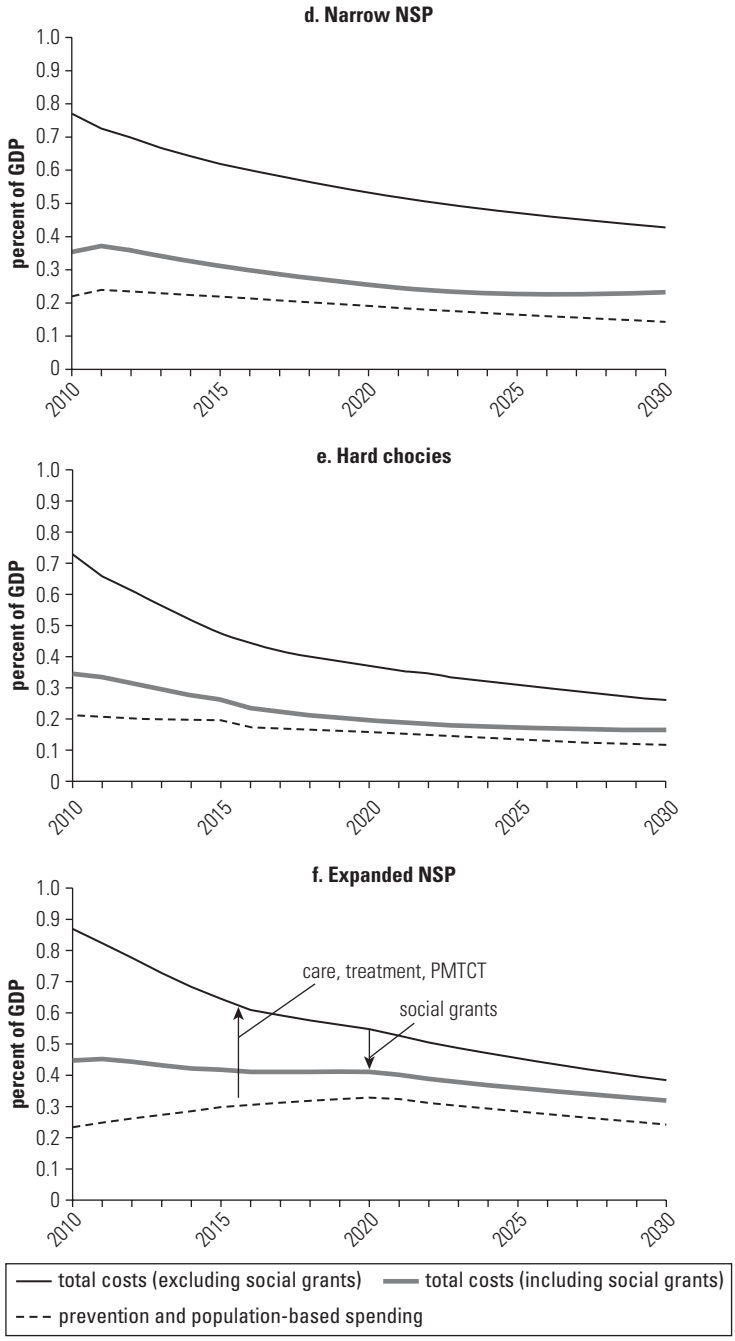
Figure 3.11: Fiscal Costs of HIV/AIDS, "Commitment" Basis, 2010–31 (*continued*)



Source: Authors' calculations.

Note: PMTCT = Prevention of mother-to-child transmission.

period, and the number of new infections increases slowly in absolute terms, accounting for the upward trend in figure 3.10a.

One striking aspect of the projections of fiscal costs of HIV/AIDS on a commitment basis presented in figure 3.11 is that they look very different from the projections of actual spending presented in figure 3.8. This underscores the point that it is important to distinguish between the cause of HIV/AIDS-related spending (HIV infections) and the effects (costs of HIV/AIDS-related services). The build-up in actual HIV/AIDS-related spending summarized in figure 3.7 thus largely represents accumulated demand for HIV/AIDS services incurred earlier, whereas the underlying burden in terms of the costs incurred by new infections is already declining. Meanwhile, the decline in actual spending toward the end of the projection period (as savings from the slowdown in the costs of social grants kick in) should not distract from the costs that continue to be incurred as a consequence of new infections.

Additional lessons can be drawn from comparisons between scenarios. While the fiscal costs incurred by new infections are initially highest in the expanded NSP scenario, they decline faster than the fiscal costs in the narrow NSP scenario and eventually are slightly lower. Even though coverage rates of a broad range of services (and thus the costs incurred by one new infection) are higher in the expanded NSP scenario, these higher costs per infection are offset by the envisaged decline in HIV incidence, and the costs incurred under the expanded NSP are below the costs incurred under the narrow NSP scenario from 2024.

Moreover, these aggregate costs mask significant differences in the outcomes of the different scenarios, reflected in the composition of spending. The expanded NSP envisages a large build-up in prevention and population-based spending, while the costs of treatment and PMTCT decline sharply as a result of reduced HIV incidence, and eventually account for only half of the costs of treatment and PMTCT compared to the narrow NSP scenario. The aggregate fiscal costs incurred under the two scenarios thus mask large differences in the outcomes from a public health perspective.

VI. Conclusions

This analysis describes HIV/AIDS as a complex and significant challenge for public policy in South Africa that can hinder the attainment of key

policy objectives such as health outcomes, social inequality, and access to education. Meanwhile, the impacts of and the response to the HIV/AIDS epidemic absorb a significant amount of fiscal resources. The bulk of this analysis has focused on the latter aspect—offering an analysis of the fiscal consequences of HIV/AIDS that covers broader ground than a conventional HIV/AIDS program costing exercise. This study also developed tools to assess the implications of HIV/AIDS and the HIV/AIDS response for fiscal resources over time, interpreting spending commitments under the HIV/AIDS program as fiscal quasi-liabilities. These tools can be used for analyzing and selecting between comprehensive HIV/AIDS programs, as well as for assessing the fiscal consequences of specific measures.

The projections of the fiscal costs of HIV/AIDS were developed in conjunction with Guthrie and others (2010), singling out three scenarios to describe broad policy options for taking forward the national response to HIV/AIDS. However, because this study focused on the fiscal repercussions of HIV/AIDS, rather than the costs of the HIV/AIDS program, the scope of this analysis is broader and also includes certain categories of social grants as well as allowances for the costs of HIV/AIDS impacts on public servants. The analysis found that the costs of HIV/AIDS are substantial in each of the scenarios, peaking around 1 percent of GDP (somewhat higher in the expanded NSP scenario). The most important driver of the rising fiscal costs of HIV/AIDS early on is the increase in the costs of treatment and care, largely reflecting the increasing number of people receiving antiretroviral treatment. Later in the projection period, the fiscal costs decline as envisaged reductions in HIV incidence begin to feed into lower demand for HIV/AIDS-related services, particularly in the expanded NSP and hard choices scenarios, and as increased mid-age mortality slows down the (otherwise increasing) costs of old-age grants.

This study developed tools for assessing the fiscal consequences of HIV/AIDS geared for the needs of policy makers assessing the consequences of different policy options or specific measures. These tools build on the observation that the costs of HIV/AIDS are highly persistent (long lags from infection to certain mitigation, care, treatment, and social services) and ultimately caused by new infections, and can be interpreted as quasi-liabilities that are, under the HIV/AIDS program, incurred by by HIV infections. To enable the analysis of specific prevention measures, the fiscal

costs caused by one individual infection were estimated and summarized by the PDV of the costs incurred over time. The analysis found that the program expenses incurred by one additional infection correspond to between 0.7 times GDP per capita (hard choices scenario) and 0.9 times GDP per capita (expanded NSP scenario). However, from a broader fiscal perspective, much of this is offset by later savings in old-age grants, so that the net fiscal costs range from 0.3 times GDP per capita to 0.1 times GDP per capita. On the macroeconomic level, the costs incurred by new infections decline steadily, for example, from 0.9 percent of GDP in 2010 to 0.4 percent of GDP in the expanded NSP scenario. This indicates that current spending indeed is not a good measure of the fiscal costs of HIV/AIDS: the build-up in spending across scenarios through 2015 is the consequence of treatment and other needs incurred by past infections, but the fiscal costs of newly incurred infections in this period are already declining. Meanwhile, the decline in the fiscal costs of HIV/AIDS (in terms of current spending) in the outer years of the projection period, as savings in the costs of old-age grants materialize, masks the costs that are newly incurred as a consequence of HIV infections.

The analysis here has implications for the design of HIV/AIDS-related policies in several areas. The analysis shows that the impact of and the response to HIV/AIDS are significant from an overall fiscal perspective, not only because they intersect with many of the government's key policy objectives, but also because the response to HIV/AIDS absorbs significant fiscal resources over a long period of time.

However, in contrast to the large fiscal costs of HIV/AIDS, there is only limited data available on the costs of HIV/AIDS and HIV/AIDS-related services, the coverage of services, and the cost-effectiveness of interventions and cost benefit. Investments in improving data on the drivers and course of the epidemic in South Africa and the costs and effectiveness of alternative HIV/AIDS-related interventions are likely to yield high returns—both in terms of improving the effectiveness and efficiency of the national HIV/AIDS response and in achieving improved health outcomes.

In addition to providing a framework for analyzing and projecting the fiscal costs of HIV/AIDS, and thus assisting in planning the financing of the national HIV/AIDS response, this analysis provides tools to inform policy choices both on the microeconomic level and for assessing broad alternative HIV/AIDS policies. To enable concrete policy choices on the microeconomic level, this analysis translates the costs incurred by an HIV infection

over time under an HIV/AIDS program into a cost (a quasi-liability) that is incurred at the moment an infection occurs. These estimated costs of one additional infection provide a tool to assess the effectiveness of prevention measures.

Alternatively, this analysis can be used to compare the fiscal consequences of alternative HIV/AIDS policies by integrating the fiscal savings from reduced HIV incidence, along with current outlays, in an assessment of the fiscal costs of an HIV/AIDS program. For example, the analysis found that the costs of the HIV/AIDS programs under the expanded NSP scenario and the narrow NSP scenario are approximately the same, because higher outlays early on under the expanded NSP are offset by the fiscal savings from reduced HIV incidence, even without taking into account the direct health outcomes, which are clearly superior under the expanded NSP.

VII. Annex

Assumptions on macroeconomic context

HIV/AIDS has major impacts on the size of the (working-age) population in the longer run, which in turn is one of the most important determinants of GDP. For the consistency of long-term projections (which frequently describe the fiscal costs of HIV/AIDS in percent of GDP), it is therefore necessary to capture the impact of HIV/AIDS on GDP and economic growth. Although there are several sophisticated models available to analyze the macroeconomic impacts of HIV/AIDS in South Africa (discussed in the main text), these models generate much richer predictions (numerous sectors, several types of labour, certain short-run dynamics) than needed for analysis here, and require more inputs that are more sophisticated than the projections generated by the demographic and epidemiological component, for example, regarding the composition of the population and the distribution of HIV prevalence across population groups.

Instead, this study adopted a very simple macroeconomic model, with only one sector and one type of labor. In this model, HIV/AIDS affects economic growth as it affects productivity, investment rates, and the supply of labor. The parameters of the model were aligned with key macroeconomic features of the South Africa economy, and were chosen to replicate the long-term behavior of one of the major macroeconomic models of the South African economy. Specifically, this study assumes that

$$Y_t = K_t^{\alpha}(AL_t)^{1-\alpha} \text{ and } K_{t+1} = sY_t - \delta K_t,$$
$$\text{with } \alpha = \frac{1}{3}, s = 0.22, \text{ and } \delta = 0.08.$$

Because the economy is recovering from the impact of the global crisis, the parameter A has been varied through 2015 so that GDP projections are in line with IMF (2010). For the outer years, the study assumes that A grows at a rate of 2.5, consistent with long-term GDP growth around 3–4 percent.

The assumptions regarding the impact of HIV/AIDS reflect the scarce microeconomic evidence. Additionally, this study tested the behavior of the model against the projections of one of the major studies of the macroeconomic impact of HIV/AIDS in South Africa (Ellis, Laubscher, and Smit 2006).

In this framework, the principal impacts of HIV/AIDS are:

- A slowdown in the growth of the working-age population L_t (in line with the population projections being used);
- A decline in the savings rate S;[53] and
- A decline in labor productivity A.[54]

Overall, this study projections suggest that GDP will be 8 percent lower by 2020 than in the absence of HIV/AIDS (about equal to the estimate by Ellis, Laubscher, and Smit 2006), and that the impact will grow to 12 percent by 2031.[55]

Notes

1. Regarding the ASSA (2006) estimates, see also Dorrington and others (2006). Johnson and Dorrington (2006) discuss underlying assumptions and methods.
2. This calculation uses population estimates from United Nations Population Division (2009) as a denominator.
3. The socioeconomic aspects of the impact of HIV/AIDS are covered in more detail in the discussion of HIV/AIDS and social development.
4. The illustrations for the categories (in brackets) are by the author, and should not be attributed to the Minister of Health.
5. See, for example, Chaisson and Martinson (2008).
6. Additionally, improving health systems' effectiveness has featured prominently in key HIV/AIDS-related policy documents (see SANAC [2007] and Department of Health [2003]).

7. It is unclear how WHO (2009) accounts for HIV/TB coinfections. The extent to which deaths are attributed to TB or HIV/AIDS may affect these ratios.
8. The implications of socioeconomic status and access to health services are covered in the section on social development.
9. For a more general discussion of the impact of HIV/AIDS on the education sector, see Coombe (2007).
10. See, in particular, Peltzer and others (2005), Shisana and others (2005), and Badcock-Walters and others (2005).
11. Another group of countries where life expectancy is out of line with the level of GDP per capita consists of new oil producers where recent high rates of economic growth have not translated into rapid increases in life expectancy.
12. This can be misleading, because differences in access to health services across population groups and different mortality rates (in turn correlated with economic factors) may blur the picture, because HIV prevalence would understate the impact of HIV/AIDS in population groups where underlying mortality is higher, or access to treatment is lower.
13. See Ellis, Laubscher, and Smit (2006) for a discussion.
14. For men, awareness that "using condoms" or "limiting sex to one uninfected partner" reduces the risk of contracting HIV/AIDS, at about 90 percent for respondents with higher education, double the level of awareness for respondents with no education. For women, awareness was higher across education categories, and the gap between respondents with higher education and no education was smaller (20 percentage points). HIV awareness was about 20 percentage points higher for males classified as "white," compared to "colored" or "African" categories. The corresponding gap for females was 10 percentage points.
15. Relatedly, Statistics South Africa (2008a) reported that only 14 percent of the population benefited from medical coverage.
16. Whether the role of the public sector is a response to or a cause of the differences in insurance use across households is beyond the scope of this discussion.
17. However, it should be noted that development outcomes of expanding treatment access, and the fiscal costs, need to be assessed against alternative policies in the areas of health and social development.
18. Rosen and others (2005) discuss in more detail the consequences of rationing implicit in the allocation of treatment, as well as alternative rationing schemes.
19. Booysen, Geldenhuys, and Marinkov (2003) provide a good survey of the earlier literature on the macroeconomic impact of HIV/AIDS in South Africa. Nattrass (2003) provides a critical discussion of approaches that have been used to address the macroeconomic impact of HIV/AIDS. Ellis, Laubscher, and Smit (2006) also provide a concise discussion of earlier studies of the macroeconomic impact of HIV/AIDS in South Africa.

20. The papers by Arndt and Lewis (2001) and Thurlow, Gow, and George (2009) both adopted a computable general equilibrium model that generated some projections on sectoral shifts, but it behaves very similar to a more aggregated model as far as macroeconomic variables such as GDP or GDP growth are concerned.
21. This latter finding is surprising at first sight, as low-income households in their study are disproportionately affected by HIV/AIDS, but reflects that increased mortality also reduces the number of poor and thus poverty and inequality. Such counter-intuitive findings are a reason why this study used a broader set of objectives, that of public policy, as a reference point for discussing the impacts of HIV/AIDS. In this perspective, disproportionately higher mortality among low-income households is—sensibly—interpreted as exacerbating existing inequalities, even though income inequality may decline as a result.
22. To illustrate the extent of discrepancies, consider Bell, Devarajan, and Gersbach (2006), projecting a catastrophic impact on the South African economy, and Young (2005), who suggests that HIV/AIDS has raised GDP per capita by about 10 percent (and that it will remain at an increased level for several decades).
23. For further discussion, see Temple (1999), or Deaton (2003, 2006).
24. This is relatively brief, as it is covered in ample detail by Guthrie and others (2010).
25. According to OECD (2010), development assistance to South Africa increased from $386 million to $1,331 million between 2000 and 2009. Much of this increase is accounted for by the increasing role of HIV/AIDS-related aid (OECD category "STD control incl. HIV/AIDS"), which rose from $19 million to $566 million.
26. GDP per capita in 2010 is 32.5 percent higher than in 1995. Because health spending increased from 7.3 percent of GDP to 8.8 percent of GDP over this period, resources absorbed by the health sector increased by 60 percent.
27. This refers to the CPI for metropolitan areas, which is the only one available throughout this period. Numbers are quoted through 2008 only, as the CPI was rebased at end-2008, making comparisons with later data difficult at this time. Data file ("Consumer Price Index [Base 2000 = 100] terminated December 2008") obtained online from Statistics South Africa on August 22, 2010.
28. The international comparison is distorted by the very high levels of health spending reported for a number of small island economies. Five of the six middle-income countries reporting public health spending much higher than South Africa belong to this category (Kiribati, Niue, Nauru, Marshall Islands, and Micronesia). The other country is Cuba, which—in terms of its economic structure—is not an obvious reference point for South Africa.
29. While informed by data on actual expenditures on various HIV/AIDS-related measures, Guthrie and others (2010) estimated and projected the costs of the HIV/AIDS program from the bottom up, mainly by combining assumptions about the population in need of a certain measure, coverage rates, and the unit costs of the intervention.

30. Looking ahead, Guthrie and others (2010) offer several scenarios; this point will be re-addressed later, in the forward-looking discussion of the fiscal dimension of HIV/AIDS.
31. Additionally, indirect effects occur as the impact of HIV/AIDS affects the government's revenues. This study does not provide estimates of the loss in government revenues resulting from HIV/AIDS so far, but it does address this issue in the projections, as reduced GDP growth translates into slower growth in government revenues.
32. If the decline in fertility is 20 percent, and the number of births from HIV-positive mothers is 100,000, the decline in the number of births resulting from reduced fertility is $(100/(100 - 20)) \times 100{,}000 = 25{,}000$.
33. While this number may appear low at first sight, it is important to recall that only a minority of children in families affected by HIV/AIDS become eligible for child support (as household income falls below the eligibility threshold) as a result of HIV/AIDS.
34. Like child support grants, foster care grants are affected by reduced birth rates. These, however, are already incorporated in the study's estimates and projections of the number of orphans and need not be modeled additionally.
35. According to Louw and others (2009), HIV prevalence among teachers, at 12.7 percent, was somewhat less than the general population in the same age band. Shisana and others (2003) estimated the prevalence of HIV/AIDS among health workers over age 18 at public facilities at 16.3 percent, just slightly higher than in the general population of reproductive age at that time (15.6 percent).
36. It is important to note that this estimate is intended to capture all sick leave incurred as a consequence of an HIV infection, not only sick leave taken immediately preceding death, and would also cover funeral- and care-related absences. This approach could yield misleading results if morbidity caused by HIV/AIDS is out of line with mortality. However, comparing estimates by WHO (2009) of disability-adjusted life years lost and increased mortality as a consequence to HIV/AIDS with other diseases, it appears that the estimation approach is not out of line. However, the estimate here appears high relative to standard leave allowances (36 days over three years, plus additional incapacity leave when required).
37. The share of HIV/AIDS in sick leave was calculated based on HIV/AIDS-related mortality in the 20–60 age group (0.42 percent, out of a total of 0.96 percent). To estimate the impact of HIV/AIDS on the costs of sick leave over time, the commonly used mortality rate for the population of ages 15–49 was adopted as a scale variable (0.45 percent in 2000) and the multiplier adjusted accordingly.
38. Rosen and others (2004) report that the death of an employee incurs a cost of between 7 and 25 days of supervisory time.
39. Rosen and others (2004) report a "reduction in productivity due to new employee's learning curve" of between 25 and 60 percent for skilled workers, and between

20 and 55 percent for unskilled workers. In many cases, a person filling a vacated position will come from a related position within the government (which may incur a lower learning cost), but would need to be replaced in his or her previous position. This study assumes that the learning costs of a new appointment and the costs of shifts between positions, possibly including a new appointment further down the chain, are equivalent.

40. Authors' calculation. Haacker (2004) provides a more extensive discussion of the impacts of HIV/AIDS on training costs and the returns to training.
41. In the expanded NSP scenario, the criterion for eligibility for treatment is a CD4 count of 350 or below. In the narrow NSP and hard choices scenarios, the eligibility criterion remains as a CD4 count of 200.
42. In Guthrie and others (2010), about 10 percent of antiretroviral treatment for adults is financed through the private sector.
43. For the later years, government revenues are assumed to be constant relative to GDP. The fiscal costs of HIV/AIDS relative to government revenues are therefore proportional to the fiscal costs relative to GDP.
44. As before, this analysis focuses on four types of social grants that account for 97 percent of social grant expenditure, omitting some items that cannot be directly linked to the impact of HIV/AIDS or that are very small from an overall fiscal perspective.
45. Consistent with this interpretation, the estimates of the PDV are based on an interest rate of 3 percent, approximating the real interest rate at which the South African government could refinance the fiscal costs of HIV/AIDS.
46. The costs of social grants—particularly old-age grants—play a more prominent role for the costs on infections already incurred, because people who have recently contracted HIV tend to reach retirement age only with a lag of several decades. The reduced fiscal costs of old-age grants as a result of new HIV infections are therefore heavily discounted.
47. The consequences of an HIV infection—in terms of survival and the role of mother-to-child transmission—differ between men and women. The estimates are an average (weighted by the respective numbers of new infections in 2010) of the consequences of an additional male or female infection.
48. These averages are below the estimated annual costs of treatment, because the expected values are averages over the states "receiving treatment," "needing but not receiving treatment," "deceased," and "not requiring treatment," weighted by the respective probabilities.
49. The changes in the costs of social grants across scenarios are very similar, as the incremental analysis abstracts from the most important factors driving these on the macroeconomic level, for example, overall prevalence or incidence. Note that since it is assumed for this study that the unit costs of social grants increase with GDP per capita, the individual costs in 2050 may therefore appear high relative to current levels of social grants.

50. This is calculated by discounting the costs incurred by one infection by one year. For example, if the fiscal costs of one additional infection are R10,000, and the discount rate is 3 percent, the fiscal savings from a one-year delay are equal to R300 (3 percent of R10,000).This example does not account for changes in the costs incurred by an infection over time, if these costs rise over time, the fiscal savings from a delayed infection would be smaller.
51. Among prevention and population-based spending are included most prevention spending and population-based social mitigation spending. Among the costs incurred by new infections are the costs of care and treatment, prevention of mother-to-child transmission, and the costs of social grants attributed to HIV/AIDS.
52. The term "commitment" is used in a way somewhat different from its normal usage in fiscal analysis. In this usage, the government's policy targets under the HIV/AIDS program, in terms of the coverage of certain HIV/AIDS-related or social services, represent a commitment, the costs of which are incurred at the time an infection occurs.
53. The study assumes that in addition to the fiscal costs of HIV/AIDS, each death incurs a private cost equivalent to 1 × GDP per capita. The rate at which these costs translate into reduced savings and investment is assumed to be equal to the aggregate savings rate. For example, a fiscal cost of 2 percent of GDP, and a mortality rate of 1 percent would translate into an overall cost of HIV/AIDS of 3 percent of GDP, and a decline in savings of 0.66 percent (= 0.22 × 3 percent) of GDP.
54. The study assumes that A grows at a rate of 1 percent over the projection period. However, to capture the aftermath of and recovery from the economic crisis, A is set in order to match the projections for GDP from IMF (2010) through 2015. Regarding the impact of HIV/AIDS, the study assumes that a mortality rate of 1 percent reduces A by 0.5 percent, that is, $A_t = (1.01)^t (1 - 0.5m)A_0$.
55. An important difference between this analysis and the work by Ellis, Laubscher, and Smit (2006) regards the rich macroeconomic dynamics included in the latter. For example, they assume that the impact of HIV/AIDS results in a tightening of the labor market, mitigating the initial impact of HIV/AIDS, although higher costs offset some of this effect later on.

References

ASSA (Actuarial Society of South Africa). 2006. "ASSA Select Model." http://www.actuarialsociety.org.za, accessed May 2009.

Ardington, C., and M. Leibbrandt. 2010. "Orphanhood and Schooling in South Africa: Trends in the Vulnerability of Orphans between 1993 and 2005." *Economic Development and Cultural Change* 58(3): 507–36.

Arndt, Channing, and Jeffrey D. Lewis. 2001. "The HIV/AIDS Pandemic in South Africa: Sectoral Impacts and Unemployment." *Journal of International Development* 13(4): 427–49.

Ataguba, John, and Di McIntyre. 2009. "Financing and Benefit Incidence in the South African Health System: Preliminary Results." Health Economics Unit, Working Paper 09-1, University of Cape Town.

Bachmann, Max O., and Frederick L. R. Booysen. 2003. "Health and Economic Impact of HIV/AIDS on South African Households: A Cohort Study." *BMC Public Health* 3(14).

———. 2006. "Economic Causes and Effects of AIDS in South African Households." *AIDS* 20(14): 1861–67.

Badcock-Walters, Peter, Daniel Wilson, Marelize Görgens, and others. 2005. "Educator Attrition and Mortality in South Africa." Education Labour Relations Council, Centurion, South Africa.

Bärnighausen, Till, Victoria Hosegood, Ian M. Timaeus, and Marie-Louise Newell. 2007. "The Socioeconomic Determinants of HIV Incidence: Evidence from a Longitudinal, Population-Based Study in Rural South Africa." *AIDS* 21(Suppl. 7): S29–S38.

Bell, Clive, Shantayanan Devarajan, and Hans Gersbach. 2006. "The Long-Run Economic Costs of AIDS: A Model with an Application to South Africa." *World Bank Economic Review* 20(1): 55–89.

Booysen, Frikkie le Roux, Jean-Pierre Geldenhuys, and Marina Marinkov. 2003. "The Impact of HIV/AIDS on the South African Economy: A Review of Current Evidence." Paper prepared for the TIPS/DPRU conference, "The Challenge of Growth and Poverty: The South African Economy Since Democracy," Johannesburg, September 8–10.

Camlin, Carol, Michel Garenne, and Tom A. Moultrie. 2004. "Fertility Trends and Patterns in a Rural Area of South Africa in the Context of HIV/ AIDS." *African Journal for Reproductive Health* 8(2): 38–54.

Carter, Michael R., Julian May, Jorge Agüero, and Sonya Ravindranath. 2007. "The Economic Impacts of Premature Adult Mortality: Panel Data Evidence from KwaZulu-Natal, South Africa." *AIDS* 21(Suppl. 7): S67–S73.

Case, Anne, and Cally Ardington. 2006. "The Impact of Parental Death on School Outcomes: Longitudinal Evidence from South Africa." *Demography* 43(3): 401–20.

Case, Anne, and Christina Paxson. 2009. "The Impact of the AIDS Pandemic on Health Services in Africa: Evidence from Demographic and Health Surveys." NBER Working Paper No. 15000, National Bureau of Economic Research, Cambridge, MA.

Chaisson, Richard E., and Neil A. Martinson. 2008. "Tuberculosis in Africa—Combating an HIV-Driven Crisis." *New England Journal of Medicine* 358(11): 1089–92.

Chirwa, Maureen L., Minrie Greeff, Thecla W. Kohi, and others. 2009. "HIV Stigma and Nurse Job Satisfaction in Five African Countries." *Journal of the Association of Nurses in AIDS Care* 20(1): 14–21.

Cleary, Susan. 2007. "The Costs of the National Strategic Plan on HIV and AIDS and STIs 2007–2011." University of Cape Town, National Treasury, Broadreach Health Care, and South African Parliament.

Cleary, Susan, Andrew Boulle, Marianela Castillo-Riquelme, and Di McIntyre. 2008. "The Burden of HIV/AIDS in the Public Healthcare System." *South African Journal of Economics* 76(S1): S3–S14.

Collins, Daryl L., and Murray Leibbrandt. 2007. "The Financial Impact of HIV/AIDS on Poor Households in South Africa." *AIDS* 21(Suppl. 7): S75–S81.

Colvin, Mark. 2005. "Impact of AIDS—the Health Care Burden." In *HIV/AIDS in South Africa*, ed. Salim Karim and Quarraisha Karim. Cambridge, UK: Cambridge University Press.

Coombe, Carol. 2007. "Mitigating the Impact of HIV/AIDS on Education Supply, Demand and Quality." In *AIDS, Public Policy and Child Well-Being*, 2nd Edition, ed. Giovanni Cornia, 245–82. Florence: UNICEF Innocenti Research Centre.

Day, Candy, and Andy Gray. 2008. "Health and Related Indicators." In *South African Health Review 2008*, ed. Peter Barron and J. Roma-Reardon. Durban: Health Systems Trust.

Deaton, Angus. 2003. "Health, Inequality, and Economic Development." *Journal of Economic Literature* 41(1): 113–58.

———. 2006. "Global Patterns of Income and Health: Facts, Interpretations, and Policies." NBER Working Paper No. 12735, National Bureau of Economic Research, Cambridge, MA.

DOH (Department of Health). 2003. *Operational Plan for Comprehensive HIV and AIDS Care, Management and Treatment for South Africa*. Pretoria. Department of Health.

———. 2009. *2008 National Antenatal Sentinel HIV and Syphilis Prevalence Survey: South Africa Report*. Pretoria: Department of Health.

DOH, Medical Research Council, and ORC Macro. 2007. *South Africa Demographic and Health Survey 2003*. Department of Health: Pretoria.

DOH, and SANAC (South African National AIDS Council). 2010. "Country Progress Report on the Declaration of Commitment on HIV/AIDS, Reporting Period: January 2008–December 2009." National Department of Health, Pretoria.

Dinkelman, Taryn, David Lam, and Murray Leibbrandt. 2007. "Household and Community Income, Economic Shocks and Risky Sexual Behavior of Young Adults: Evidence from the Cape Area Panel Study 2002 and 2005." *AIDS* 21(Suppl.7): S49–S56.

Dorrington, Rob E., Debbie Bradshaw, Leigh Johnson, and Debbie Budlender. 2006. "The Demographic Impact of HIV/AIDS in South Africa: National Indicators for 2006." Centre for Actuarial Research and South African Medical Research Council.

Ellis, Linette, Pieter Laubscher, and Ben Smit. 2006. "The Macroeconomic Impact of HIV/AIDS under Alternative Intervention Scenarios (with Specific Reference to ART) on the South African Economy." Bureau for Economic Research, University of Stellenbosch, South Africa.

Evian, Clive. 2008. "HIV Epidemiology and Trends in a Large National Manufacturing Company in South Africa, 2001–2006." *African Journal of AIDS Research* 7(3): 305–10.

Gordhan, Pravin. 2010. "2010 Budget Speech." Accessed April 25, 2010, http://www.treasury.gov.za, National Treasury, Pretoria.

Guthrie, Teresa, Nhlanhla Ndlovu, Farzana Muhib, Robert Hecht, and Kelsey Case. 2010. "The Long Run Costs and Financing of HIV/AIDS in South Africa." Centre for Economic Governance and AIDS in Africa, Cape Town.

Haacker, Markus. 2004. "The Impact of HIV/AIDS on Government Finance and Public Services." In *The Macroeconomics of HIV/AIDS*, ed. M. Haacker. Washington, DC: IMF.

Hargreaves, James R., C. P. Bonnell, L. A. Morison, and others. 2007. "Explaining Continued High HIV Prevalence in South Africa: Socioeconomic Factors, HIV Incidence and Sexual Behaviour Change Among a Rural Cohort, 2001–2004." AIDS 21(Suppl. 7): S39–S48.

IMF (International Monetary Fund). 2010. *World Economic Outlook Database*, *April 2010 Edition*. Washington, DC.

ING Barings South African Research. 2000. "Economic Impact of AIDS in South Africa: A Dark Cloud on the Horizon." ING Barings South Africa, Johannesburg.

Johnson, Leigh F., and Rob E. Dorrington. 2006. "Modelling the Demographic Impact of HIV/AIDS in South Africa and the Likely Impact of Interventions." *Demographic Research* 14(22): 541–74.

Laubscher, Pieter, Linette Visagie, and Ben Smit. 2001. "The Macro-Economic Impact of HIV/AIDS in South Africa." Economic Research Note No. 10, Bureau for Economic Research, University of Stellenbosch, South Africa.

Louw, Julia, Olive Shisana, Karl Peltzer, and Nompumelelo Zungu. 2009. "Examining the Impact of HIV and AIDS on South African Educators." *South African Journal of Education* 29: 205–17.

Meyer-Rath, Gesine. 2009. "Calculating the National Cost of ART Provision in South Africa, 2009–2016." Health Economics and Epidemiology Research Office, Pretoria, and Wits Health Consortium, Johannesburg, South Africa.

———. 2011. "National ART Cost Model, South Africa." Health Economics and Epidemiology Research Office, Boston University; University of the Witwatersrand, Johannesburg.

Motsoaledi, Aaron. 2010. "Debate on the Health Budget Vote Speech." April 14, 2010, obtained from Web site of Department of Health (http://www.doh.gov.za/).

Naidu, Veni, and Geoff Harris. 2005. "The Impact of HIV/AIDS Morbidity and Mortality on Households—A Review of Household Studies." *South African Journal of Economics* 73 (Special Edition on HIV/AIDS): 533–44.

National Treasury. 2010. *Budget Review.* Pretoria: National Treasury.

Nattrass, Nicoli. 2003. "AIDS, Economic Growth and Income Distribution in South Africa." *South African Journal of Economics* 71(3): 428–54.

OECD. 2010. Creditor Reporting System database, accessed December 15, http://www.aidsinfoonline.org/on.

Palamuleni, Martin, Ishmael Kalule-Sabiti, and Monde Makiwane. 2007. "Fertility and Childbearing in South Africa." In *Families and Households in Post-Apartheid South Africa: Socio-Demographic Perspectives*, ed. Acheampong Yaw Amoateng and Tim B. Heaton. Cape Town: HSRC Press.

Peltzer, Karl, O. Shisana, E. Udjo, and others. 2005. *Educator Supply and Demand in the South African Public Education System*. Cape Town: HSRC Press.

Phaswana-Mafuya, M. Nancy, and Karl Peltzer. 2005. "Perceived HIV/AIDS Impact among Staff in Tertiary Institutions in the Eastern Cape, South Africa." *Journal of Social Aspects of HIV/AIDS* 2(2): 277–85.

———. 2006. "Perceived HIV/AIDS Impact among Higher Education Institutions in the Eastern Cape." *South African Journal of Higher Education* 20(1):147–60.

Pillay, Rubin. 2009. "Retention Strategies for Professional Nurses in South Africa." *Leadership in Health Services* 22 (1): 39–57.

Public Service Commission. 2002. "Sick Leave Trends in the Public Service." Pretoria: Public Service Commission.

———. 2008. *State of the Public Service Report 2008*. Pretoria: Public Service Commission.

Roe, Terry L., and Rodney B. W. Smith. 2008. "Disease Dynamics and Economic Growth." *Journal of Policy Modeling* 30(1): 145–68.

Rosen, Sydney, J. R. Vincent, W. MacLeod, and others. 2004. "The Cost of HIV/AIDS to Businesses in Southern Africa." *AIDS* 18(2): 317–24.

Rosen, Sydney, Ian Sanne, Alizanne Collier, and Jonathon L. Simon. 2005. "Rationing Antiretroviral Therapy for HIV/AIDS in Africa: Choices and Consequences." *PLoS Medicine* 2(11): 1098–1104.

Shisana, Olive, E. Hall, K. R. Maluleke, and others. 2003. *The Impact of HIV/AIDS on the Health Sector: National Survey of Health Personnel, Ambulatory, and Hospitalised Patients and Health Facilities*. Pretoria: Department of Health.

Shisana, Olive, E. J. Hall, R. Maluleke, J. Chauveau, and C. Schwabe. 2004. "HIV/AIDS Prevalence among South African Health Workers." *South African Medical Journal* 94 (10): 846–50.

Shisana, Olive, Karl Peltzer, Nompumelelo Zungu-Dirwayi, and Julia Louw. 2005. *The Health of Our Educators: A Focus on HIV/AIDS in South African Public Schools*. Cape Town: HSRC Press.

Shisana, Olive, T. Riehle, L. C. Simbayi, and others. 2005. *South African National HIV Prevalence, HIV Incidence, Behaviour and Communication Survey*. Cape Town: HSRC Press.

SANAC (South African National AIDS Council). 2007. *HIV & AIDS and STI Strategic Plan for South Africa 2007–2011*. Pretoria: SANAC.

Statistics South Africa. 2008a. *General Household Survey 2007*. Pretoria.

———. 2008b. *Income and Expenditure of Households 2005/2006*. Pretoria.

Temple, Jonathan. 1999. "The New Growth Evidence." *Journal of Economic Literature* (37)1: 112–56.

Thurlow, James, Jeff Gow, and Gavin George. 2009. "HIV/AIDS, Growth and Poverty in KwaZulu-Natal and South Africa: An Integrated Survey, Demographic and Economy-wide Analysis." *Journal of the International AIDS Society*12(18).

UNAIDS (Joint United Nations Programme on HIV/AIDS). 2010a. *Global Report: UNAIDS Report on the Global AIDS Epidemic 2010*. Geneva.

———. 2010b. Data prepared for *UNAIDS Report on the Global AIDS Epidemic 2010*, http://www.aidsinfoonline.org/.

United Nations Population Division. 2009. "World Population Prospects: The 2008 Revision Population Database." New York: United Nations.

van Rensburg, Dingie, Francois Steyn, Helen Schneider, and Les Loffstadt. 2008. "Human Resource Development and Antiretroviral Treatment in Free State Province, South Africa." *Human Resources for Health* 6(15).

WHO (World Health Organization). 2009, Disease and Injury Country Estimates 2004, accessed April 24, 2010, http://www.who.int/healthinfo/global_burden_disease/en/.

———. 2010a. *South Africa—National Expenditure on Health*, updated March 2010, accessed April 25, http://www.who.int/nha/en/.

———.2010b. WHO Statistical Information System (WHOSIS), accessed November, http://www.who.int/whosis/en/index.html.

WHO, UNAIDS (Joint United Nations Programme on HIV/AIDS), and UNICEF (United Nations Children's Fund). 2008. "Epidemiological Fact Sheet on HIV and AIDS: South Africa." WHO, Geneva.

Young, Alwyn. 2005. "The Gift of the Dying: The Tragedy of AIDS and the Welfare of Future African Generations." *Quarterly Journal of Economics* 120 (2): 423–66.

CHAPTER 4

Swaziland

I. Introduction

Swaziland has the highest estimated HIV prevalence in the world; 26 percent of the working-age population is estimated to be HIV positive (UNAIDS 2010a, 2010b) As a result of HIV/AIDS, crude mortality in Swaziland rose from 0.9 percent during 1990–95 to 1.6 percent during 2005–10 (United Nations Population Division 2009), and the probability of a newborn reaching age 50 has dropped from around 80 percent to just over 40 percent. The World Bank (2010) estimates that life expectancy has dropped from 59 years in 1991 to 45 years in 2005. CSO and Macro International (2008) report that 20 percent of young Swazis aged 10–14 have lost at least one parent, and 7.5 percent have lost both parents.

The pervasiveness of the epidemic in Swaziland poses extraordinary policy challenges in terms of planning, implementing, and financing the response to the epidemic. Moreover, these challenges will persist over many years or even decades—even if HIV incidence is rapidly reduced, the number of people requiring treatment will continue to rise for many years, and a large number of young people will continue to grow up in households affected by illness or death.

The objectives of this study are to assess fiscal policy challenges arising from the response to HIV/AIDS, develop tools to better understand the links between the HIV/AIDS program and the fiscal costs of HIV/AIDS, and thus inform the planning of the national HIV/AIDS response, and fiscal planning in general.

This study's contributions specifically include:

- Compared to a study estimating the costs of a national HIV/AIDS strategic plan (which would normally cover about three to five years), this analysis provides additional value added in two directions: it includes aspects of the HIV/AIDS impact that are not normally covered by a costing analysis (for example, the costs of HIV/AIDS impacts on public servants), and—based on the recognition that the fiscal costs of HIV/AIDS will persist for a long time—it adopts a long-term perspective to address issues regarding fiscal sustainability.
- This analysis of the fiscal dimension of HIV/AIDS is embedded in a discussion of the fiscal context and outlook. Specifically, it assesses the fiscal costs arising from the impact of and the response to HIV/AIDS in the context of the projected decline in government revenues from the Southern African Customs Union (SACU).
- The study develops improved tools to analyze the trade-offs inherent in HIV/AIDS program choices. Specifically, the analysis links the current costs of HIV/AIDS-related services to past infections; estimates the costs incurred by new infections; and assesses how fiscal resources committed to the HIV/AIDS response are evolving.

Section II reviews the impact of HIV/AIDS in Swaziland so far. Beginning with the state and course of the epidemic, it places a spotlight on two areas where the HIV/AIDS impact is most apparent—health and the youth population. This is followed by a discussion of HIV/AIDS impact overall from different perspectives, including the macroeconomic impact; broader summary indicators (capturing impacts on health and education) such as the UNDP Human Development Index (HDI); and impacts on poverty and inequality.

Section III prepares the fiscal analysis, reviewing issues such as the state of public finance and the available data on HIV/AIDS-related spending. It starts with a description of the fiscal context in which the HIV/AIDS response occurs and the state of public finances, including the poor outlook for SACU revenues, which is compounding the challenges of financing the rising costs of HIV/AIDS, and reviews available data on health spending and financing. This is complemented by a summary of available data on HIV/AIDS spending and a discussion of the HIV/AIDS impact on government employees.

Section IV contains the core of this study's analysis. It describes the demographic and epidemiological projections underlying the analysis; summarizes the objectives of the National Strategic Framework on HIV/AIDS 2009–14, which forms the basis of the analysis; and projects the fiscal costs of HIV/AIDS for 2010–30. Three subsections provide further analytical content. First, the projected HIV/AIDS costs are interpreted as a long-term fiscal quasi-liability, using tools normally applied to the debt sustainability analysis. Second, starting from the premise that most of the future costs of HIV/AIDS are ultimately caused by new infections, the study estimates the fiscal cost of one additional infection, and uses these estimates to assess the evolving fiscal burden of HIV/AIDS. Third, the role of external support in financing the national HIV/AIDS response is reviewed.

II. The Impact of HIV/AIDS in Swaziland

The scope of the review on the state and impacts of HIV/AIDS reflects the purpose of the study—an analysis of the fiscal dimension of HIV/AIDS. The review begins with a brief discussion on the course of the epidemic in Swaziland, and then turns to health impacts, the most visible impacts of the epidemic, which directly and indirectly undermine the government's development objectives. Another critical intersection of HIV/AIDS and public policy are the social challenges arising from the increasing number of orphans. This creates an immediate social policy challenge, but also affects the country's longer-term development prospects by impeding access to education and human capital formation. HIV/AIDS impacts on GDP and GDP per capita are relevant from a fiscal perspective because they are important summary measures of material well-being and are closely linked to the tax base. While GDP per capita is a robust indicator for well-being, it can be argued that there has been a disconnect in Swaziland in recent years: its GDP per capita level places it among middle-income countries, but its life expectancy is among the lowest in the world. For this reason, this review also includes HIV/AIDS impacts in terms of summary indicators such as the UNDP Human Development Index. Finally, this review also covers some of the implications of HIV/AIDS for poverty and inequality, which arise because the impacts and ability to cope differ across population groups.

The course and state of the epidemic

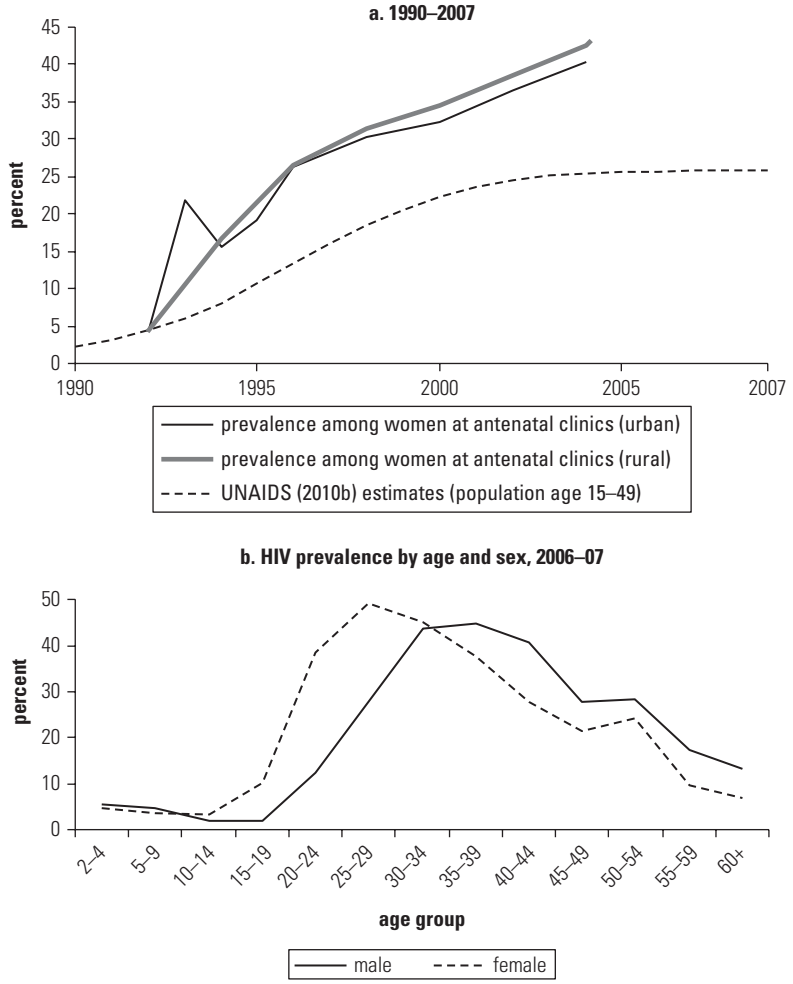
HIV/AIDS in Swaziland (and elsewhere) is a very young disease. The first cases in Swaziland were reported in 1986. As of 1990, the Joint United Nations Programme on HIV/AIDS (UNAIDS 2010a) estimates that 9000 people were living with HIV/AIDS in Swaziland, corresponding to an HIV prevalence of 2.3 percent among the population of aged 15–49. In the 1990s, HIV prevalence accelerated rapidly (figure 4.1a). For example, the number of women at antenatal clinics who tested positive for HIV increased from 4 percent in 1992 to 32 percent in 2000, and increased further to 42 percent in 2008 (NERCHA 2010). UNAIDS (2010b) estimates that HIV prevalence among the population aged 15–49 increased tenfold to 22.3 percent in 2000, with HIV incidence peaking at 4.6 percent in 1998. As of 2009, HIV prevalence appears to have stabilized at 25–26 percent, and HIV incidence is estimated at 2.7 percent of the population of aged 15–49.

One well-known characteristic of HIV/AIDS is the fact that young adults, particularly young women, are most at risk of exposure. This is illustrated in figure 4.1b, with HIV prevalence peaking at ages 25–29 for women and at ages 34–39 for men. Figure 4.1b, also illustrates the catastrophic spread of HIV/AIDS in Swaziland: almost 50 percent of women are infected before they reach age 30, and an even higher proportion can statistically expect to become infected during their lifetime. For men, HIV prevalence peaks at 45 percent in the 34–39 age group.

Health. HIV/AIDS had and is having a large impact on key health and development outcomes in Swaziland. For example, it has been associated with major reversals in infant and child mortality[1] as well as an increase in maternal mortality rates. Because of HIV/AIDS, Swaziland now has the highest tuberculosis (TB) incidence rate in the world, 1,198 per 100,000 persons, and 80 percent of people with TB are also HIV positive (figure 4.2).

The pervasive impact of HIV/AIDS on health outcomes is also illustrated by estimated mortality rates, especially for young adults (figure 4.3). According to the United Nations Population Division (2009), crude mortality in Swaziland has risen from 0.9 percent in 1990–95 to 1.6 percent in 2005–10.[2] In line with the available data on HIV prevalence (recall figure 4.1b), mortality peaks at 3.8 percent for women in the 30–34 age group. The age profile for mortality is somewhat flatter for men, peaking at 3.4 percent at ages 34–39. A different perspective on the increase in mortality

Figure 4.1: Trends in HIV Prevalence

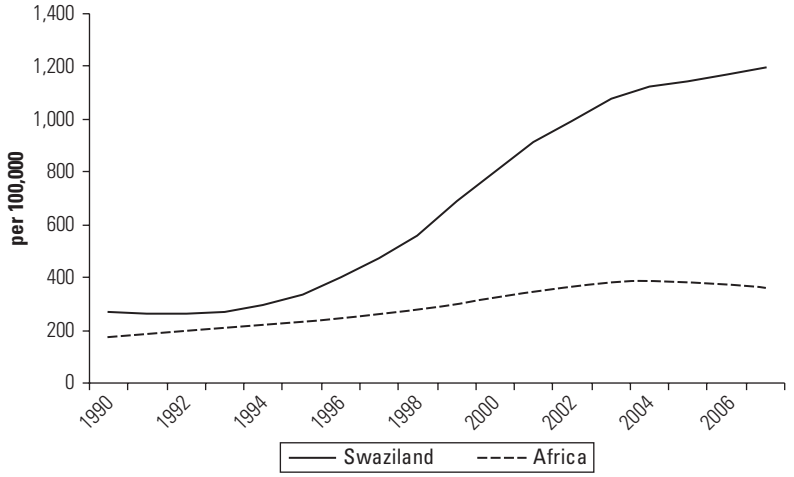


Sources: a. WHO, UNAIDS, and UNICEF (2008), and UNAIDS (2010b); b. CSO and Macro International, Inc. (2008).

is provided in figure 4.3b, which shows survival curves consistent with the mortality profiles illustrated in figure 4.3a. As a result of AIDS-related deaths, the median age at death declines from over 70 years to less than 45 years, while the probability of a newborn reaching age 50 drops from around 80 percent to just over 40 percent.

In addition to the observed trends in health outcomes in Swaziland and the estimates of the contributions of HIV/AIDS to increased mortality, a

Figure 4.2: TB Incidence, 1990–2007



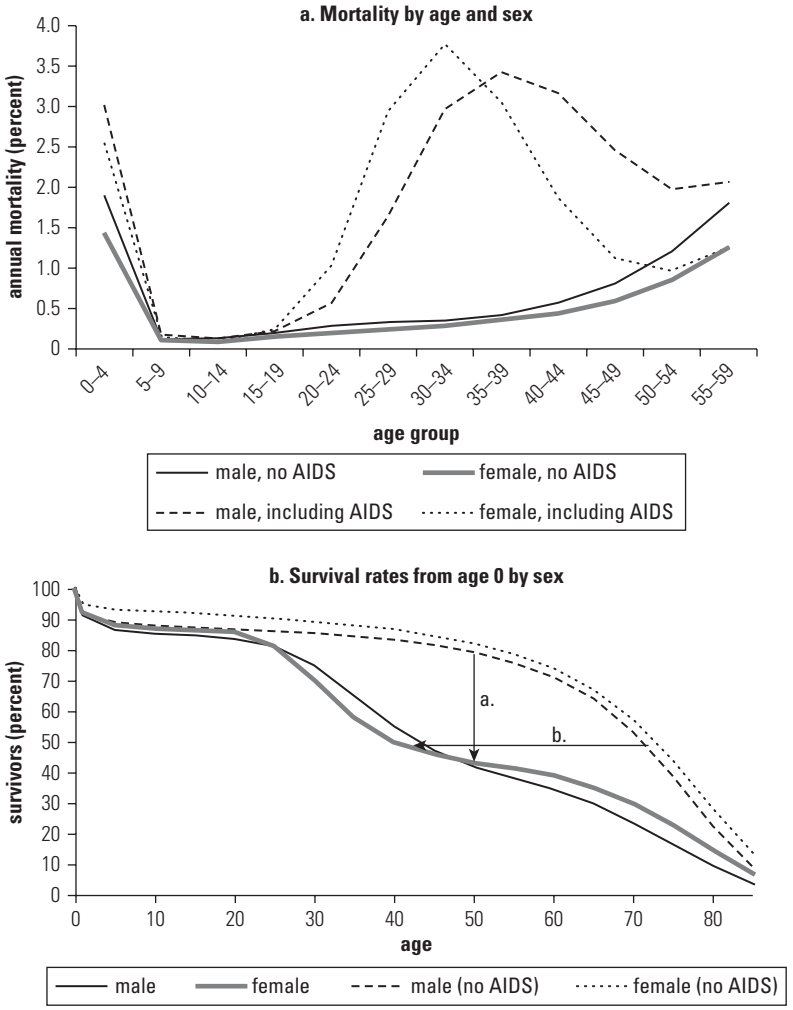
Source: WHO (2009).

cross-country comparison provides a wider analysis. Figure 4.4 plots estimates of life expectancy as a summary indicator of health outcomes against GDP per capita as a summary indicator of the level of economic development. In terms of GDP per capita (current purchasing power parity dollars), Swaziland can be grouped with countries such as Paraguay, Guatemala, Georgia, and the Arab Republic of Egypt. However, life expectancy at birth in these countries exceeds 70 years, whereas it is only 46 years in Swaziland.[3] Drawing the comparison horizontally, life expectancy in Swaziland (and similarly, in Lesotho) is trailing behind countries such as Sierra Leone, the Central African Republic, and the Democratic Republic of Congo, and not much ahead of Afghanistan, despite a much higher level of economic development.

Orphans and education access. One prominent demographic impact of HIV/AIDS is the increase in the number of orphans, for several reasons:

(i) The age profile of AIDS-related mortality means that people dying from AIDS-related illnesses frequently leave behind children, unlike for many other diseases, which predominantly affect either old or very young people.

Figure 4.3: HIV/AIDS, Mortality, and Survival Rates, 2000–05

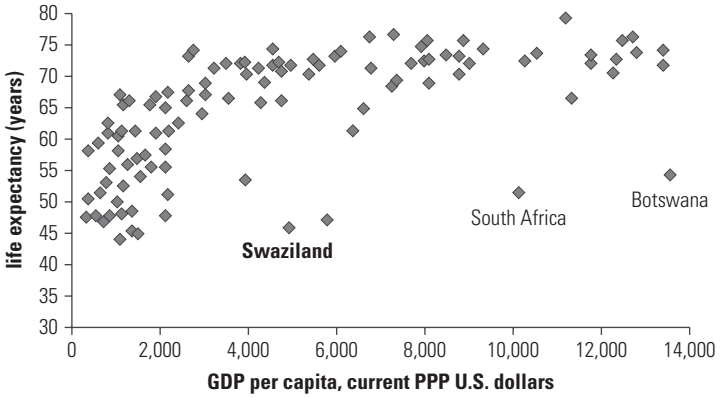


Source: Authors' calculations, based on United Nations Population Division (2009).
Note: a. Share of cohort reaching age 50 cut by close to one-half; b. Median life expectancy declines from 70–75 to 40–45.

(ii) High co-infection rates among couples mean that a disproportionate number of orphans have lost both parents or live with a surviving parent who is HIV positive.

(iii) In addition, Swaziland—in terms of the composition of the population—is a very young country, with 50 percent of the population younger than 18 years as of 2005.[4]

Figure 4.4: Life Expectancy against GDP per Capita, 2008



Source: World Bank (2010).

(iv) The extraordinary scale of the epidemic in Swaziland, with its corresponding increase in orphans and high rates of co-infection, means that traditional social structures of fostering orphans are stretched to (or over) the limit.

Table 4.1 illustrates the contribution of AIDS-related deaths to the rising number of orphans in Swaziland. In 2007, 96,000 young Swazis were estimated to be orphans (defined as having lost at least one parent). Of these, 56,000 were orphaned as a result of AIDS-related deaths (up from an estimated 19,000 in 2001).[5] Furthermore, as a result of co-infection between couples, children frequently lose both parents and become "double orphans." Consequently, 30,000 out of a total of 37,000 double orphans in the country were orphaned as a result of AIDS (plus 4,000 "mixed" double orphans who lost one parent to AIDS-related illness and one to other causes). Sixty percent of children who lost a parent to an AIDS-related illness were double orphans, compared to only 18 percent of children who lost a parent for other causes.[6]

The number of orphans, however, is only a partial measure of the adverse impacts of HIV/AIDS on the youth population. The government of Swaziland (GoS 2006c) estimates that in addition to 70,000 orphans, there were 60,000 children "with parents who are still alive, but so ill, destitute, or unfit as parents that the children require interventions by the community and government for their support and protection." In addition, the GoS (2006c)

Table 4.1: Number of Orphans, 2007

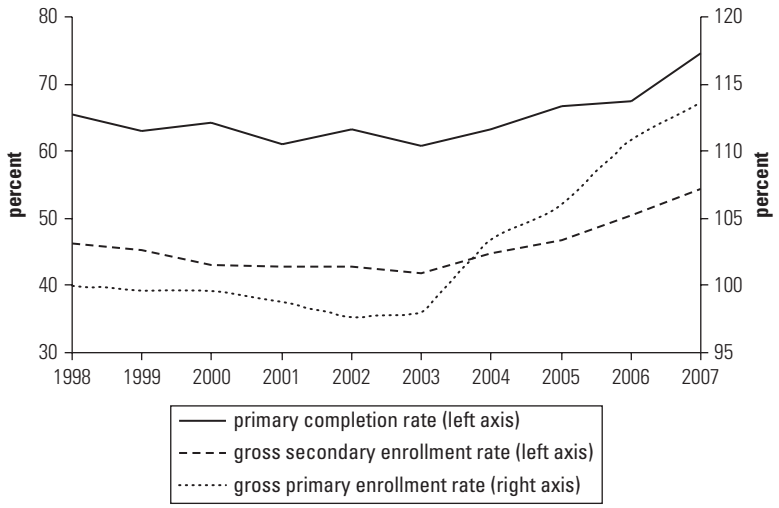
ORPHANS	TOTAL	DOUBLE	PATERNAL	MATERNAL
		Units		
Total	96,000	37,000	58,000	74,000
HIV/AIDS	56,000	30,000	33,000	52,000
Other causes	40,000	3,000	25,000	22,000
"Mixed" double orphans		4,000		
		Percent of population age 0–17		
Total	17.1	6.6	10.3	13.2
HIV/AIDS	10.0	5.3	5.9	9.3
Other causes	7.1	0.5	4.5	3.9
"Mixed" double orphans		0.7		
		Percent of population, all ages		
Total	8.3	3.2	5.0	6.4
		Units		
Children orphaned by HIV/AIDS, 2001	19,000	7,300	10,000	15,000

Source: Authors' calculations, based on WHO, UNAIDS, and UNICEF (2008), and UNICEF (2008b).

suggests that the number of "orphans and vulnerable children" would rise to 198,000 by 2010, which would correspond to about one-third of the youth population (ages 0–17), and almost one-sixth of the total population. Similarly, CSO and Macro International (2008) consider 31 percent of all young Swazis (ages 0–17) as orphans and vulnerable children (OVC, having lost at least one parent or living in a household affected by sickness), a rate increasing from 18 percent at ages 0–4 to 43 percent at ages 15–17.

The national HIV/AIDS response emphasizes providing support to children in need within their communities. GoS (2009) reports that 3,300 community caregivers were reaching 34,000 children in need as of 2007, providing food and psychosocial support. Negative impacts resulting from youth deprivation include reduced access to education because of fewer incentives and lack of resources to invest in education, and reduced transmission of knowledge from parents to their children. Most indicators for education access deteriorated between 1998 and 2003 (figure 4.5)—for example, the secondary enrollment rate declined from 46 percent to 42 percent. This development has motivated the introduction of school fee grants, which have been credited for reversing this trend. As a result of these policies, the decline in access to education has not only been reversed, but enrollment and completion rates have now risen above their 1998 levels, with 92 percent of OVC attending school (GoS 2009). Consequently, CSO and Macro

Figure 4.5: Trends in Access to Education, 1998–2007



Source: World Bank (2009).

International (2008) observe virtually no difference between the school attendance rates of OVC (about one-third benefited from school-related support) and non-OVC children, even though OVC were more likely to experience different forms of material deprivation and to be underweight.[7]

Macroeconomic impact. Economic growth in Swaziland has been disappointing in recent years, with GDP growth averaging 2.2 percent for 2000–2010, and growth of GDP per capita at 1.9 percent over the same period. However, the extent to which the impact of HIV/AIDS has affected growth is difficult to establish. The slowdown in economic growth from its high levels in the 1980s (averaging 7 percent) occurred in the early 1990s, preceding the period in which HIV/AIDS could plausibly affect growth. The slowdown is more likely attributable to factors like the end of apartheid in South Africa (depriving Swaziland of a regional advantage in terms of attracting investment), adverse weather conditions, and a difficult world market for sugar, one of its major export commodities (Whiteside and others 2006). Nevertheless, even though HIV/AIDS appears not to be the cause of the economic growth slowdown around 1990, it is possible that the impacts of HIV/AIDS are impeding a return to higher growth rates.

Surprisingly, only a few studies discuss the impact of HIV/AIDS on economic growth in Swaziland. Haacker (2002) suggests a moderate HIV/AIDS impact of 2.3 percent on the level of income per capita. The International Labour Organization (ILO) (2004) estimates an annual loss of 2.8 percent in GDP growth and 1.8 percent in GDP per capita growth.[8] Additionally, Thurlow, George, and Gow (2009) analyze the impact of HIV/AIDS in KwaZulu-Natal (just across the border from Swaziland) and estimate that GDP growth declines by 1.6 percentage points and GDP per capita growth declines by 0.5 percentage points between 2005 and 2025.

The critical factor that distinguishes the different approaches to analyzing the HIV/AIDS impacts on economic growth is the impact of the epidemic on productivity. Studies focusing on the disruptions to production caused by increased mortality and morbidity (for example, Haacker [2002]) find relatively small impacts of HIV/AIDS on productivity and hence growth. Other studies (for example, Thurlow, George, and Gow [2009]) assume that HIV/AIDS results in lower productivity growth, that is, that the impact on productivity increases each year.

In the long run, a critical factor will be the extent to which HIV/AIDS erodes human resources, whether through increased mortality among working-age adults or by affecting education access. Empirical cross-country literature on growth determinants points to risks for the growth outlook in Swaziland over the coming years, frequently finding that lower life expectancy translates into lower growth, directly (reflecting a weaker state of health of the population) or indirectly (as it affects access to and returns to education).[9] The International Monetary Fund (IMF 2008a), applying growth regressions of this type, calculates that HIV/AIDS has a negative impact of 1.1 percentage points on GDP per capita growth.

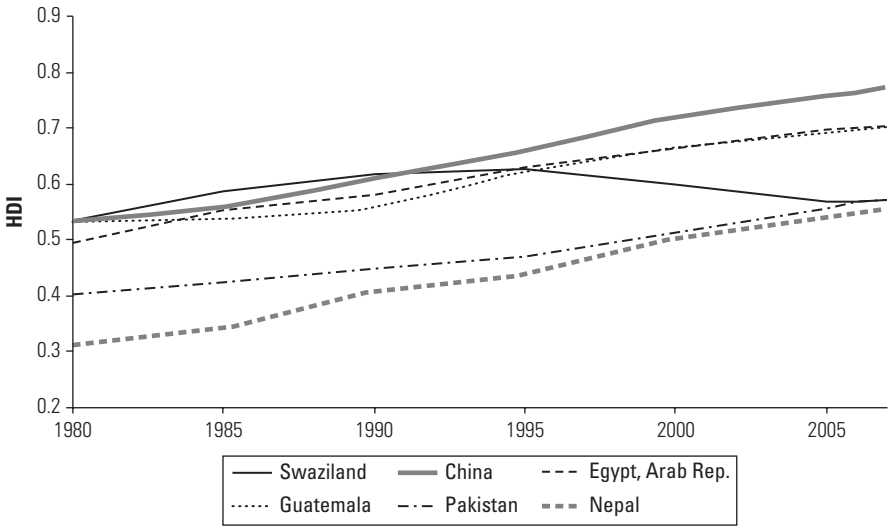
Human development

The preceding sections highlighted the consequences of HIV/AIDS in three areas critical for Swaziland's development outlook—health, education, and economic growth, highlighting in particular the devastating impact of HIV/AIDS on health outcomes. The uneven impacts of HIV/AIDS across different aspects of development implies that GDP per capita is not a good measure for changes in living standards in Swaziland over the last 20 years, or for comparisons of living standards in Swaziland with other countries.

The HDI developed by the United Nations Development Programme (UNDP 2009a) is an attempt to bring together these different strands, combining measures of health (life expectancy), educational attainment (adult literacy, gross enrollment), and GDP per capita. As observed earlier (figure 4.3), life expectancy in Swaziland is about 20 years lower than in other countries with similar levels of GDP per capita. This discrepancy is also reflected in Swaziland's ranking of 142nd (out of 182 countries included in the ranking), far below Paraguay (101), Egypt (123), Georgia (89), and Guatemala (122), even though the level of GDP per capita is similar. The HIV/AIDS impact is also illustrated in figure 4.6, which traces the HDI in several countries over time. In the 1980s, while the HDI improved in Swaziland faster than in other countries with a similar starting level (such as China and Guatemala), it has since declined in absolute terms, while the HDI continued to improve in these other countries. Swaziland is now on a level similar to Pakistan (GDP per capita about half of Swaziland's) and Nepal (GDP per capita about one-fifth of Swaziland's).

In addition to observing the trends over time, which illustrate the extent to which Swaziland has fallen behind other countries in terms of the HDI,

Figure 4.6: Human Development Index, Selected Countries, 1980–2007



Source: UNDP (2009a).

it is possible to directly estimate, in terms of the decline in the HDI, the costs of HIV/AIDS. Swaziland's HDI in 2007 is based on an estimated life expectancy of 45.3 years (UNDP 2009a). According to the United Nations Population Division (2009), life expectancy would be about 18 years higher in a no-AIDS scenario.[10] This would translate into a no-AIDS HDI that is 0.1 points higher (UNDP 2009b), at 0.67, at rank 130—above Morocco—rather than on about the same level as Pakistan and Nepal.[11]

Impact of HIV/AIDS across households

One shortcoming in all of the approaches used above to analyze the development impact of HIV/AIDS is their focus on aggregates or national averages. These aggregate indicators, however, may not capture certain distributional effects of HIV/AIDS that are relevant from a social welfare and development perspective. Specifically, the epidemic has the potential to affect inequality and social cohesion, to the extent that (i) HIV incidence and prevalence differ across socioeconomic groups or by income and wealth; (ii) households differ in terms of their capability to cope with health shocks such as HIV/AIDS; and (iii) access to health services is correlated with the socioeconomic characteristics of individuals or households.

Table 4.2 provides information about the distribution of HIV prevalence according to socioeconomic criteria (the "socioeconomic gradient" of HIV/AIDS). HIV prevalence for the population aged 15–49 is higher in urban areas, at 31 percent, compared to rural areas at 24 percent. HIV prevalence is highest for the lowest education category; the differences in this regard are most pronounced for males. It is distributed fairly evenly across wealth levels, but differs strongly by employment status, especially for men, where HIV prevalence among employed (28 percent) is almost three times higher than for the unemployed.[12]

Data on the vulnerability of Swazi households to HIV/AIDS impacts are limited. Based on survey data with a limited sample size, Muwanga (2002) suggests that the consequences of AIDS-related deaths for Swazi households include losses in land under cultivation, crop yields, impaired access to education, and loss of remittances as a source of income. Muwanga observes a loss in production and the size of herds for households that have had a member die from an AIDS-related illness (as opposed to other deaths, which tend to occur among the old or very young).

Table 4.2: Socioeconomic Gradient of HIV/AIDS

	WOMEN 15–49		MEN 15–49		TOTAL	
SOCIOECONOMIC GRADIENT	HIV POSITIVE (%)	NUMBER TESTED	HIV POSITIVE (%)	NUMBER TESTED	HIV POSITIVE (%)	NUMBER TESTED
Residence						
Urban	36.8	1,171	25.5	1,071	31.4	2,242
Rural	29.1	3,254	17.3	2,699	23.8	5,953
Education						
No education	29.6	1,347	30.7	286	29.8	1,632
Lower primary	33.8	785	22.5	424	29.9	1,209
Higher primary	33.3	795	16.1	915	24.1	1,710
Secondary	30.5	779	17.1	1,097	22.7	1,876
High school	30.1	511	20.6	756	24.4	1,267
Tertiary	26.8	177	23.5	286	24.8	463
Employment						
Currently working	38.1	1,919	28.0	2,054	32.9	3,973
Not working	26.2	2,361	9.7	1,708	19.3	4,069
Wealth quintile						
Lowest	31.6	711	19.8	561	26.4	1,272
Second	32.1	775	19.8	607	26.7	1,382
Middle	31.5	873	17.0	787	24.6	1,660
Fourth	31.8	991	21.1	856	26.8	1,847
Highest	29.4	1,075	20.4	959	25.1	2,033
Marital status						
Currently in union	32.5	1,811	36.3	1,059	33.9	2,870
Widowed	55.7	254	67.5	52	57.7	306
Divorced/separated	51.3	146	54.5	132	52.9	278
Never in union	25.9	2,213	9.9	2,520	17.4	4,733
Total 15–49	31.1	4,424	19.7	3,763	25.9	8,187

Source: CSO and Macro International, Inc. (2008).

Salinas and Haacker (2006) model the impacts of HIV/AIDS on poverty dynamics in Swaziland. Even though average income in Swaziland is relatively high, the high degree of inequality means that a large number of households are vulnerable to the economic impacts of the illness or death of a household member. Consequently, Salinas and Haacker argue that the impact of the epidemic could increase poverty rates (US$1 per day) by 1 percentage point annually, or counteract a decline in poverty that would occur for other reasons, such as economic growth, complicating efforts to reduce poverty and high rates of inequality in Swaziland.

III. Stocktaking—HIV/AIDS and Public Finance

As a building block toward the core analysis of the fiscal costs of HIV/AIDS, this section summarizes the available data relevant for and informing this analysis. This summary starts with a discussion of the fiscal context, because to understand the significance of the costs of HIV/AIDS and the HIV/AIDS program from a fiscal perspective, it is necessary to relate it to available government resources. Next is a discussion of health spending and financing, including recent developments in Swaziland and placing its health spending in an international context. The costs of the National Strategic Framework are explored, including a review of the main spending categories and financing sources. A special section is devoted to the costs of HIV/AIDS impacts on government employees.

The state of public finances

This analysis relates the projections of the fiscal costs of the impacts of HIV/AIDS and its response to the fiscal context to determine how much of the available fiscal space these costs are absorbing and understand the challenges of financing the HIV/AIDS program in a changing fiscal environment. In addition, HIV/AIDS costs are increasing at a time when Swaziland is facing serious fiscal challenges; its main source of fiscal resources, revenues from SACU, is declining.[13]

Table 4.3 summarizes available data on the structure and size of the government budget. Until 2003/4, government revenues amounted to 25 percent to 27 percent of GDP, of which SACU revenues accounted for about half (12–13 percent of GDP). The situation evolved rapidly from 2003, with SACU revenues accelerating sharply, and reaching a peak of 28 percent of GDP in 2006/7. This reflects that the size of the SACU revenue pool largely depends on South African imports, which were booming over these years. Not all of these additional revenues were spent, the government was running a sizable surplus in 2006/7 (10.4 percent of GDP) and 2007/8 (6.5 percent of GDP). However, by 2008/9, government expenditures had increased to over 40 percent of GDP. As SACU revenues contracted, reflecting the end of the import boom in South Africa and the impact of the global economic crisis, the fiscal balance turned sharply into a deficit of 7 percent of GDP in 2009/10. Despite some fiscal adjustment, the deficit is projected to accelerate sharply to 14 percent of GDP in 2010/11.

Table 4.3: Summary of Government Operations

TYPE OF OPERATION	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9[a]	2009/10	2010/11[b]
					Percent of GDP			
Revenues and grants	27.9	32.1	33.2	42.8	38.9	40.4	36.1	25.1
Domestic revenues	26.9	31.4	32.2	41.9	38.6	39.8	35.7	24.4
o/w: SACU	13.4	18.4	18.7	28.4	23.3	25.3	20.4	9.4
Grants	1.0	0.8	1.0	0.9	0.3	0.6	0.5	0.7
Total expenditure and net lending	30.8	36.9	34.8	32.3	32.4	40.6	43.3	39.1
Current expenditure	24.5	28.5	26.7	25.0	24.1	30.7	34.1	30.3
o/w: wages and salaries	11.9	13.0	14.8	13.8	12.8	16.5	17.3	18.5
o/w: interest	1.2	1.1	1.2	0.9	0.8	1.0	0.8	0.8
Capital expenditure	5.8	8.4	8.5	7.7	8.1	10.4	10.4	9.8
Net lending	0.4	0.0	–0.4	–0.3	0.2	–0.5	–1.2	0.0
Overall balance	–2.9	-4.7	–1.6	10.4	6.5	–0.2	–7.1	–14.0
Expenditures by economic classification								
Education	6.6	7.7	7.2	7.2	7.9	—	—	7.5
Health	2.5	2.9	3.3	3.0	2.8	2.7	—	4.7

Sources: IMF (2008a, 2008b, 2010, 2011); Sithole (2010).

Note: — = not available.

a. Values from 2008/9 updated from IMF (2011).

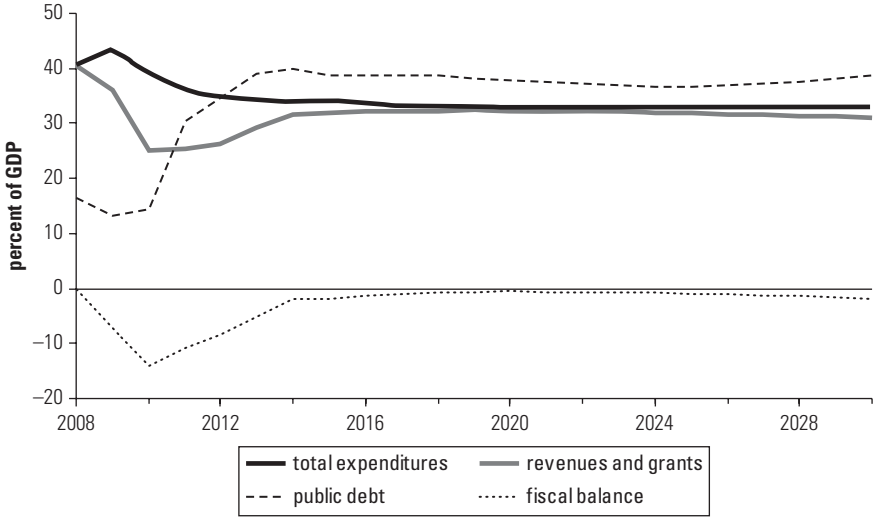
b. Projections.

To place the projected costs of HIV/AIDS and the HIV/AIDS program in a fiscal context, it is important to recognize that the country is going through a difficult fiscal transition. The authors' assumptions regarding the required fiscal adjustment are summarized in figure 4.7. For fiscal years 2010/11–2015/16, the projections are aligned with the government's Fiscal Adjustment Roadmap, as summarized in IMF (2011). These projections envisage a partial recovery of SACU revenues to about 11 percent of GDP, and a gradual reduction in the fiscal deficit to 2 percent of GDP by 2015/16. Nevertheless, public debt increases from 14 percent of GDP in 2010/11 to close to 40 percent of GDP in 2015/16. For the period beyond 2015, the government is projected to run a small fiscal deficit of around 1 percent of GDP, and that public debt is projected to stabilize at below 40 percent of GDP.

Health spending and financing

Because care and treatment account for a substantial share of the fiscal costs of HIV/AIDS, this section reviews the state of health spending and financing in Swaziland. Of particular importance are how the estimates of the

Figure 4.7: Fiscal Outlook, 2008–30



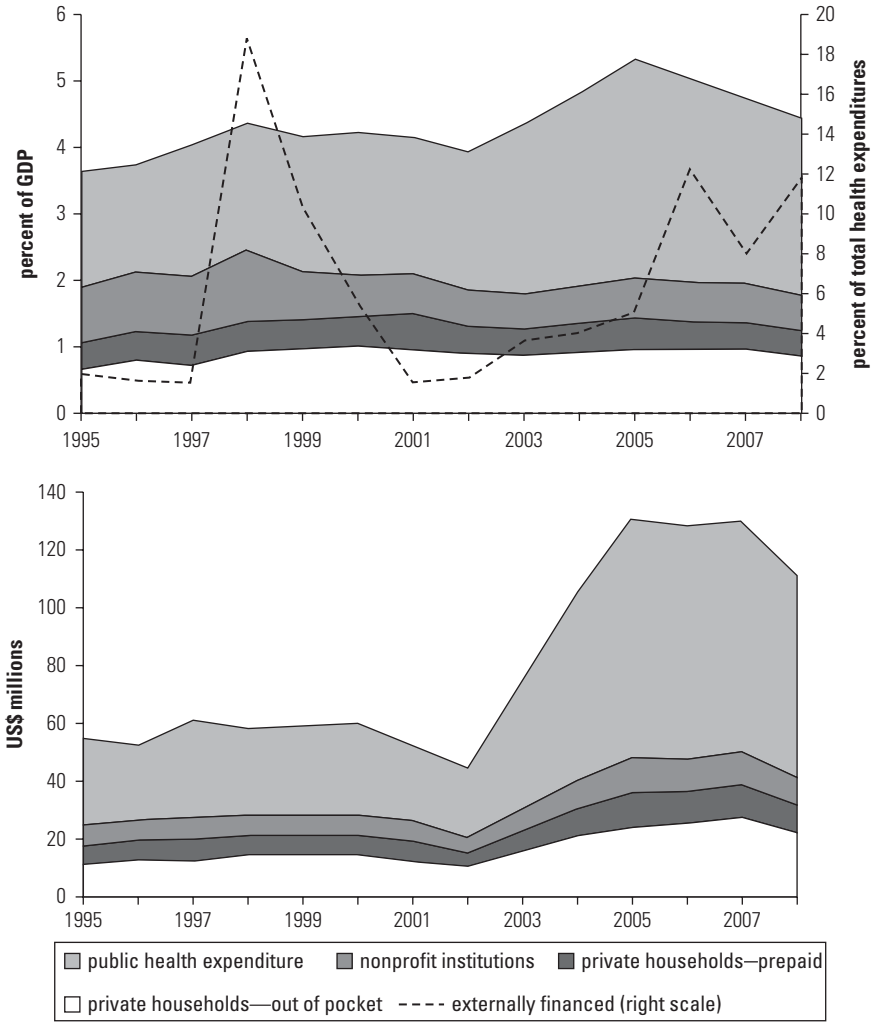
Source: IMF (2011) through 2015, authors' assumptions thereafter.

costs of HIV/AIDS-related health spending relate to public and private health spending overall, and the extent to which the increased need for health services as a result of HIV/AIDS has translated into additional health spending so far.

The best known international sources of data on health spending and financing are the National Health Accounts published by the World Health Organization (WHO). However, this data source is weak regarding health expenditures in Swaziland; data on public health expenditures are compiled from several sources, with gaps, and data on private health expenditures are extrapolated from 2000. In the interest of improved accuracy and consistency, this study substitutes data on public health spending reported by the Ministry of Finance, compiled from various issues of the IMF's Statistical Appendix reports (figure 4.8).

From 1995 to 2002, total health expenditures hovered at or just below 4 percent of GDP, with public health expenditures accounting for about half. Since 2002, the situation has changed—while private health expenditures remained somewhat stable relative to GDP, unsurprisingly, as they are estimated as a constant proportion to overall consumption

Figure 4.8: Health Expenditures by Source of Financing



Sources: WHO (2010) for private health spending, Minstry of Finance for public health spending (IMF 2008b).

expenditure, public health spending rose from 2 percent of GDP in 2002 to 3.8 percent of GDP in 2008. Relative to government spending (compare table 4.3), the share of public health spending increased from 6.5 percent (somewhat lower than in previous years) in 2002 to 8.5 percent in 2008. According to the latest budget figures for 2010/11 (Sithole

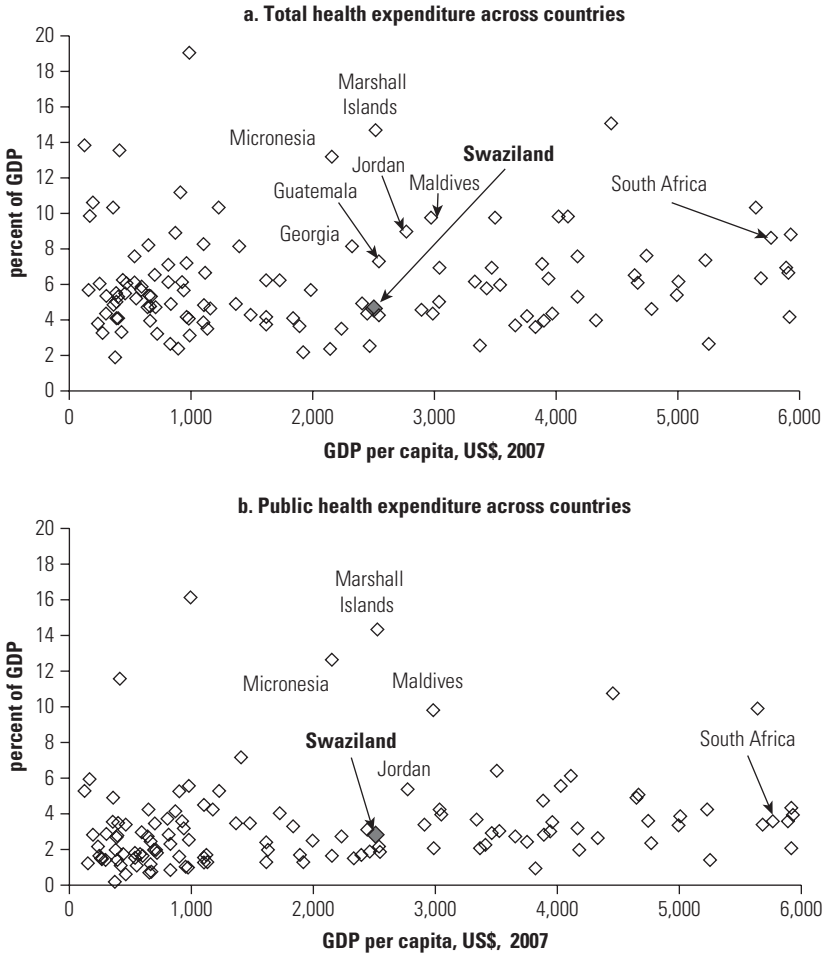
2010), the increase in public allocations for health continued through 2010/11, reaching 4.7 percent of GDP and 12.5 percent of government expenditures.[14] In terms of U.S. dollars,[15] the increase in public health spending is more pronounced, rising from $24 million in 2002 to $82 million in 2005. This reflects the appreciation of the domestic currency, resulting in an increase in nominal GDP from $1.2 billion to $2.5 billion over these years. However, much of this nominal increase is absorbed by a corresponding increase in wages and salaries, so that the real increase is better captured by health spending relative to GDP.

Because the WHO data cover most countries, they can be used to conduct cross-country comparisons (figure 4.9). Overall, the level of health spending (in percent of GDP) in Swaziland is similar to the level observed in countries with a similar level of economic development. Public health expenditures are somewhat higher than for most countries with similar GDP per capita through 2007, and based on 2010/11 budget allocations, Swaziland will have one of the highest levels of public health spending of countries in its income bracket (excluding the "three Ms").[16]

External financing accounts for some of the health spending increase through 2008 (figure 4.8a). The role of external support in health spending increased from 2 percent in 2002 to 10 percent of total health expenditures in 2008, and the equivalent of 18 percent of public health expenditures.[17]

More than for health spending (or overall government expenditures) in general, external financing plays an important role in the HIV/AIDS response. This is clearly illustrated in figure 4.10, which summarizes data on aid commitments and disbursements from the Organisation for Economic Co-operation and Development's (OECD) Creditor Reporting System database (OECD 2009). HIV/AIDS-related external aid, which did not play a role before 2000, has come to dominate aid disbursements in the areas of health and population programs,[18] averaging 0.5 percent of GDP in 2002–08, whereas aid in health and population programs excluding HIV/AIDS accounted for 0.1 percent of GDP. At the same time, HIV/AIDS-related aid has become a significant factor in trends in aid commitments to Swaziland overall, and accounted for about 40 percent of all external aid included in the OECD database. Further, external aid has been increasing overall, and the increase in HIV/AIDS-related aid appears to have added to, rather than crowded out, aid in other categories.

Figure 4.9: Total Health Expenditure across Countries, 2007

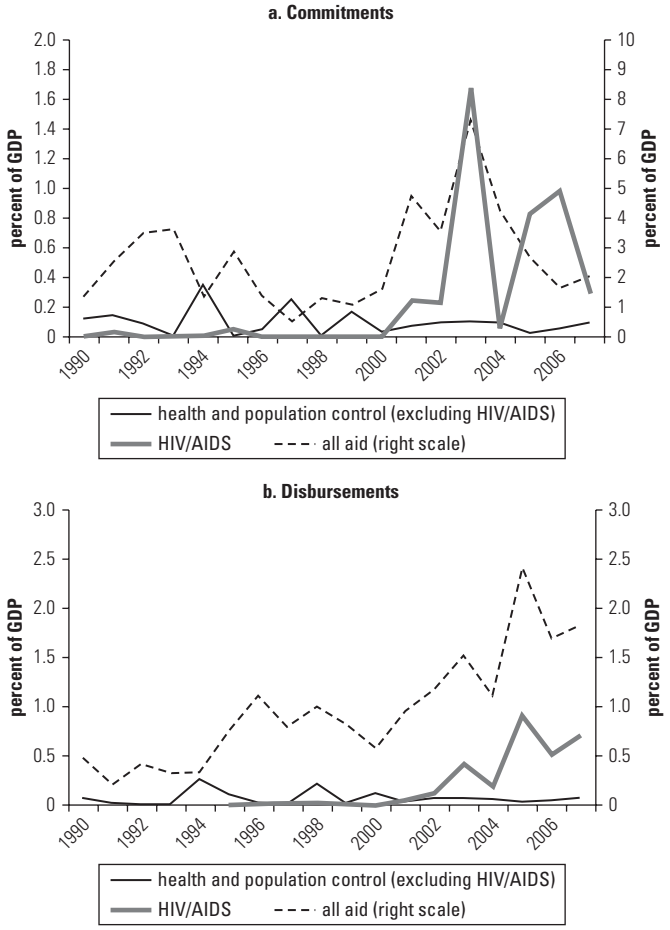


Source: WHO (2010).

Costs of national HIV/AIDS response

The national HIV/AIDS response is spearheaded by the National Emergency Response Council on HIV/AIDS (NERCHA), established in 2001 and made a statutory council in 2003. The national response is currently guided by the National Multisectoral Strategic Framework for HIV and AIDS 2009–14 (GoS 2009). Most HIV/AIDS-related services are delivered

Figure 4.10: Aid Commitments and Disbursements by Sector, 1990–2007



Source: Authors' calculations, based on OECD (2009) and IMF (2009).

through the public sector; nongovernmental organizations (NGOs) play a subordinate role.

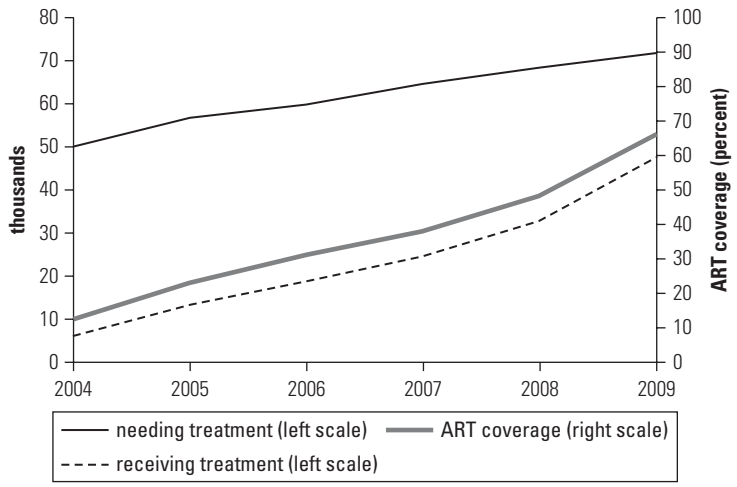
The objectives of the Strategic Framework can be grouped in three areas—prevention; treatment, care, and support; and impact mitigation and response management, concerning the overall efficacy of the program. In the area of prevention, GoS (2009) envisages a decline in adult HIV incidence from 2.9 percent to 2.3 percent by 2014. While the number of people living with HIV/AIDS would continue to grow in absolute terms

over this period (partly reflecting reduced mortality resulting from increased access to treatment), HIV prevalence would start declining.

The provision of antiretroviral therapy through the public sector was launched in December 2003. The number of people obtaining antiretroviral therapy has risen steadily since then (figure 4.11), from about 6,000 people at end-2004 (out of estimated 45,000 in need of treatment) to 47,000 at end-2009 (UNAIDS 2010a). GoS (2009) envisages an increase in the coverage of antiretroviral therapy to 85 percent of adults and 90 percent of children by 2014, as well as increased survival time while receiving treatment, contributing to an increase in life expectancy from an estimated 40 years in 2008 to 44 years in 2014.

The latest complete data on HIV/AIDS-related spending and the financing of the HIV/AIDS program are included in the most recent National AIDS Spending Assessment (NERCHA and UNAIDS 2008), the findings of which are summarized in table 4.4. While somewhat outdated now, it still provides useful information on the structure of the HIV/AIDS program. Over the two years covered, spending increased from $40 million in 2005/6 to $49 million in 2006/7. The most important program components over these two years were prevention (about 20 percent of total), treatment and care (about 25 percent of total), and OVC (about 30 percent of the total).

Figure 4.11: Access to Antiretroviral Therapy, December 2004 to December 2009



Source: UNAIDS (2010a).

Table 4.4: HIV/AIDS-Related Expenditures, 2005/6–2006/7

EXPENDITURE	2005/6	2006/7	2005/6	2006/7
	US$ MILLIONS		PERCENT OF GDP	
Total	40.1	49.1	1.5	1.8
Prevention	9.6	8.5	0.4	0.3
Treatment and care	12.5	9.3	0.5	0.3
Human capital	1.2	5.4	0.0	0.2
OVC	10.3	14.9	0.4	0.5
o/w: financed from domestic sources	6.6	10.2	0.3	0.4
Social protection	0.8	3.0	0.0	0.1
Management, coordination, and support	5.8	7.9	0.2	0.3
By source of financing				
Public domestic sources	11.4	19.4	0.4	0.7
External sources	28.7	29.7	1.1	1.1
o/w: GFATM	19.6	15.4	0.8	0.6
o/w: international NGOs	3.3	6.6	0.1	0.2
By implementing agency/sector				
Public sector	33.1	36.2	1.3	1.3
NGOs	6.6	11.7	0.3	0.4
International organizations	0.2	0.3	0.0	0.0
Other	0.1	0.8	0.0	0.0
Memorandum items:				
GDP	2,610	2,779	100.0	100.0
Public health expenditures (% of GDP)	—	—	3.3	3.0

Sources: Authors' calculations, based on NERCHA and UNAIDS (2008), IMF (2008b), and IMF (2009).
Note: — = not available; GFATM = Global Fund to Fight AIDS, Tuberculosis, and Malaria. Source data show minor inconsistencies in totals between categories.

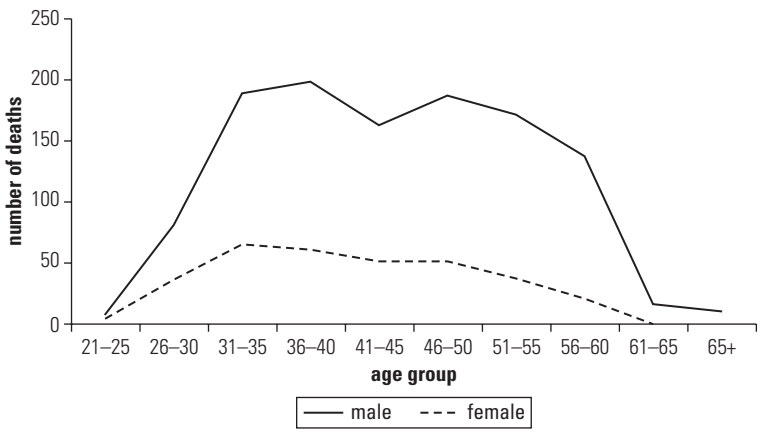
External financing accounted for about $30 million in each year, largely through a grant from the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM). The mix between external financing and domestic financing differs substantially between program categories. While the mitigation of the social consequences of HIV/AIDS for children affected by HIV/AIDS is financed largely from domestic sources, other program components are predominantly covered by grants. Unlike the situation in a number of other countries facing this magnitude of HIV/AIDS impacts, HIV/AIDS-related services in Swaziland are predominantly delivered through the public sector (about three-quarters of total spending), while NGOs play a subordinate role (about one-fifth of total spending).

Impact of HIV/AIDS on government employees

In addition to (and exacerbating) the financial implications, HIV/AIDS affects the government's capacities through the increased mortality and morbidity of public servants. Increased mortality and morbidity have fiscal costs, including the costs of absenteeism and sick leave, the costs of recruiting replacement staff, and medical- and death-related benefits.[19] These costs are generally more difficult to quantify than the costs of a national HIV/AIDS program because they are not reflected in specific HIV/AIDS-related expenditure categories; because relevant data (for example, on mortality and absenteeism of government employees) are not available in the public domain; or because the line between efficiency losses and financial losses is sometimes blurred.

The employment records from the human resource management system operated by the Ministry of Public Service, which covers about three-quarters of government employees, illustrate the impact HIV/AIDS is having on the government workforce. Data on attrition are coded by reason of exit, including death. Figure 4.12 summarizes the number of death-related exits by age of employee. Overall, approximately 1,500 government employees died between 2002 and 2009, corresponding to an annual death-related attrition rate of about 1 percent.[20] The age profile of deaths, peaking at ages 31–35 for women and 36–40 for men, strongly suggests that the bulk of deaths among public servants is AIDS related.

Figure 4.12: Deaths among Government Employees, 2002–09

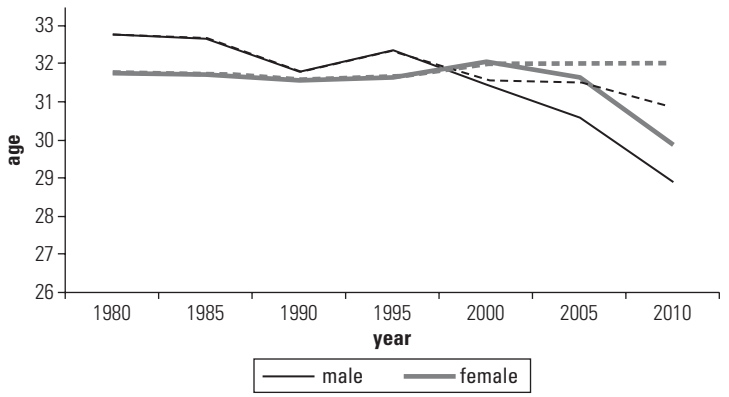


Source: Ministry of Public Service, Mbabane, Swaziland.

The data on death-related attrition among public servants (or increased sick leave) only partly capture the consequences of the HIV/AIDS impacts on public service. Additionally, the pool of potential employees changes as increased mortality is increasingly reflected in the population structure. This effect could be particularly important in Swaziland, not only because of the scale of the epidemic, but also because Swaziland has an unusually young population. In 1990, the median age of the population aged 20–59 was just under 32 years, suggesting that certain types of skills (notably, those requiring experience) were in short supply even before the arrival of HIV/AIDS (figure 4.13). The HIV/AIDS epidemic has exacerbated this situation—the median age of the population of aged 20–59 has fallen to 29 years for males and 30 years for females, reflecting a decline of about 2 years in the median age as a result of HIV/AIDS.

A few studies provide estimates of the HIV/AIDS impacts on public servants, and the resulting fiscal costs. An early study commissioned by the Swazi Ministry of Education (1999) predicted that the number of teachers that needed to be trained by 2016 would more than double, from 5,000 to 13,000, because of AIDS-related illnesses and deaths. A study of HIV/AIDS impact on three ministries (Finance, Economic Planning and Development, and Public Service) proposed that these agencies would lose roughly one-third of their staff to AIDS-related illness or death by 2021 (JTK Associates 2002). The additional costs to the

Figure 4.13: Median Age of Population Age 20–59, 1980–2010



Source: Authors' calculations, based on UN Population Division (2009).
Note: Solid lines represent estimates of actual trends, broken lines a scenario excluding the impact of HIV/AIDS.

three ministries—including increased pension fund contributions, costs for sick leave, and training—were estimated at 1.5 percent of personnel costs. The Ministry of Health and Social Welfare (2005) projected that the costs of HIV/AIDS impacts on its employees would exceed 6 percent of the ministry's salary bill.[21] The Ministry of Health and Social Welfare also reported that 2.6 percent of its staff died in 2004.

Less information is available on the costs of sick leave and other benefits, including pensions. Muwanga (2002) and the Ministry of Health and Social Welfare (2005) document an upward trend in absenteeism and sick leave.[22] Although the Swazi government does not provide special medical benefits to its employees (see Muwanga [2002], and Beckmann and Rai [2005]), the government does cover some of the costs of medical services to public employees through increased use of public health services.

One potentially large component of higher personnel costs resulting from increased mortality and morbidity is the increase in the cost of pensions. This, however, is exceedingly difficult to analyze. Increased outlays because of higher premature mortality imply lower payouts to government employees reaching retirement age. High co-infection rates among couples mean that surviving partners (who could be eligible for a pension) frequently die prematurely, too, and high orphan rates mean that survivor's pensions to a deceased employee's children become more common.[23] These trends appear to be reflected in data on the number of beneficiaries of the Public Sector Pension Fund (PSPF); between April 2008 and March 2009, the number of recipients of survivor's pensions increased from 10,000 to 15,000, while the number of pensioners increased from 5,000 to 6,000 (PSPF 2008/2009). For earlier years, Muwanga (2002) provides data from PSPF annual reports showing a sharp increase in death annuities (absolute and relative to other types of benefits). JTK Associates (2002) proposed that increased pension fund payouts could reach 2–4 percent of salaries, but did not provide enough underlying data to allow for the reproduction or update of their analysis as a basis for projections.

While this analysis was not able, from the available different data sources, to establish the full costs of increased mortality, morbidity, and attrition on public servants, table 4.5 provides some crude estimates. Specifically, this analysis assumes that each government employee receiving antiretroviral treatment incurs 10 days of sick leave per year, and that he or she draws on 60 working days of sick leave before death (it makes little difference for these

Table 4.5: Costs of the Impacts of HIV/AIDS on Government Employees, 2009

	IN PERCENT OF . . .		
	WAGES AND SALARIES	GOVERNMENT EXPENDITURES	GDP
Sick leave	0.9	0.4	0.13
Funeral attendance	0.4	0.1	0.05
Increased turnover	0.6	0.2	0.09
Training	1.0	0.4	0.14
Total (excluding medical costs)	*2.9*	*1.1*	*0.4*
Medical benefits (imputed)	1.9	0.7	0.3
Total (including medical costs)	*4.8*	*1.9*	*0.7*

Source: Authors' estimates.

estimates whether these are consecutive or spread over a longer period). Following Haacker (2004), each death is assumed to incur 40 days of leave for funeral attendance. The costs of administering the exit of an employee and filling a vacancy correspond to one month of salary of the position filled.[24] In addition, the productivity of a new employee is typically 25 percent lower during the first year on the job, which is at the lower end of the range reported by Rosen and others (2004) for the private sector.[25] Medical expenditures are estimated based on actual spending on care and treatment in 2006/7 (from NERCHA and UNAIDS [2008]) and attributed to government employees according to their share in the workforce. This analysis does not include pensions and death-related benefits through the PSPF, because modeling these benefits would go beyond the scope of this exercise.

Table 4.5 suggests that the costs of the HIV/AIDS impacts on government employees are an important share of the fiscal costs of HIV/AIDS. In 2009, the impact on government employees absorbed the equivalent of about 1 percent of total government expenditures, or 0.4 percent of GDP, even before any policy measures to address the challenges are taken into account. When medical treatment for government employees is included, the costs of HIV/AIDS impacts on public servants are 0.7 percent of GDP. To put this number in perspective, the total costs of the HIV/AIDS response, as documented by NERCHA and UNAIDS (2008), totaled 1.8 percent of GDP as of 2006/7. Even as the costs of the HIV/AIDS program increase (and are projected to increase further, as discussed below), the costs of HIV/AIDS impacts on public servants remain a significant share of the total fiscal costs of HIV/AIDS.

IV. The Fiscal Dimension of HIV/AIDS

Based on the available data on the state of the epidemic and the fiscal costs of HIV/AIDS so far, this section covers the costs of HIV/AIDS from the public finance perspective, including costs that are not captured by HIV/AIDS-related budget line items. In addition, this section strongly emphasizes the persistence of the fiscal costs of HIV/AIDS and offers an interpretation of these fiscal costs as a quasi-liability to be served over many years.

Methodology

The analysis of the fiscal dimension of HIV/AIDS combines three elements: (i) estimates and projections of the state of the epidemic; (ii) estimates and projections of the fiscal costs of HIV/AIDS; and (ii) a simple model and assumptions describing the macroeconomic and fiscal context.

The estimates and projections of the state of the epidemic were generated from a model that builds on assumptions regarding the number of new adult infections, and derives estimates of the number of people living with HIV/AIDS, people needing and receiving treatment, and AIDS-related deaths.[26] Additionally, the model estimates and projects the number of children living with HIV/AIDS and children orphaned by AIDS. Underlying estimates of the size and the structure of the population were obtained from the United Nations Population Division (2009). Key parameters, such as treatment coverage rates, were set in line with the National Strategic Framework (NSF) 2009–14 (GoS 2009), and the estimates of the state of the epidemic were aligned with estimates prepared for the 2010 UNAIDS Report on the Global AIDS Epidemic, which have benefited from some feedback from the national authorities and are the most comprehensive estimates of the state of the epidemic available for Swaziland.[27]

The **estimates and projections of the fiscal costs of HIV/AIDS** are based on the targets specified in the NSF 2009–14 (GoS 2009). Based on actual spending data (through 2007) and a preliminary costing of the NSF 2009–2014 obtained from counterparts, a costing of the most significant aspects of the NSF was prepared. Additionally, this study's estimates of the fiscal costs of HIV/AIDS include provisions for the costs of impacts on government employees (in line with the estimates for 2009, as explained above).

Assumptions regarding the **fiscal context** were detailed in the previous section reviewing the state of public finances. Revenues from the Southern

African Customs Union (SACU) account for a significant share of government revenues: 57 percent of domestic revenues in 2009/10. SACU revenues and thus domestic revenues overall are projected to decline relative to GDP. The increasing costs of the HIV/AIDS program thus add to the challenges of fiscal adjustment, while the tightening fiscal resource envelope complicates financing the increasing costs of the impacts of and response to HIV/AIDS. Especially over the medium and long term, it is necessary to account for the **macroeconomic consequences** of HIV/AIDS. Not only does the working-age population grow more slowly because of HIV/AIDS,[28] so does GDP. This is also relevant to fiscal analysis, because fiscal revenues depend on the level of economic activity. For this reason, the projections include a simple macroeconomic model, which is described in the appendix.

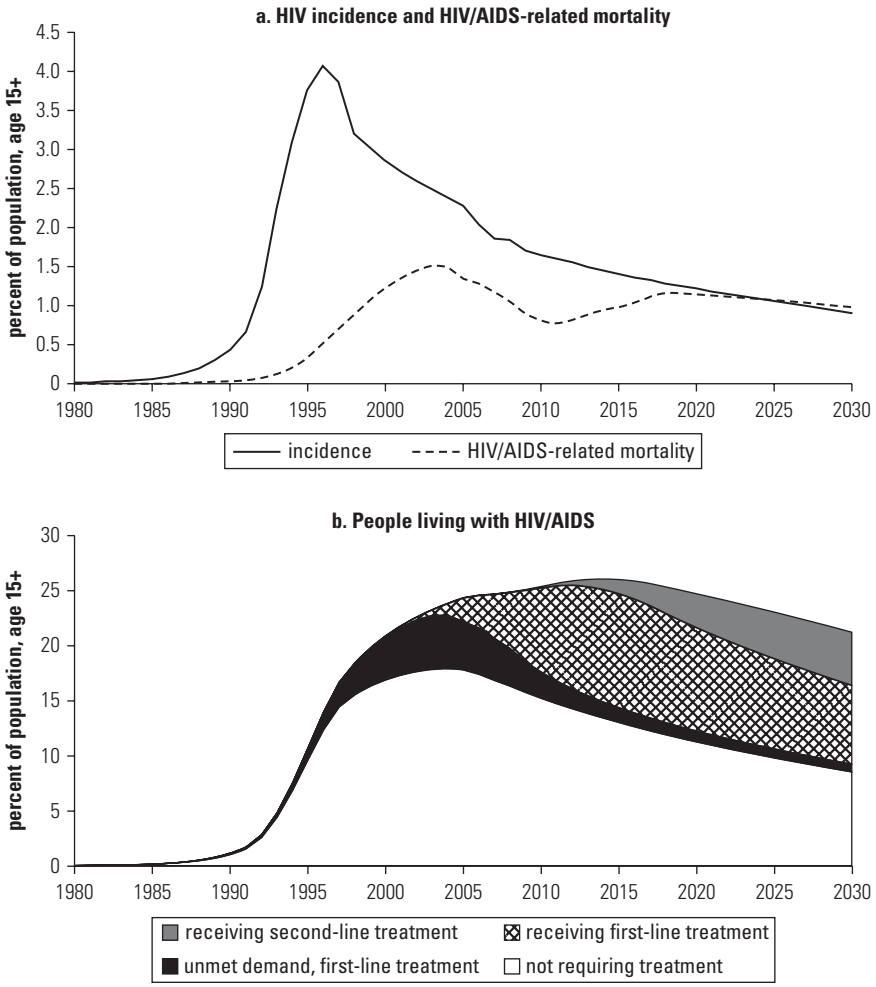
The state and course of the epidemic

Figure 4.14 summarizes this study's estimates and projections on the course of the epidemic for the population aged 15+ (figure 4.14a). Until the mid-1990s, increasing HIV prevalence was driven by escalating HIV incidence (peaking at about 4 percent of the adult population in 1995). AIDS-related mortality did not play an important role in this early phase, but accelerated sharply from 0.1 percent of the population aged 15+ in 1995 to 1.8 percent of the population aged 15+ in 2006. Between 2005 and 2010, HIV incidence continued to decline. Mortality declined sharply over this period as well (figure 4.14a) because of the increased availability of treatment. This study's projections envisage further gradual declines in HIV incidence rates, while the AIDS-related mortality rate remains at about 1 percent of the population aged 15+.

Figure 4.14.b provides further insights regarding trends in HIV prevalence. Until about 2000, HIV prevalence increased sharply, driven by high HIV incidence rates (figure 4.14a). From 2003, increased access to treatment became a critical factor underlying trends in HIV prevalence. Estimates suggest that by 2010, 7 percent of the population aged 15+ was receiving treatment; this rate is projected to increase to 13 percent by 2020 and remain at about that level until 2030.[29]

Figure 4.15 illustrates this study's estimates and projections of the HIV/AIDS impact on the youth population. Increased prevention of mother-to-child infection and increased treatment access for young people

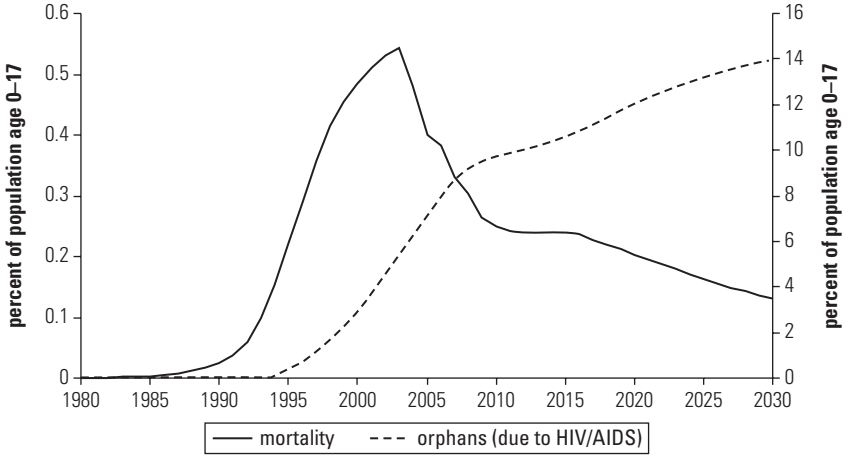
Figure 4.14: HIV Incidence, HIV/AIDS-Related Mortality, and People Living with AIDS, 1980–2030



Source: Authors' estimates and projections.

living with HIV/AIDS have resulted in a sharp decline in mortality starting around 2002. However, the number of children orphaned by AIDS continues to rise throughout the projection period. One factor behind this increase is reduced HIV incidence and increased survival of children born to HIV-positive mothers. Second, orphan rates follow adult mortality with a long lag, and keep increasing even through the scaling-up of treatment as adult mortality remains higher than before 2000.

Figure 4.15: Impact of HIV/AIDS on Youth, 1980–2030



Source: Authors' estimates and projections.

Assumptions regarding fiscal costs of HIV/AIDS

This study's projections of the costs of the national HIV/AIDS response are based on the NSF 2009–14 (GoS 2009). A full costing of the NSF was not available at the time of this report. Based on actual HIV/AIDS-related spending data and a crude costing that had been undertaken in support of a GFATM funding proposal, data and projections on the state of HIV/AIDS in Swaziland prepared in support of UNAIDS (2010a, 2010b), and the targets specified under the NSF, an initial costing of the NSF was conducted. The most important assumptions underlying the projections were discussed with staff at NERCHA, and the feedback received was incorporated into the projections.

Key targets of the NSF reflected in this study's projections include the following:

- Share of female sex workers reached by prevention programs rising to 60 percent.
- Number of pregnant women tested for HIV rising from 67 percent in fiscal year (FY) 2008 to 90 percent by FY 2014.

- Number of people aged two and older tested for HIV in the past 12 months and knowing their HIV status rising from 22 percent (women) and 9 percent (men) to 50 percent (women) and 40 percent (men).
- Share of HIV-positive TB cases receiving treatment for both HIV and TB rising from 58 percent in FY 2008 to 98 percent in FY 2014.
- Coverage rates for antiretroviral therapy rising from 52 percent in FY 2008 to 85 percent in FY 2014 for adults, and from 60 percent to 95 percent for children over the same period.
- Number of health facilities providing advanced care and treatment rising from 26 in FY 2008 to 66 in FY 2014.
- Share of orphans receiving school fee support rising to 98 percent, proportion of households with orphans receiving external support rising to 60 percent, and 40 percent of orphans to receive food support by FY 2014.

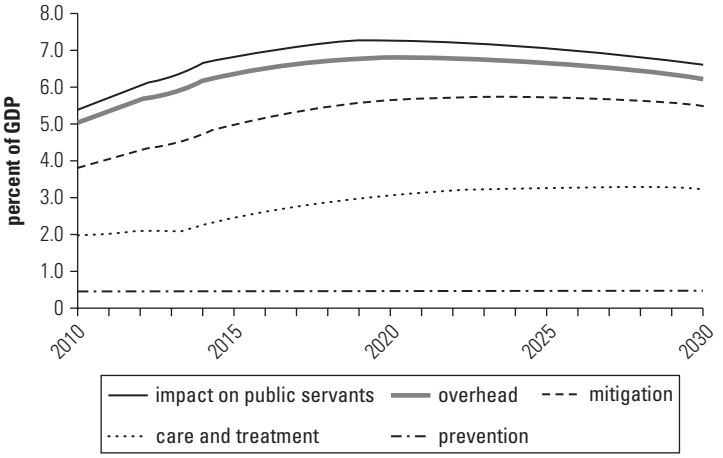
Treatment costs account for a substantial proportion of the costs of the national HIV/AIDS response. In this regard, the annual cost (including non-drug costs) of first-line antiretroviral treatment is assumed to be emalangeni (E) 4,100 at the outset, and second-line antiretroviral treatment to be E 18,000. While the costs of second-line therapy are expected to come down over the next years (consistent, for example, with Stover 2009), to about E 14,200, the share of patients on second-line therapy (a small minority as of 2010) among people receiving antiretroviral treatment is projected to rise (see figure 4.14b), so that the average unit costs of antiretroviral treatment are projected to rise from E 4,600 in 2010 to E 5,700 by 2020, and E 7,700 by 2030.

Projections of the fiscal dimension of HIV/AIDS and the HIV/AIDS program

This study's projections for the fiscal costs of HIV/AIDS and the HIV/AIDS program are based on epidemiological projections, assumptions regarding the costing of various components of the NSF, crude cost projections prepared in support of the recent GFATM grant application, and this study's analysis of HIV/AIDS impacts on government employees (figure 4.16).

Overall, the costs of HIV/AIDS and the HIV/AIDS program are estimated at 5.5 percent of GDP in 2010, are projected to rise to 7.3 percent of

Figure 4.16: Fiscal Costs of HIV/AIDS, 2010–30, percent of GDP

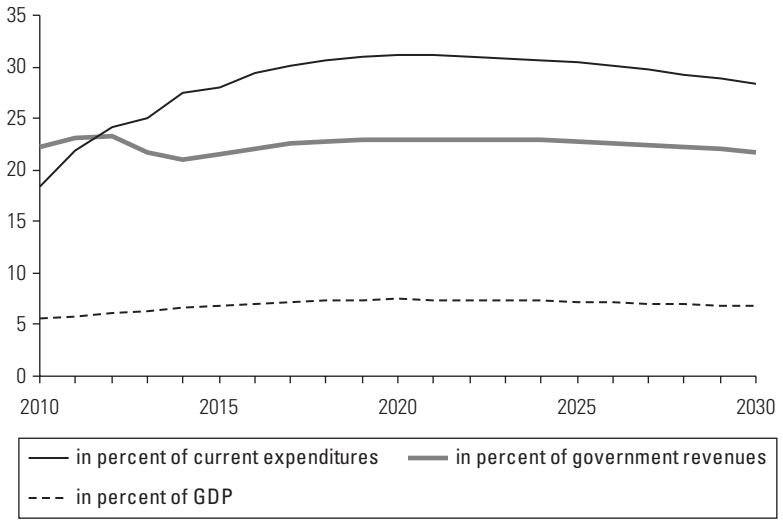


Source: Authors' estimates and projections.

GDP by 2020, and then to slowly decline to 6.6 percent of GDP by 2030. The most important components of the total costs are care and treatment, which double from 1.5 percent of GDP in 2010 to 2.7 percent of GDP in 2020; mitigation, which rises from 1.8 percent of GDP to 2.6 percent of GDP by 2020; and overhead of the HIV/AIDS program, which increases from 1.2 percent of GDP to 1.4 percent by 2014.

These estimated costs are very large from a fiscal or macroeconomic perspective, particularly because they are highly persistent, starting to decline only around 2020. Moreover, the escalation in the fiscal costs of HIV/AIDS takes place at a time when fiscal resources are shrinking. Figure 4.17 relates the fiscal costs of HIV/AIDS to summary measures of fiscal capacities (overall government revenues and current expenditures). The fiscal costs of HIV/AIDS absorb the equivalent of 22 percent of government revenues in 2010, the year government revenues hit a low as a result of decreased SACU revenues.[30] Even though government revenues partly recover from the extreme low in 2010, the fiscal costs of HIV/AIDS, relative to government revenues, remain above 20 percent. Relative to current expenditures, the increase is even more pronounced—while the fiscal costs of HIV/AIDS initially absorb 18 percent of current expenditures, this share is projected to increase to over 30 percent.

Figure 4.17: Fiscal Costs of HIV/AIDS, 2010–30



Source: Authors' estimates and projections.

HIV/AIDS as a fiscal liability

Because HIV/AIDS impacts incur highly persistent fiscal costs, current expenditures in any given year offer an incomplete and imperfect measure of the epidemic's fiscal consequences. For this reason, this study discusses the evolving projected fiscal costs of HIV/AIDS over a 20-year horizon (as, for example, in figure 4.16). However, the long duration of fiscal commitments under the HIV program and of the consequences of alternative policies render an evaluation of alternative policies for fiscal space difficult.

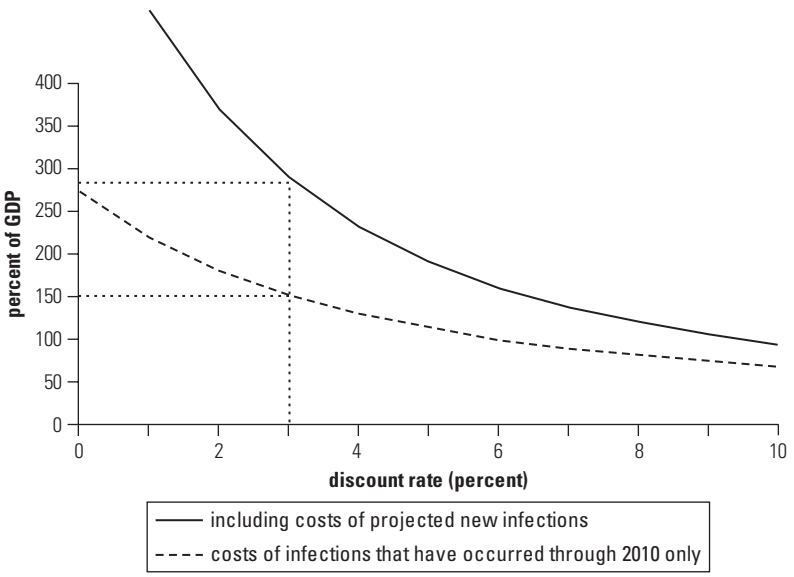
To adequately address the long-term nature of the commitments under the HIV/AIDS program, this analysis begins with the observation that the fiscal costs of HIV/AIDS share characteristics of a national debt that needs to be served over a long period of time. In this regard, these costs are similar to fiscal quasi-liabilities such as pension obligations. While these costs may not exhibit all of the characteristics of a formal debt, they represent firm spending commitments over a long period that would be difficult and politically costly to renegotiate. This means that instruments commonly used to analyze the extent of a country's indebtedness and debt sustainability can be adapted to assess the implications of HIV/AIDS on the

government's fiscal space and fiscal sustainability, both at a specific time and as the fiscal burden is evolving over the projection horizon.

With these considerations in mind, figure 4.18 provides estimates of the present discounted value (PDV), the most common summary indicator of the magnitude of a liability, of the fiscal costs of HIV/AIDS.[31] At a discount rate of 3 percent, close to the real interest rate at which the government would be able to borrow, the projected costs of HIV/AIDS represent a fiscal quasi-liability equivalent to almost three times (293 percent of) GDP. These estimates, however, include costs of projected future infections that have not yet been incurred and are subject to change depending on the government's policies. Figure 4.18 therefore also provides estimates of the PDV of the fiscal costs of HIV/AIDS already committed as of 2010, based on the targets of the NSF and the HIV infections that have already occurred by 2010. By this count, the fiscal costs of HIV/AIDS committed by 2010 correspond to about 151 percent of GDP.

To place this number in perspective, a comparison with the level of Swaziland's public and external debt is useful. Total external debt stood at E 3.2 billion at the end of March 2010, corresponding to 14.2 percent of GDP (CBS 2010), and domestic debt was E 396 million at end-2009

Figure 4.18: Present Discounted Value of the Fiscal Costs of HIV/AIDS as of 2010



Source: Authors' estimates and projections.

(Sithole 2010), signifying a relatively low level of external or overall public debt. The spending commitments under the HIV/AIDS program thus correspond to about 10 times the level of public debt. The financing needs of the HIV/AIDS program thus severely compress the fiscal space available for the attainment of the government's policy objectives across the board. Moreover, the fiscal impact of HIV/AIDS occurs against the backdrop of a difficult fiscal adjustment, with public debt—according to the fiscal scenario described above—rising to 50 percent of GDP, further constraining the government's fiscal position over the coming years.

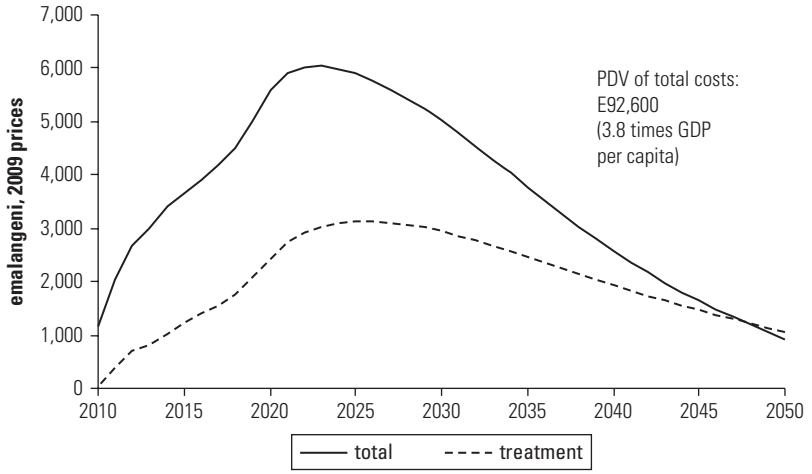
HIV incidence and the fiscal costs of HIV/AIDS

The 2008 Report on the Global AIDS Epidemic (UNAIDS 2008b) highlights intensified HIV prevention as a prerequisite to attaining and sustaining comprehensive access to treatment.[32] While prevention, HIV incidence, and treatment need are obviously linked, the long lags between infection and treatment mean that while the costs of increased prevention occur immediately, the fiscal savings occur only after and are spread over many years, which makes an assessment of the link between HIV incidence and the fiscal costs of an HIV/AIDS program difficult.[33]

To address this question on the fiscal consequences of alternative policy options more generally, the interpretation of the fiscal costs of HIV/AIDS as a quasi-liability can be extended to obtain a sharper analysis of the links between policy measures or outcomes and the fiscal costs of HIV/AIDS. This analysis proceeds in two steps. First, it addresses the link between one additional infection and the fiscal costs of HIV/AIDS. The second step includes a macroeconomic analysis of the costs of HIV/AIDS and attributes the fiscal costs to the points in time at which they are ultimately incurred, that is, when an infection occurs.

Figure 4.19 summarizes the estimates of the fiscal costs of an HIV infection occurring in 2010, under the policy targets included in the NSF. The costs rise fairly steadily over 15 years following infection, largely reflecting the costs of treatment. First, an increasing number of people obtain treatment. Even though the number of people receiving treatment will decline eventually, an increasing share of people on treatment will receive more expensive second-line treatment because of drug resistance, so that the average unit cost increases. Toward the tail of the costs curve, costs are dominated by treatment costs[34] and the costs of certain mitigation expenses

Figure 4.19: Costs of An Additional Infection Occurring in 2010



Source: Authors' estimates and projections.

(largely orphans). Overall, one additional infection is estimated to incur a fiscal cost of E 92,600 (about four times GDP per capita), applying a discount rate of 3 percent. However, the risk of infection is persistent, and an individual not contracting an infection at one time may still contract it in the future. For example, a delayed onset of sexual activity results in a reduced risk of contracting HIV overall, but in many cases an individual may still get infected at a later date. For this reason, it is also useful to obtain a measure of the gains from infections delayed. For example, using a discount rate of 3 percent, the fiscal savings from a delay in an infection by five years is E 13,000 (in 2009 prices).[35] Thus, describing the outcomes of a prevention program in terms of infections averted or delayed, it is possible to assess the contribution of the program to containing the fiscal costs of HIV/AIDS.[36]

This microeconomic analysis of the high costs caused by additional infections is in sharp contrast to the macroeconomic perspective, whereby changes in HIV incidence affect the fiscal costs of HIV/AIDS only with very long lags. Consequently, current spending provides limited information on the evolving fiscal burden of HIV/AIDS, which is ultimately caused by new infections.

To reconcile the microeconomic and macroeconomic perspectives, this study provides an analysis of the fiscal costs of HIV/AIDS on a "commitment" basis, that is, attributing the bulk of the costs of HIV/AIDS to the point in

time at which they are actually incurred, that is, the time of infection.[37] This analysis includes calculating the costs incurred by one additional infection for each year, and multiplying by the number of projected infections for that year. Then projected expenditures not linked directly to HIV prevalence are added in (essentially, certain prevention measures targeting the entire population), because these are not captured by the analysis of the costs incurred by one infection.

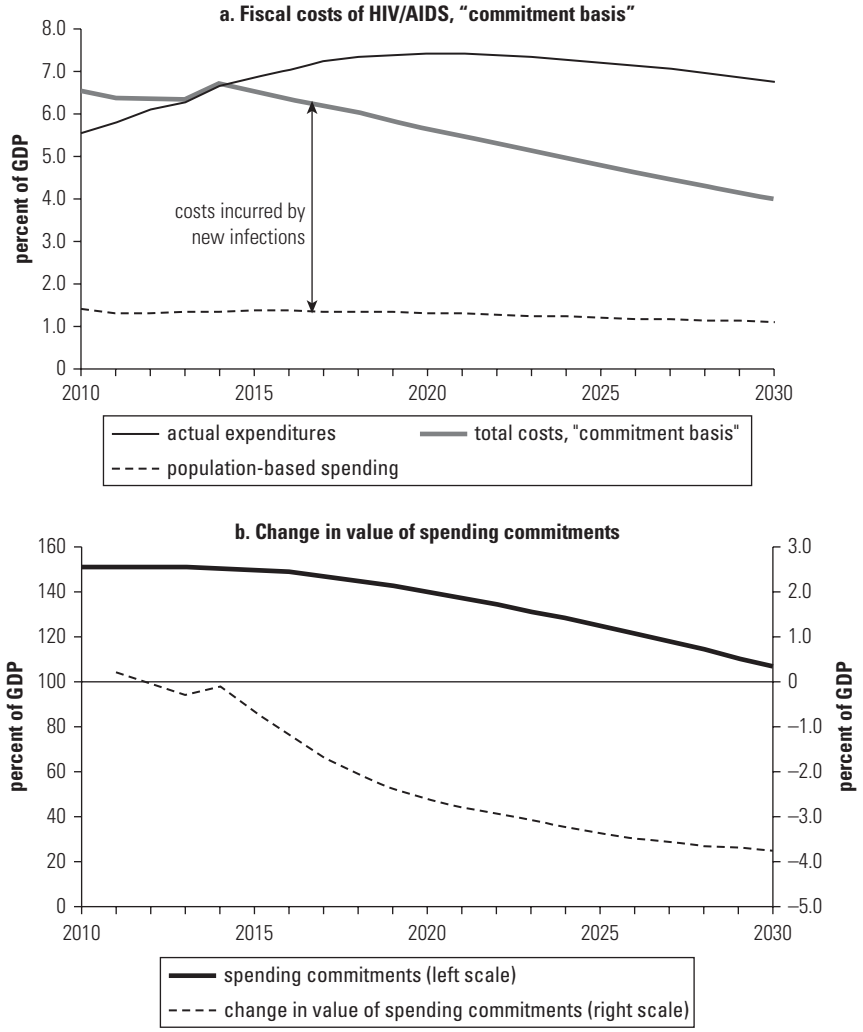
To reconcile the macroeconomic perspective, whereby a decline in prevalence translates into reduced costs only with a long delay, and the microeconomic perspective, which focuses on the considerable cost incurred by one additional infection, this analysis offers a different presentation of the costs of HIV/AIDS and the HIV/AIDS program, recognizing that most of the costs of an HIV/AIDS program are ultimately caused once an infection occurs (for example, treatment costs, prevention of mother-to-child transmission, and orphan support). For these costs, it is possible to obtain aggregate estimates by multiplying the costs incurred by a single infection with the number of infections.

To obtain the overall costs of an HIV/AIDS program on a "commitment basis," it is then necessary to add certain costs that are not directly linked to HIV prevalence (for example, community support and prevention measures targeting the overall population or certain groups).

Estimates are summarized in figure 4.20. Initially, the costs of HIV/AIDS on a commitment basis exceed actual expenditures, and increase through 2014 as the coverage rates of certain services increase. However, from about 2015, the costs incurred by new infections come down steadily, because HIV incidence is declining throughout the projection period, and are lower than actual spending. However, by the end of the projection period, the estimates indicate that population-based spending and the costs of new infections still add up to a very substantial 4 percent of GDP annually.

While the programmed spending remains very high over the projection period, the decline in the costs newly committed means that the fiscal burden of HIV/AIDS is declining over the projection period. Overall, the value of the quasi-liability implied by the costs of HIV/AIDS and the HIV/AIDS program declines from 150 percent of GDP in 2010 to 109 percent of GDP by 2030. The difficult fiscal position does not improve by the same amount, because the decline in fiscal resources committed through the HIV/AIDS program coincides with a projected increase in public debt by about 25 percent of GDP.

Figure 4.20: Actual Spending and Costs Incurred by New Infections, 2010–30

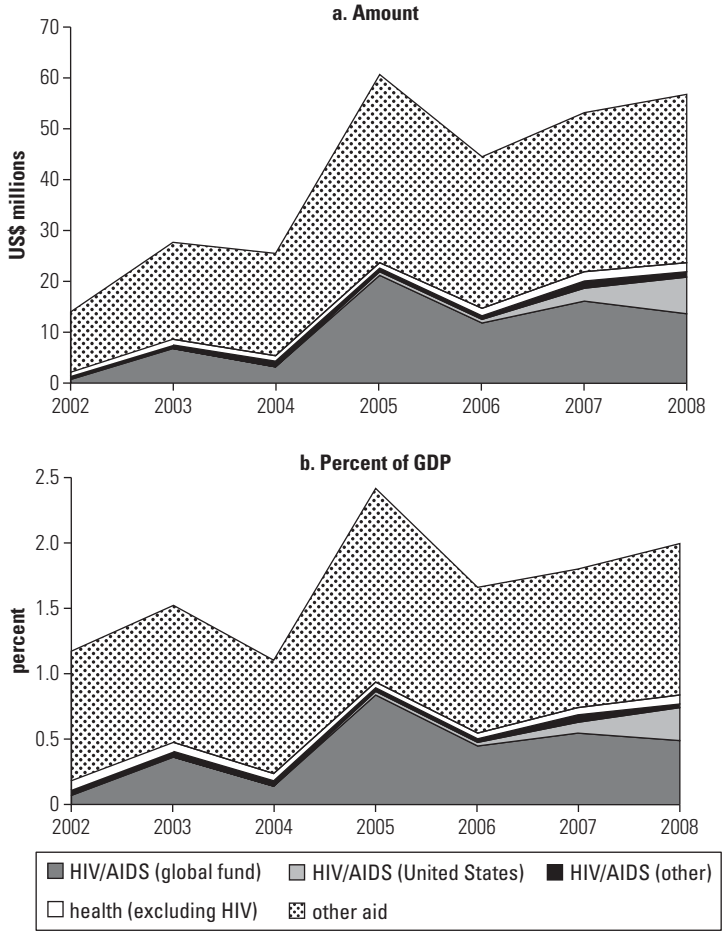


Source: Authors' estimates and projections.

The role of external financing

External financing has played an important role in funding the national HIV/AIDS response. Figure 4.21 illustrates recent trends in external aid disbursement. Overall, disbursements have increased from $14.0 million (1.2 percent of GDP) in 2002 to $56.7 million (2.0 percent of GDP) in

Figure 4.21: Aid Disbursements—HIV/AIDS Share



Source: OECD (2010).

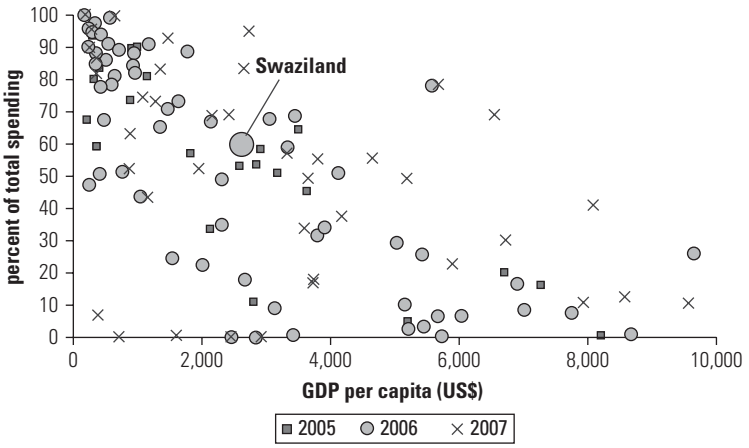
2008. This increase can be attributed to external support for Swaziland's HIV/AIDS program, rising from 0.1 percent of GDP in 2002 to 0.8 percent of GDP in 2008 ($22 million). By far, the most important external contributor to Swaziland's HIV/AIDS program through 2008 was GFATM, with disbursement of 0.5 percent of GDP in 2006–8, and a total of $73.7 million from 2002 to 2008. Furthermore, the increase in HIV/AIDS financing apparently did not come at the expense of development assistance in other areas, which increased from $11.8 million in 2002 to $32.8 million in 2008.

To assess the role of external support in financing the national HIV/AIDS response, it is also useful to place Swaziland in an international context. Overall, that is, for all purposes, not only HIV/AIDS, the level of external assistance received by Swaziland—2.4 percent of GDP in 2008 (World Bank 2010)—is in line with the level of support received by countries with similar levels of economic development. Regarding external support for the HIV/AIDS program, the extent of external financing received by Swaziland (relative to the costs of the HIV/AIDS program) also appears to be similar to that received by countries with similar levels of GDP per capita (figure 4.22). However, some middle-income countries, notably Botswana and Namibia, have been successful in soliciting higher levels of external support for their HIV/AIDS programs in absolute terms.

Because of the extraordinarily high fiscal burden of HIV/AIDS over the next years, Swaziland will continue to depend on external assistance to finance its HIV/AIDS program. The extent to which external aid will be forthcoming, however, is difficult to project. For this reason, two scenarios are described below. Neither of these scenarios is intended as a policy prescription, they are only devices to analyze the consequences of more or less accommodating external support.

- Scenario 1: External support for the HIV/AIDS program grows at 2.5 percent annually from 2009. This could reflect that main donors keep

Figure 4.22: External Financing of HIV/AIDS Programs across Countries



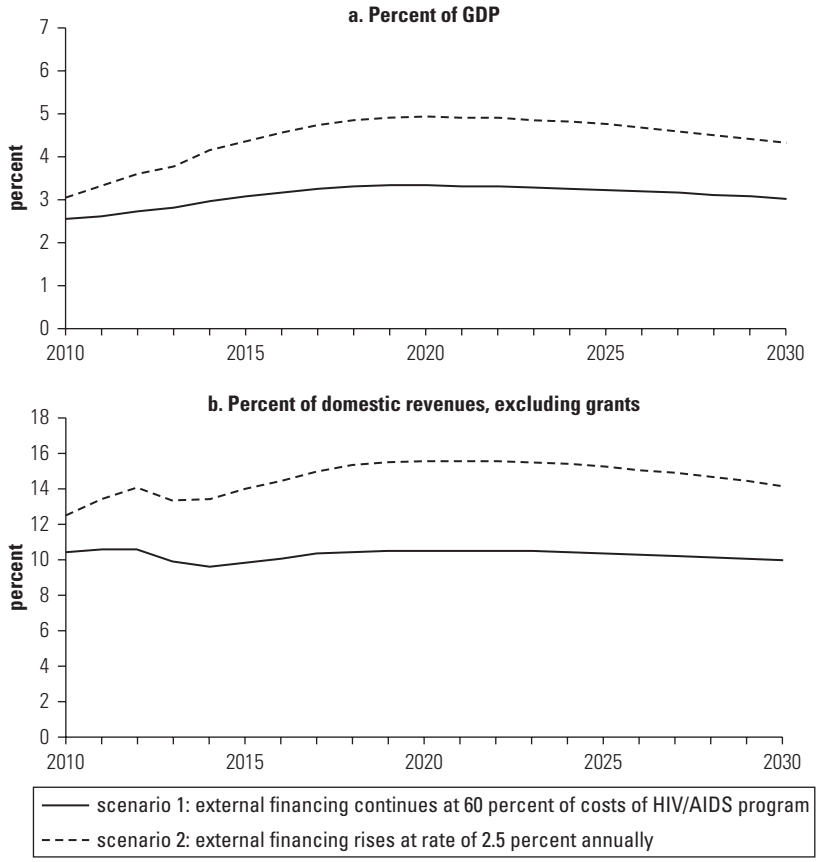
Source: Authors' calculations, based on UNAIDS (2008b) and IMF (2008).

allocations to HIV/AIDS programs broadly constant as a share of (donor) GDP; this growth rate is broadly in line with historical growth rates, and growth rates projected through 2015, from IMF (2010).

- Scenario 2: External financing accounts for 60 percent of the costs of the HIV/AIDS program.[38] This is based on the rates of external support received in the past, as shown in figure 4.22.

The projections are summarized in figure 4.23, which shows the high domestic financing needs under the two scenarios, and through the large differences between the scenarios, the vulnerability of public finances to

Figure 4.23: Domestic Financing Needs, 2010–30



Source: Authors' estimates and projections.

changes in donor support. In scenario 1, domestic financing needs rise to 3 percent of GDP, and 12 percent of domestic revenues (excluding grants). If external financing rises broadly in line with donors' GDP (assumed to grow at rate of 2.5 percent annually), domestic financing needs would rise to just below 5 percent of GDP, or 17 percent of projected domestic revenues. In scenario 1, the PDV of domestic financing needs is 133 percent of GDP, and the value of external support thus comes out at 171 percent of GDP as of 2010. In scenario 2, the PDV is higher, at 148 percent of GDP.[39]

The two scenarios can also be used to analyze the shifts in donor support that would be required to contain the high fiscal burden of HIV/AIDS in Swaziland. Here, scenario 2 is a good benchmark, because it would be consistent with constant allocations (in percent of donors' GDP) to HIV/AIDS programs by donors. To achieve a constant share of external financing (scenario 2), aid allocations would need to be over 60 percent higher by 2020 than under scenario 1, and over 50 percent higher by 2030.

V. Conclusions

Swaziland stands out as a member of a small group of countries with the highest rates of HIV prevalence in the world. The HIV prevalence rate is 26 percent of the population aged 15–49, with orphans accounting for an estimated 20 percent of the youth population (the majority orphaned as a result of AIDS-related deaths). The scale of Swaziland's HIV epidemic poses extraordinary challenges in responding to the epidemic. The objectives of this study were to assess fiscal policy challenges arising from the HIV/AIDS response, develop tools to better understand the links between the HIV/AIDS program and the fiscal costs of HIV/AIDS, and thus inform the planning of the national HIV/AIDS response, and fiscal planning in general. To this end, the analysis:

(i) Summarizes available estimates of the fiscal costs of HIV/AIDS in Swaziland and provides projections for the period 2010 to 2030;

(ii) Places the fiscal costs of HIV/AIDS in the context of a shrinking fiscal resource envelope; and

(iii) Develops an analysis of the fiscal costs of HIV/AIDS as a long-term fiscal commitment, or quasi-liability, and analyzes how this quasi-liability evolves over time.

Overall, the costs of HIV/AIDS and the HIV/AIDS program are estimated at 5.5 percent of GDP in 2010, are projected to rise to 7.3 percent of GDP by 2020, to then slowly decline to 6.6 percent of GDP by 2030. The most important components of costs are care and treatment, doubling from 1.5 percent of GDP in 2010 to 2.7 percent of GDP in 2020; mitigation, rising from 1.8 percent of GDP to 2.6 percent of GDP by 2020; and overhead of the HIV/AIDS program, rising from 1.2 percent of GDP to 1.4 percent of GDP by 2014.

These costs occur over a period in which government revenues are expected to slow down in response to declining SACU receipts. Consequently, the projected costs of HIV/AIDS and the HIV/AIDS program are expected to rise from 19 percent of current expenditures and 23 percent of government revenues in 2010 to one-third of current expenditures and 26 percent of government revenues by 2022.

Even if current levels of external financing can be maintained, these estimates signify an extraordinary fiscal challenge. In the past, Swaziland was able to cover about 60 percent of the costs of its HIV/AIDS program from external sources, a level of support that appears consistent with donor practice across countries. However, even to sustain this share in the face of increasing costs of HIV/AIDS, aid allocations would need to rise substantially. Meanwhile, the high level of projected fiscal costs leaves Swaziland highly vulnerable to a slowdown in external support.

Because fiscal costs of HIV/AIDS are highly persistent, and many of them represent firm policy commitments, these costs can be interpreted as a quasi-liability and analyzed using methods similar to those used to analyze public debt. Using these methods, the PDV of fiscal commitments under the HIV/AIDS program and other fiscal costs of HIV/AIDS are estimated to correspond to about three times (293 percent) of GDP as of 2010, with fiscal costs equivalent to 151 percent of GDP incurred as a consequence of HIV infections that have already occurred through 2010, and the balance covering the costs of projected future infections.

This analysis of the fiscal costs of HIV/AIDS over time also provides some tools for assessing fiscal trade-offs inherent in HIV/AIDS program choices. Similar to the analysis of the extent to which HIV/AIDS and the HIV/AIDS response absorb available fiscal space in terms of the PDV of the costs of HIV/AIDS, the implications of policy choices, in terms of changes in the PDV, can also be assessed. For example, one additional infection is estimated to absorb fiscal resources equivalent to almost four times GDP per capita.

Because of the long lags between "cause" (new infections) and "effect" (demand for services and fiscal costs), current spending is not a good indicator for the evolving fiscal burden of HIV/AIDS. To combine the macroeconomic and microeconomic strands of the analysis, current spending is compared with the costs incurred by new infections. While overall spending (mostly paying off the fiscal costs of past infections) hovers between 6 and 7 percent of GDP for most of the projection period, the costs[40] incurred by new infections decline to 3 percent of GDP by the end of the projection period. The quasi-liability of the fiscal costs committed under the HIV/AIDS program as a result of HIV infections declines from 151 percent of GDP in 2010 to 109 percent of GDP by 2030.

In summary, this study contributes to the design of HIV/AIDS programs and informs fiscal policy regarding the fiscal space absorbed by the costs of HIV/AIDS and the HIV/AIDS response in several areas:

- It analyzes the fiscal costs of HIV/AIDS in the context of the government's changing resource envelope, informing medium-term fiscal planning and providing a framework for managing the domestic financing needs of the HIV/AIDS program.
- Focusing on the costs incurred by an additional new infection, the study adopts the PDV of the expected additional costs under the HIV/AIDS program as a tool to assess the fiscal implications of program options. However, this tool can also be applied to the analysis of any measures that form part of an HIV/AIDS program. Rather than assessing different profiles of government spending over several decades, it provides immediate indicators of the consequences of policy choices on fiscal space.
- Because of the persistence of the costs of HIV/AIDS, current spending is not a good indicator of the sustainability of an HIV/AIDS program. Instead, interpreting the costs over time as a quasi-liability (similar to pension obligations) and analyzing how this liability evolves over time provide an immediate measure of the costs of HIV/AIDS and the HIV/AIDS program for fiscal space.

This analysis suggests that there are opportunities to contain the fiscal costs of HIV/AIDS and better utilize existing funding resources by improving allocative and operational efficiency within the national HIV/AIDS response; exploring innovative financing mechanisms; strengthening institutions and health systems to improve service delivery; implementing policy reforms to generate private savings for health and social insurance; and

conducting more cost-effectiveness, cost-benefit, and microeconomic studies to improve program efficiency and effectiveness.

VI. Annex

Assumptions on Macroeconomic Context

HIV/AIDS impacts the size of the (working-age) population in the long term, which in turn is one of the most important determinants of GDP. For consistency in the long-term projections (which frequently describe the fiscal costs of HIV/AIDS as a percentage of GDP), it is therefore necessary to capture the HIV/AIDS impact on GDP and economic growth. Because of the limited availability of data (and of macroeconomic studies of the impacts of HIV/AIDS in Swaziland), this study adopted a simple macroeconomic model, with one sector and one type of labor. In this model, HIV/AIDS affects economic growth as it affects productivity, investment rates, and the supply of labor.

Specifically, it is assumed that $Y_t = K_t^{\alpha}(AL_t)^{1-\alpha}$

and $K_{t+1} = sY_t - \delta K_t$

with $\alpha = 1/3$, $s = 0.17$ (before taking into account impact of HIV/AIDS), and $\delta = 0.08$. In this framework, the principal impacts of HIV/AIDS are:

- A slowdown in the growth of the working-age population L_t (in line with the population projections used by this study);
- A decline in the savings rate s[41]; and
- A decline in labor productivity A.[42]

Notes

1. According to the World Bank (2010), infant mortality increased from 62 deaths per 1,000 births in 1990 to 83 per 1,000 in 2000, reflecting the impact of HIV/AIDS, and has since fallen to 59 as of 2008. Child mortality increased from 84 deaths per 1,000 births in 1990 to 124 per 1,000 in 2000, and has since declined to 83. The reversals in mortality to close to the initial levels need to be interpreted against the improvements that have been achieved in other countries over this period; the negative impacts of HIV/AIDS—while diminished by improvements in prevention of mother-to-child transmission, care, and treatment—thus persist.

2. The increase in mortality understates the impact of HIV/AIDS, because mortality would have declined in the absence of an adverse health shock (to an estimated 0.7 percent according to United Nations Population Division 2009). However, crude mortality rates also reflect changes in the population structure, blurring comparisons across scenarios. Controlling for population growth (normalized to 0) and changes in the population structure, AIDS-related deaths increased average mortality from 1.6 percent to 2.2 percent during 2005–10.
3. Not all (but most) of the life expectancy gap can be attributed to HIV/AIDS. United Nations Population Division (2009) estimates that life expectancy without the impact of HIV/AIDS would be 64 years in 2005–10, suggesting that 18 years (out of a total gap of 24–26 years) can be attributed to HIV/AIDS.
4. This share is almost equal to the average for Sub-Saharan Africa, but much higher than the population shares of the youth population in other countries in southern Africa with very high HIV prevalence, such as Botswana (42 percent), Lesotho (48 percent), Namibia (46 percent), and South Africa (38 percent).
5. UNAIDS (2010) estimates that the number of children orphaned as a result of AIDS-related deaths has risen to 69,000 by 2009.
6. In interpreting these averages across the youth population (ages 0–17), the share of orphans increases with age, starting at close to zero at birth, whereas the share of orphans for ages 10–17 is much higher than the average for the youth population. Illustrating this point, CSO and Macro International (2008) report that the share of orphans increases from 7 percent below age 5 to 37 percent at ages 15–17. In one regard, the estimates by WHO, UNAIDS, and UNICEF (2008) and UNICEF (2008b) are inconsistent with the findings of CSO and Macro International (2008). According to the former, the majority of children who have lost only one parent have lost their mother, whereas paternal death is the more common cause of orphanhood reported by the latter.
7. According to CSO and Macro International (2008), 39 percent of OVC, but only 25 percent of other children, lacked at least one of three types of basic endowments: shoes, two pairs of clothes, and a meal a day. Eleven percent of OVC were underweight, comparing to 7 percent for other children.
8. However, ILO (2004) does not show how these estimates are calculated; underlying "technical notes" referred to in ILO (2004) apparently have not been published.
9. However, the empirical literature is weak on identifying the mechanisms behind this link (see Temple [1999] or Deaton [2003, 2006], who discuss this point in more detail). Much of the empirical literature reflects the positive correlation of life expectancy with other development outcomes (figure 4.4). Because this link is broken in countries with high HIV prevalence (as documented in figure 4.4), the value of these lessons from the empirical literature for assessing an extreme negative health shock like HIV/AIDS is not clear.
10. This comparison is based on the estimates by United Nations Population Division (2009), suggesting a life expectancy at birth of 45.8 years for 2005–10, and of 63.8 years in a no-AIDS scenario.

11. The increase in rank in a no-AIDS scenario understates the differences between an HDI of 0.67 and 0.57. Most countries are clustered either above 0.68 (generally middle-income countries and up) or below 0.55 (generally low-income countries).
12. This is puzzling in light of the more even distribution by wealth or education, and may reflect that HIV/AIDS is more closely correlated with employment for groups with lower education or wealth (where unemployment is higher).
13. SACU revenues are customs revenues from the Southern African Customs Union (Botswana, Lesotho, Namibia, South Africa, and Swaziland) distributed to its member countries according to a key that reflects the scale of economic activity and a "development component." Overall allocations (relative to the recipient's GDP) are therefore tilted toward SACU countries with relatively low GDP per capita (Swaziland and especially Lesotho).
14. While this remains below the Abuja target, the Minister of Finance has identified health as a priority area in the context of the ongoing fiscal adjustment, so it is likely that the share of health expenditures in public spending will rise further. This study does not use the Abuja target as a benchmark because it does not control for the burden of disease and it is not clear whether it remains a meaningful benchmark in the face of an extreme health shock such as HIV/AIDS in Swaziland.
15. All dollars U.S. unless otherwise noted.
16. That is, excluding the small island economies of the three Ms (Micronesia, the Marshall Islands, and Maldives), two of which receive substantial amounts of external aid in support of the health sector.
17. WHO (2010) does not provide a breakdown of external financing by recipient within countries. Unlike in earlier years (note the spike in external financing in 1998, which appears to have largely benefited nongovernmental organizations), much of the increased external financing reportedly went to the public sector.
18. The references to OECD data on aid commitments and disbursements correspond to sector categories "health" (sector code 120) and "population programs" (sector code 130), of which "STD control including HIV/AIDS" is a subsector (code 13040). This study includes all aid flows under category 13040 under HIV/AIDS (project data suggest that non-HIV/AIDS funding in this category is negligible), and adds aid flows under subsector "Social mitigation of HIV/AIDS" (code 16064).
19. Some of these costs take the form of an increase in expenditures; others result in reduced capacities for a given level of expenditures.
20. Based on a total number of public employees of 27,000 (IMF 2008b). The number covered by the public sector human resource management system is about 20,000.
21. This includes an estimated cost of 0.0–0.9 percent (of the payroll) for treatment (depending on the level of uptake), 2.0 percent for pensions, 1.1–1.3 percent for absenteeism and sick leave, 0.5–0.7 percent for compassionate leave, 0.7–1.5 percent for additional training, a productivity loss equivalent to 0.7–0.9 percent, and small allowances for housing and recruitment costs.

22. Sick leave allowances for government employees are relatively generous in Swaziland—they may take up to six months of sick leave at full pay, and another six months at half pay over any three-year period (Haacker 2004). Additionally, public servants in Swaziland are entitled to 7 days compassionate leave, or 28 days for women upon the death of their husband (Ministry of Health and Social Welfare 2005).
23. For an illustrative quantitative analysis, see Plamondon, Cichon, and Annycke (2004).
24. Rosen and others (2004) report that the death of an employee incurs a cost of between 7 and 25 days of supervisory time. According to Muwanga (2002), the cost of filling a vacancy in the private sector ranges from 29 to 46 percent of the position's annual salary.
25. Rosen and others (2004) report a "reduction in productivity due to new employee's learning curve" of between 25 and 60 percent for skilled workers, and between 20 and 55 percent for unskilled workers. In many cases, a person filling a vacated position will come from a related position within the government (which may incur a lower learning cost), but would need to be replaced in his or her previous position. This assumption assumes that the learning costs of a new appointment and the costs of shifts between positions, possibly including a new appointment further down the chain, are equivalent.
26. Unlike a full demographic and epidemiological model, this model cannot capture certain inter-generational effects because lower fertility and increased mortality among children eventually affect the size of the adult population. This shortcoming plays a very limited role over the 20-year time frame of this study. For analysis beyond this period, a more sophisticated model should be used.
27. In one area this analysis departs from the estimates prepared by UNAIDS (2010). The number of people requiring treatment estimated by UNAIDS is based on a CD4 count of 200 through 2008, and a CD4 count of 350 thereafter. For consistency, this study used a CD4 count of 350 throughout. Looking forward, this is in line with the stance of the government of Swaziland, which has endorsed a CD4 count of 350 as a benchmark for treatment need (Sithole 2010).
28. According to United Nations Population Division (2009), the total population in 2010 is about 10 percent smaller than it would be without the impact of HIV/AIDS (1.202 million versus 1.338 million). By 2030, the United Nations Population Division (2009) projects that the population size will grow to 1.524 million (about 20 percent smaller than a no-AIDS projection).
29. The share of the population receiving treatment remains broadly constant in the latter half of the projection period, reflecting three main trends working in different directions: an increasing number of people requiring treatment; the immediate impact of increased treatment access on mortality dissipates; and, especially in later years, the projected gradual decline in HIV incidence eventually results in a slowdown in the number of people requiring treatment.
30. Externally financed HIV/AIDS spending does not necessarily appear in the fiscal accounts. The comparison to fiscal resources is meaningful, however, because it

provides a measure of the scale of the HIV/AIDS response relative to domestic resources. The role of external financing is discussed more explicitly further below.

31. To obtain this PDV, projections were extended to 2070, using simple assumptions regarding the course of HIV/AIDS (continuing gradual decline in HIV incidence) and the HIV/AIDS response (applying 2030 coverage rates forward).
32. As summarized in the foreword to UNAIDS (2008b): "Today, for every two people who start taking antiretroviral drugs, another five become newly infected. Unless we take urgent steps to intensify HIV prevention we will fail to sustain the gains of the past few years, and universal access will simply be a noble aspiration."
33. The focus on the impact of HIV incidence on government expenditures in this section does not intend to imply that these are the only—or even the most important—aspects of the HIV/AIDS impacts that the government would want to take into account.
34. While few people on treatment are projected to survive for 40 years following an infection, these survivors are likely to receive second-line treatment and therefore carry a high weight in expected treatment costs.
35. Applying a discount rate of 3 percent, the value of a liability delayed by five years is reduced by 14.1 percent. The fiscal savings of E 13,000 are thus obtained as 0.141 times E76,000.
36. It should be stressed that this is a very narrow focus, looking at the link between prevention and fiscal space only, and excluding any private costs, both financially and in terms of reduced life expectancy, which the government may also take into account when designing its HIV/AIDS policy.
37. The term "commitment" usually suggests that a government is legally obligated to fulfill a liability. The situation regarding HIV/AIDS spending is different, because the government is not legally obligated to meet certain targets under the HIV/AIDS program. Usage of "commitment" in this respect is therefore weaker than the legal definition, and derives from political commitments made under the HIV/AIDS program.
38. The estimated costs in figure 4.22 are based on UNAIDS (2008b) and do not include nonprogram fiscal costs such as the costs of HIV/AIDS impacts on public servants included in this study. The rate of external support assumed in these projections therefore relates to program costs, whereas the nonprogram costs are fully financed domestically.
39. The estimate of the PDV of GDP in scenario 2 reflects very high rates of external financing (up to 85 percent) in the outer years the calculations are based on. If the rate of external financing is capped at 60 percent in these outer years, the PDV of domestic financing needs would come out at 178 percent of GDP.
40. In addition to annual costs of about 1 percent of GDP, which cannot be directly attributed to new infections.
41. This study assumes that in addition to the fiscal costs of HIV/AIDS, each resulting death incurs a private cost equivalent to 1 × GDP per capita. The rate at which these costs translate into reduced savings and investment is assumed to be equal to the

aggregate savings rate. For example, a fiscal cost of 2 percent of GDP and a mortality rate of 1 percent would translate into an overall cost of HIV/AIDS of 3 percent of GDP, and a decline in savings of 0.51 (= 0.17 × 3%) percent of GDP.

42. This analysis assumes that *A* grows at a rate of 1 percent over the projection period. However, to capture the aftermath of and recovery from the economic crisis, *A* is set to match the projections for GDP from IMF (2010) through 2015. Regarding the impact of HIV/AIDS, the analysis assumes that a mortality rate of 1 percent reduces *A* by 0.5 percent, that is, $A_t = (1.01)^t\ (1\text{-}0.5\text{m})A_0$.

References

Beckmann, Sabine, and Pallavi Rai. 2005. *Swaziland—HIV/AIDS, Work and Development*. Geneva, ILO.

CBS (Central Bank of Swaziland). 2010. *Annual Report, April 2009—March 2010*. Mbabane.

CSO (Central Statistical Office), and Macro International, Inc. 2008. *Swaziland Demographic and Health Survey 2006–07*. Mbabane: CSO.

Deaton, Angus. 2003. "Health, Inequality, and Economic Development." *Journal of Economic Literature* XLI: 113–58.

———. 2006. "Global Patterns of Income and Health: Facts, Interpretations, and Policies." NBER Working Paper No. 12269, National Bureau of Economic Research, Cambridge, MA.

GoS (government of the Kingdom of Swaziland). 2006. *National Plan of Action for Orphans and Vulnerable Children*. Mbabane.

———. 2009. *The National Multisectoral Strategic Framework for HIV and AIDS 2009–2014*. Mbabane.

Haacker, Markus. 2002. "The Economic Consequences of HIV/AIDS in Southern Africa." IMF Working Paper No. 02/38, Washington, DC.

———. 2004. "The Impact of HIV/AIDS on Government Finance and Public Services." In *The Macroeconomics of HIV/AIDS*, ed. M. Haacker. Washington, DC: IMF.

ILO (International Labour Organization). 2004. *HIV/AIDS and Work: Global Estimates, Impact and Response*. Geneva.

IMF (International Monetary Fund). 2003. *Swaziland: Selected Issues and Statistical Appendix*. IMF Country Report No. 03/22, Washington, DC.

———. 2008a. *Kingdom of Swaziland: 2008 Article IV Consultation—Staff Report*. IMF Country Report No. 08/356, Washington, DC.

———. 2008b. *Kingdom of Swaziland: Selected Issues and Statistical Appendix*. IMF Country Report No. 08/355, Washington, DC.

———. 2009. *World Economic Outlook Database, April 2009 Edition*. Washington, DC.

———. 2010. *World Economic Outlook Database, October 2010 Edition*. Washington, DC.

———. 2011. *Kingdom of Swaziland: Staff Report for the 2010 Article IV Consultation*. IMF Country Report No. 11/25, Washington, DC.

JTK Associates. 2002. *Assessment of the Impact of HIV/AIDS on the Central Agencies of the Government of the Kingdom of Swaziland*. Mbabane.

Ministry of Education. 1999. *Impact Assessment of HIV/AIDS on the Education Sector*. Mbabane.

Ministry of Finance. 2010. "Medium Term Budget Policy Statement 2010/11—2012/13." Mbabane.

Ministry of Health and Social Welfare. 2005. *Study of the Health Service Burden of HIV and AIDS and Impact of HIV and AIDS on the Health Sector in Swaziland.* Mlabane.

Muwanga, Fred Tusuubira. 2002. *Impact of HIV/AIDS on Agriculture and the Private Sector in Swaziland—The Demographic, Social and Economic Impact on Subsistence Agriculture, Commercial Agriculture, Ministry of Agriculture and Co-operatives and Business.* Mbabane: Ministry of Agriculture and Co-operatives and Business.

NERCHA (National Emergency Response Council on HIV and AIDS). 2010. *Monitoring the Declaration of the Commitment on HIV and AIDS*. UNGASS Swaziland Country Report. Mbabane: NERCHA.

NERCHA, and UNAIDS (Joint United Nations Programme on HIV/AIDS). 2008. *The Kingdom of Swaziland National AIDS Spending Assessment 2005/06 and 2006/07*. Mbabane: NERCHA and UNAIDS.

OECD (Organisation for Economic Co-operation and Development). 2010. Aid Activities (CRS) online database, accessed Dec. 15, http://stats.oecd.org.

Plamondon, Pierre, Michael Cichon, and Pascal Annycke. 2004. "Financial Effects of HIV/AIDS on National Social Protection Schemes." In *The Macroeconomics of HIV/AIDS*, ed. Markus Haacker. Washington, DC: IMF.

PSPF (Public Service Pension Fund). 2008/2009. http://www.pspf.co.sz (May 29/November 15).

Rosen, Sydney, J. R. Vincent, W. MacLeod, and others. 2004. "The Cost of HIV/AIDS to Businesses in Southern Africa." *AIDS* 18 (2): 317–24.

Salinas, Gonzalo, and Markus Haacker. 2006. "HIV/AIDS: The Impact on Poverty and Inequality." IMF Working Paper No. 06/126, Washington, DC.

Sithole, Majozi V. 2010. "Budget Speech 2010." Mbabane, Ministry of Finance.

Stover, John. 2009. "Spectrum-Estimating the Need for ART and the Resources Required." Presented at the Department of Health ART Costing Meeting, Pretoria, March 26–27.

Temple, Jonathan. 1999. "The New Growth Evidence." *Journal of Economic Literature* 37 (1): 112–56.

Thurlow, James, Gavin George, and Jeff Gow. 2009. "HIV/AIDS, Growth and Poverty in KwaZulu-Natal and South Africa: An Integrated Survey, Demographic and Economy-Wide Analysis." *Journal of the International AIDS Society* 12 (Item 18).

UNAIDS (Joint United Nations Programme on HIV/AIDS). 2008a. "Annual Estimates of HIV Prevalence, People Living with HIV/AIDS, and HIV/AIDS-Related Deaths, 1990–2007." Geneva.

———. 2008b. *UNAIDS Report on the Global AIDS Epidemic 2008*. Geneva.

———. 2010a. HIV and AIDS Estimates and Data. Accessed January 28, 2011, http://www.aidsinfoonline.org.

———. 2010b. *UNAIDS Report on the Global AIDS Epidemic 2010*. Geneva.

UNDP (United Nations Development Programme). 2009a. *Human Development Report 2009*. New York.

———. 2009b. "Technical Note 1: Calculating the Human Development Indices." New York.

UNICEF (United Nations Children's Fund). 2008a. *Children and AIDS: Third Stocktaking Report, 2008*. New York.

———. 2008b. *The State of the World's Children 2009*. New York.

United Nations Population Division. 2009. *World Population Prospects: The 2008 Revision—Population Database*. New York: United Nations.

Whiteside, Alan, C. Andrade, L. Arrehag, S. Dlamini, T. Ginindza, and A. Parikh. 2006. *The Socio-Economic Impact of HIV/AIDS in Swaziland*. Mbabane: NERCHA; Durban: HEARD.

WHO (World Health Organization). 2009. *Global Tuberculosis Control 2009*. Geneva.

———. 2010. *World Health Statistics*. Geneva.

WHO, UNAIDS (Joint United Nations Programme on HIV/AIDS), and UNICEF (United Nations Children's Fund). 2008. "Epidemiological Fact Sheet on HIV and AIDS—Core Data on Epidemiology and Response: Swaziland (2008 Update)." WHO, Geneva.

———. 2009. *Toward Universal Access—Scaling up Priority HIV/AIDS Interventions in the Health Sector*. Geneva: WHO.

World Bank. 2006. *Swaziland—Achieving Basic Education for All: Challenges and Policy Directions*. Report No. 36145-SZ, Washington, DC.

———. 2009. *World Development Indicators 2009*. Washington, DC.

———. 2010. *World Development Indicators 2010*. Washington, DC.

CHAPTER 5

Uganda

I. Introduction

Uganda was one of the first countries to face an escalating HIV epidemic. While the level of HIV prevalence[1] in Uganda is much lower now than at its peak, and lower than some other countries in the region, the national response to HIV/AIDS poses considerable fiscal challenges. In particular, even though costs are lower in absolute terms, the cost of treatment relative to GDP per capita is higher in Uganda than in the (middle-income) countries with the highest rates of HIV prevalence. As a result, the projected costs of the national HIV/AIDS program, which exceeds 3 percent of GDP for most of the projection period, are large from a macroeconomic or fiscal perspective.

This study broadens the analysis of the fiscal dimension of HIV/AIDS to inform both medium-term fiscal planning and the planning and management of the national HIV/AIDS response. Specifically, it addresses three aspects of the fiscal dimension of HIV/AIDS in Uganda:

- The costs of meeting the demand for HIV/AIDS-related services under the national HIV/AIDS policy, as embodied in the National Strategic Plan (NSP).
- The large role of external support in financing Uganda's HIV/AIDS program.
- Because of the long duration of commitments under the HIV/AIDS program and the long time gap between HIV infections and the resulting demand for public services, the fiscal costs of HIV/AIDS can be regarded

as a quasi-liability (similar to pension obligations and other social entitlements) and analyzed by adopting tools typically used to assess the level and course of a public debt.

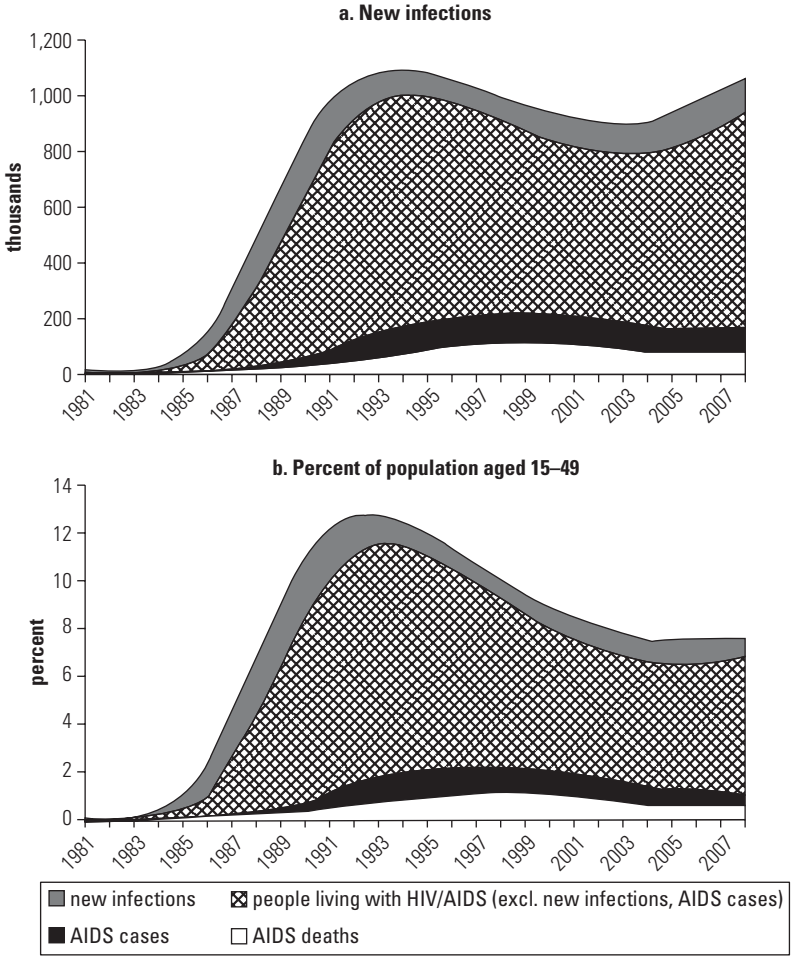
Section II describes the state of the HIV epidemic in Uganda and summarizes available data and studies on the impact of the epidemic, looking at direct health impacts and their wider macroeconomic significance. Section III places the HIV/AIDS response in the context of public finance, starting with a stocktaking of the state of public finance and of health expenditure and its financing. In addition, this section presents available data on HIV/AIDS-related spending thus far, and discusses the impacts of HIV/AIDS on public servants.

Section IV provides the core analysis, describes the methodology underlying the projections of the fiscal costs of HIV/AIDS, and presents and discusses estimates of the fiscal costs in the context of the domestic resource envelope. In light of the prominent role of external support in financing Uganda's HIV/AIDS program, external financing needs are discussed in detail, as well as the implications for domestic fiscal resources of alternative scenarios regarding the availability of external financing. Finally, this study analyzes how the value of the quasi-liability implied by the costs of the HIV/AIDS program evolves over time. Section V provides a summary of the findings.

II. The Impact of HIV/AIDS in Uganda

Uganda was one of the first countries to experience the rapid spread of HIV/AIDS. The first infections were diagnosed in the early 1980s, but AIDS-like symptoms and high mortality had been observed earlier (Allen and Heald 2004; Allen 2005). The epidemic took off in the mid-1980s (figure 5.1a and 5.1b), and HIV incidence peaked in 1988–90, with around 200,000 new infections every year (corresponding to 1.2 percent of the whole population and 2.8 percent of the population aged 15–49). Accordingly, the number of people living with AIDS grew rapidly and peaked at just over 1 million, corresponding to an adult HIV prevalence rate of 12 percent in the first half of the 1990s (Hladik and others 2008). According to the most recent data, 1.2 million people were living with HIV/AIDS in Uganda at end-2009, of whom 440,000 were male adults, 610,000 were

Figure 5.1: Evolution of HIV Epidemic, 1981–2008



Source: Hladik et al. (2008).

female adults, and 150,000 were children (UNAIDS 2010b). In addition, 120,000 new HIV infections and 64,000 HIV/AIDS-related deaths occurred in 2009 (UNAIDS 2010b). However, because population growth in Uganda is very high,[2] HIV prevalence has been declining, and is estimated at 6.5 percent of the population aged 15–49 as of 2009 (UNAIDS 2010a, 2010b).

A significant change in the evolving HIV epidemic is the increase in access to antiretroviral treatment. The number of people receiving treatment has

increased from 44,000 in 2004 to 200,000 at end-2009, the latter corresponding to a treatment coverage rate of 39 percent (eligibility based on CD4 count of 350) or 53 percent (eligibility based on CD4 count of 200) (WHO 2010b). The increase in access to treatment and the corresponding decline in mortality have also contributed to the increase in the number of people living with HIV/AIDS—while HIV incidence has remained flat in recent years, the number of deaths has declined.

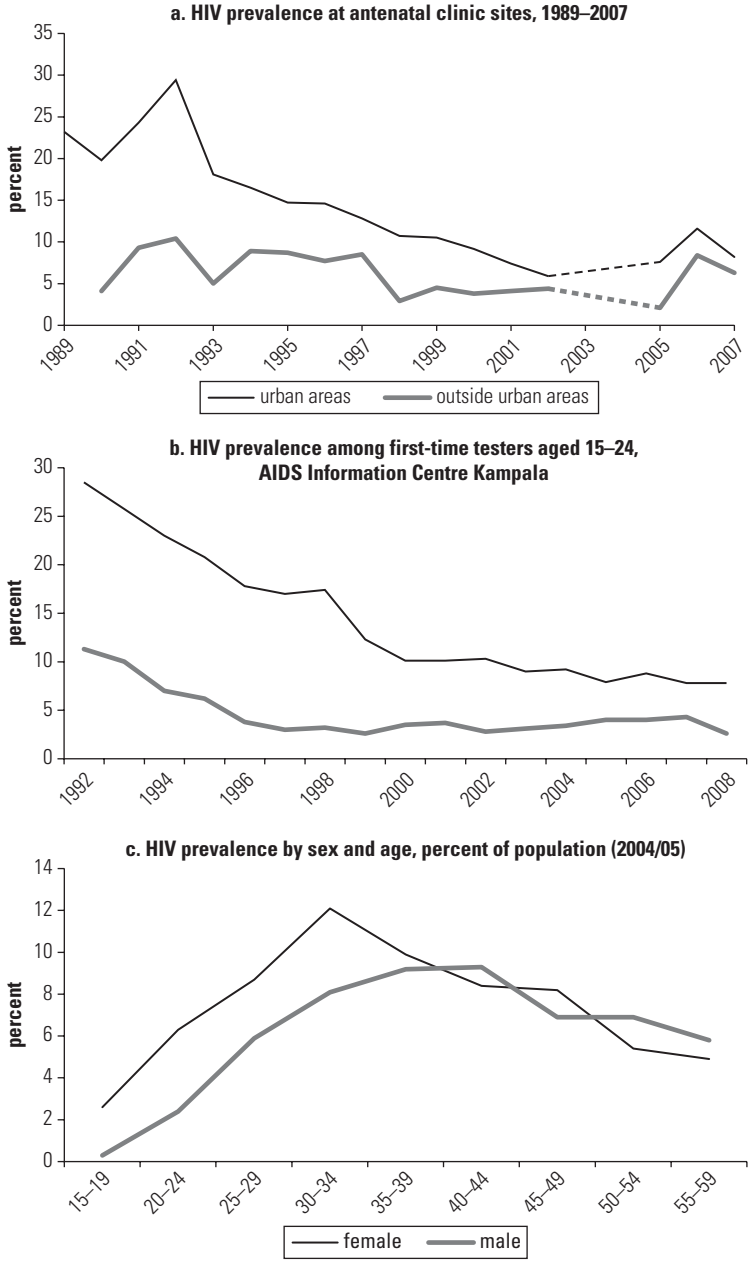
Figure 5.1a and 5.1b and table 5.1 complement the model-generated population data presented in figure 5.2a with survey-based and more disaggregated data on HIV prevalence. The data on HIV prevalence at antenatal clinics (ANCs; figure 5.2a) are broadly consistent with the model-generated data presented earlier, partly because the ANC data are one of the major

Table 5.1: Socioeconomic Gradient of HIV/AIDS

	WOMEN AGED 15–49		MEN AGED 15–49		TOTAL	
SOCIOECONOMIC FACTOR	HIV POSITIVE (%)	NUMBER TESTED	HIV POSITIVE (%)	NUMBER TESTED	HIV POSITIVE (%)	NUMBER TESTED
Residence						
Urban	12.8	1,435	6.7	1,096	10.1	2,531
Rural	6.5	7,956	4.7	6,419	5.7	14,375
Education						
No education	5.8	2,129	7.5	6,24	6.2	2,753
Primary incomplete	7.7	4,355	4.5	3,515	6.3	7,870
Primary complete	9.8	1,064	6.5	1,058	8.2	2,122
Secondary+	7.6	1,826	4.4	2,310	5.8	4,136
Employment						
Currently working	8.4	5,758	6.1	5,195	7.3	10,953
Not working	6.1	3,560	2.5	2,238	4.7	5,798
Wealth quintile						
Lowest	4.8	1,532	4.0	1,147	4.4	2,679
Second	6.6	1,911	4.2	1,541	5.5	3,453
Middle	6.7	1,760	5.1	1,418	6.0	3,177
Fourth	7.0	1,895	5.9	1,552	6.5	3,446
Highest	11.0	2,294	5.5	1,857	8.6	4,151
Marital status						
Currently in union	5.9	5,977	6.8	3,973	6.3	9,950
Widowed	31.2	557	32.2	94	31.4	651
Divorced/separated	16.0	742	10.8	500	13.9	1,241
Never in union	2.7	2,075	0.8	2,910	1.6	4,985
Total for 15–49 age group	7.5	9,391	5.0	7,515	6.4	16,906

Source: MOH and ORC Macro (2006).

Figure 5.2: HIV Prevalence across Population Groups and Over Time



Source: a. MOH (2009); b. MoH (2009); c. MOH and ORC Macro (2006).
Note: Dashes indicate missing values.

data sources that the population estimates build on. HIV prevalence is much higher at urban sites, especially in the early years (peaking at about 25 percent of women tested for urban sites, and about 10 percent outside urban areas). For the most recent years, the data are less conclusive because of data gaps, and show a bump in prevalence in 2006 for which there is no clear explanation.

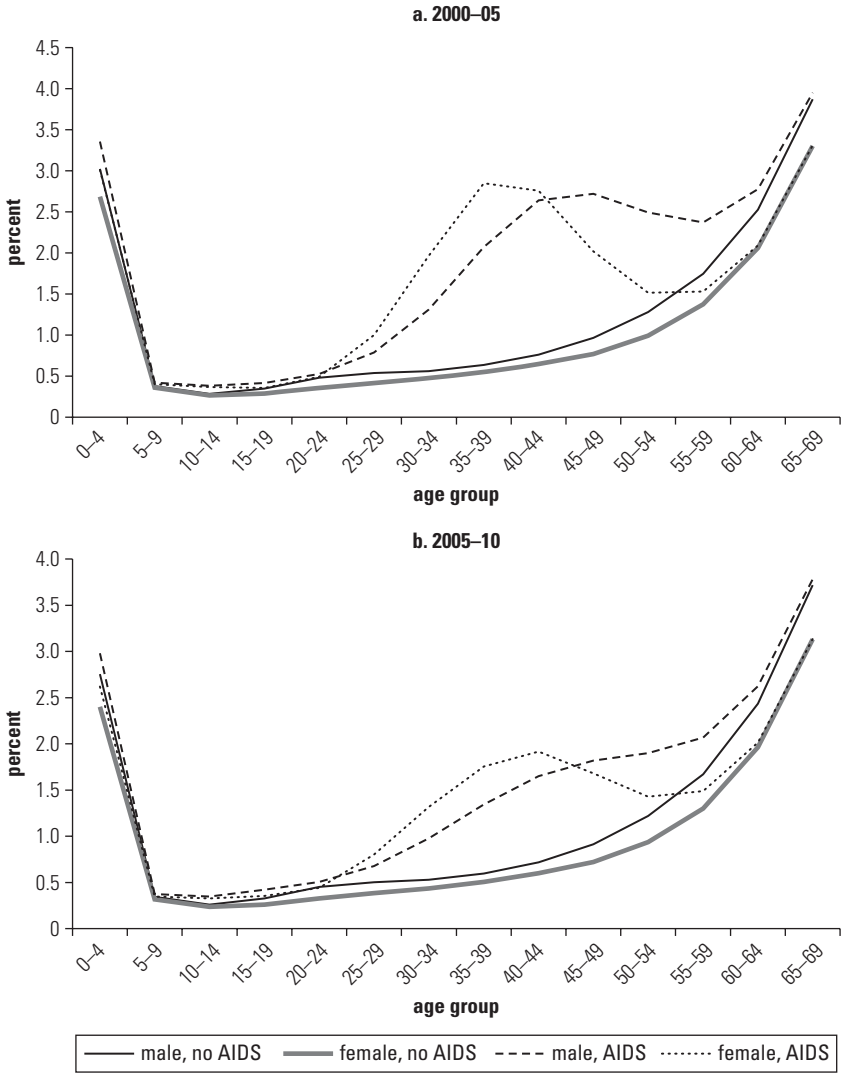
Figure 5.2b shows trends in HIV prevalence for young adults, by sex, from a major testing site in Kampala (AIDS Information Centre). HIV prevalence among young women came down steeply from 28 percent in 1992 to 10 percent in 2000, and has slowly declined further since then to 8 percent by 2008. For young men, HIV prevalence was much lower in 1992 (11 percent), declined to about 3 percent by 2000, and has since hovered at about this level. Figure 5.2b is interesting also as it provides indirect evidence regarding trends in HIV incidence at young ages, suggesting that HIV incidence has been sustained at levels much reduced from their peaks, but not much further progress—in this regard—has been achieved over the last years.

Figure 5.2c illustrates the pattern of HIV prevalence by age and sex based on estimates from the latest Demographic and Health Survey (MOH and ORC Macro 2006). MOH and ORC Macro estimate that HIV prevalence greatly increases with age for young women, from 2.6 percent for the 15–19 age group to 12.1 percent at ages 30–34, and is much higher for women than men until age 34. For men, the increase in HIV prevalence across age groups is slower than for women, with HIV prevalence peaking at about 9 percent at ages 35–44.

Table 5.1 offers insights into the socioeconomic characteristics of HIV/AIDS in Uganda. Similar to findings from other African countries, HIV prevalence is higher for urban than for rural areas, and tends to be higher among the economically advantaged population, as measured by wealth or employment status.[3] However, the link between educational status and HIV/AIDS appears more complex. This may reflect that those with higher education are more likely to adapt their risky behavior, while the better educated tend to be more wealthy and likely to be employed and therefore face more opportunities to contract HIV/AIDS. One of the striking features of the data is that almost one-third of widows and widowers are HIV positive. This points to the important role of coinfection between couples as a mode of HIV infection, with fairly even roles for male-to-female and female-to-male transmission within couples.

Figure 5.3 illustrates the effect of HIV/AIDS on mortality by sex and age. Estimates for 2000–05 and 2005–10 provide a scenario for the consequences of scaling up treatment and—to a lesser extent—a decline in HIV prevalence.[4] HIV/AIDS increases child mortality because of mother-to-child transmission. For adults, mortality increases steeply starting with the cohort

Figure 5.3: Mortality by Sex and Age



Source: Authors' calculations, based on United Nations Population Division (2009).

of ages 25–29. For women (in 2000–05), mortality peaks in the 35–39 age group at 2.9 percent annually, compared to 0.6 percent in a no-AIDS scenario, and subsequently declines until mortality increases again due to old age. For men (in 2000–05), HIV/AIDS-related mortality peaks later, between ages 40 and 49, at about 2.5 percent, compared to 0.9 percent in a no-AIDS scenario. While HIV/AIDS-related mortality then tapers off, mortality for other reasons increases with age. All in all, life expectancy at birth for the cohort 2000–05 was around 9 years less than it would have been without HIV/AIDS (48.1 years instead of 57.2 years). The United Nations Population Division (2009) estimates and projections for 2005–10 show a steep decline in HIV/AIDS-related mortality among young adults compared to the preceding period, with excess mortality (the difference in mortality between the baseline and the no-AIDS scenarios) for the 25–49 age group reduced from 1.4 percent to 0.9 percent for women, and from 1.0 percent to 0.5 percent for men. Consequently, the United Nations Population Division estimates that life expectancy increased from 48.1 years to 52.4 years between 2000–05 and 2005–10.

Another useful data source for the health consequences of HIV/AIDS are the World Health Organization's (WHO) burden of disease estimates (WHO 2009a), which estimate the causes of death across health conditions for 2004. According to WHO estimates, HIV/AIDS accounted for 94,000 deaths in 2004, almost one-quarter of total deaths from all causes (406,000), half of all deaths from infectious and parasitic diseases (200,000), and almost three times higher than malaria-related deaths (39,000). As noted above, the number of HIV/AIDS-related deaths now is closer to 60,000 because of expanded access to treatment.

One of the consequences of increased mortality among young adults is an increase in the number of orphans. UNAIDS estimates that 1.2 million young people ages 0–17, or 7 percent of the youth population, were orphaned (lost at least one parent) because of HIV/AIDS as of 2009 (UNAIDS 2010a). This corresponds to about half of young orphans, estimated at 15 percent of the youth population by the Bureau of Statistics and Macro International (2007). A disproportionately large share of young people orphaned by HIV/AIDS are double orphans: Hladik and others (2008) estimate that four-fifths of all double orphans can be attributed to HIV/AIDS. With double orphans accounting for about 20 percent of all orphans (3.1 percent of the youth population), this would imply that about one-third of young people orphaned by HIV/AIDS are double orphans.[5]

In addition to the direct health impacts of HIV/AIDS, the **economic repercussions** are relevant for this discussion on the fiscal dimension of HIV/AIDS. On the microeconomic level, the impacts of HIV/AIDS (for example, on households or orphans) intersect with the government's development objectives, and measures to address some of these effects are explicitly covered in the estimates of the fiscal costs of HIV/AIDS. On the macroeconomic level, government revenues are closely linked to the size of the economy. To the extent that a health shock like HIV/AIDS slows economic growth and fiscal revenues, this would compound the more direct impacts on the demand for public services and government expenditures.

Regarding the **microeconomic effects**, the available empirical literature is very thin for Uganda. Blending data from household surveys and the state of the epidemic for Uganda with assorted evidence from other countries regarding the impacts of HIV/AIDS on households, Jefferis and others (2008) estimate the impact of HIV/AIDS on poverty rates, proposing that HIV/AIDS will increase the poverty rate by 1.6 percentage points because of health care costs, funeral costs, and income losses. Additionally, Jefferis and others illustrate the adverse impacts of HIV/AIDS on the material well-being of households, in addition to the increased health risks, evident from the data on increased mortality. HIV/AIDS therefore results in an increased risk to material living standards, as well as to the prospect of leading a long and healthy life. Looking ahead, the available household evidence suggests that households materially recover from deaths (including by joining other households or taking in new members). However, increased mortality among young adults may affect access to education, and thus also the long-term economic prospects of surviving children.[6]

By far the most substantial study on the **macroeconomic consequences** of HIV/AIDS in Uganda is by Jefferis and Matovu (2008).[7] They distinguish a base case model in which the macroeconomic impact of HIV/AIDS arises from slower growth of the working-age population and an impact on the productivity of HIV-positive workers. The alternate model also incorporates assumptions regarding the distribution of HIV prevalence across population groups (higher among the labor force than overall, and—within the labor force—higher among skilled workers), investment rates, and total factor productivity.[8] Both models are used to assess the unfettered impact of HIV/AIDS on economic growth and the consequences of scaling up treatment.

As a reference point (common across the two models), Jefferis and Matovu (2008) estimate that GDP would grow by an average of 6.5 percent annually "without AIDS" between 2005 and 2025, and that GDP per capita would grow by 2.7 percent a year over this period. In the base case model, GDP grows more slowly at 6.3 percent annually, while GDP per capita grows at 2.6 percent annually. In the alternative case setting, the impact of HIV/AIDS is larger, with GDP growth at 5.3 percent annually, and growth of GDP per capita at 1.7 percent per year, largely reflecting the assumptions on lower investment rates and slower productivity growth. This large HIV/AIDS impact is matched by a large partial reversal resulting from the scaling up of treatment, with GDP growth rebounding to 5.7 percent, and growth of GDP per capita to 2.0 percent annually.

III. HIV/AIDS and Public Finance

The State of Public Finances

This section places the estimates of the fiscal costs of HIV/AIDS in context by briefly summarizing the state of public finances (table 5.2). Over the past four fiscal years, total government expenditure accounted for 17–18 percent of GDP. About two-thirds of government operations are financed from domestic revenues, the remainder primarily from external resources, either through grants (2.4 percent of GDP in 2009/10) or concessional loans (2.0 percent of GDP in 2009/10). To interpret these numbers and relate them to source data on HIV/AIDS financing (frequently denominated in U.S. dollars), table 5.2 also provides the level of GDP and GDP per capita ($493 in 2009/10). On a per capita basis, total government spending thus accounted for $85 per capita in 2009/10.

The level of public and external debt is low, partly reflecting that Uganda has benefitted from the Heavily Indebted Poor Countries (HIPC) Initiative (in 1999/2000) and the Multilateral Debt Relief Initiative (MDRI, in 2005/6 and 2006/7; IMF and World Bank 2010). Public and publicly guaranteed external debt accounted for 13.8 percent of GDP (about $2 billion) at the end of fiscal year 2008/9. The bulk of external debt (87 percent) was owed to multilaterals, especially the International Development Association (IDA), which accounted for 58 percent of total. Domestic debt accounts for less than 10 percent of GDP.

Table 5.2: Summary of Government Operations

	2006/7	2007/8	2008/9	2009/10[a]
	PERCENT OF GDP			
Revenues and grants	17.1	15.5	15.9	14.9
Domestic revenues	12.6	12.8	12.5	12.5
Grants	4.5	2.7	3.4	2.4
Total expenditure and net lending	18.2	17.9	17.8	17.2
Current expenditure	11.5	11.8	10.7	10.8
Development expenditure	5.7	5.6	6.4	5.6
Other	0.9	0.5	0.7	0.7
Overall balance	–1.1	–2.4	–1.9	–2.3
Financing	0.8	2.2	1.8	2.3
External	1.8	2.5	2.0	2.0
Domestic	–1.0	–0.3	–0.2	0.3
Errors and omissions	0.3	0.2	–0.1	0.0
Memorandum items (US$)				
GDP (fiscal year), billions	10.9	13.2	15.1	16.5
GDP per capita (fiscal year)	362.0	423.0	469.0	493.0
Government expenditures per capita	65.9	75.6	83.5	84.8

Sources: IMF (2010a, 2010b).

Note: Other spending includes net lending and investment, and arrears. Fiscal year begins in July, GDP and GDP per capita are averages of calendar-year data.

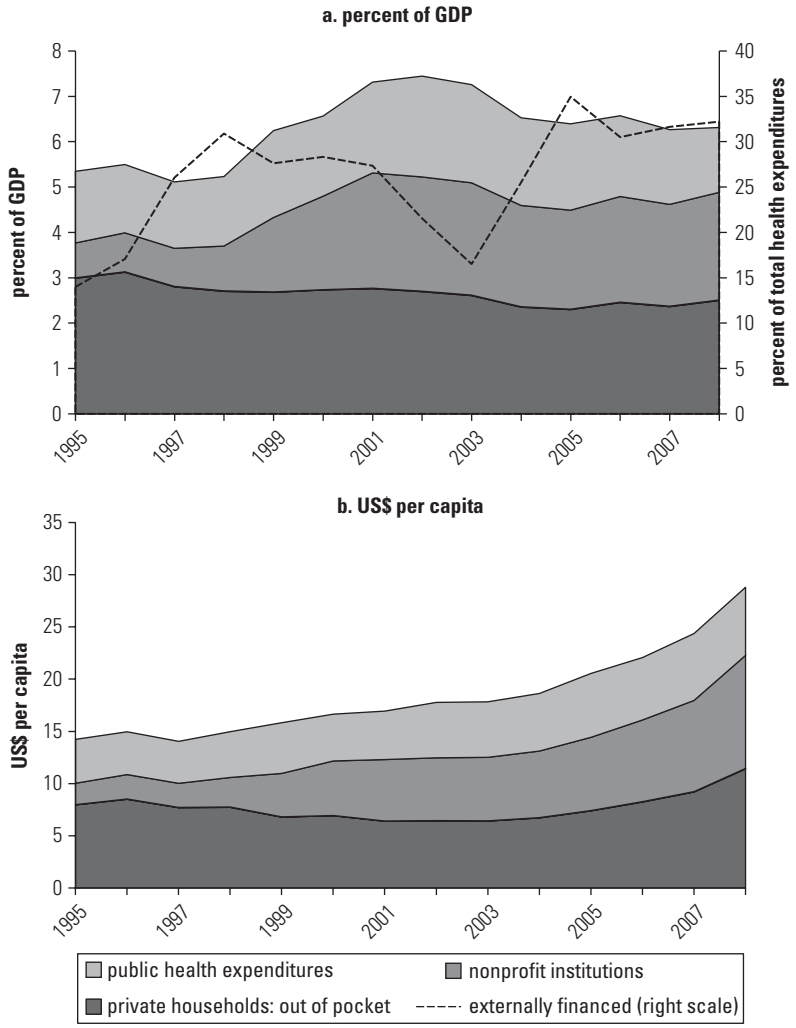
a. Projections.

Health Expenditure and Financing

In light of the magnitude of the challenges of providing care and treatment to people living with HIV/AIDS, a brief outline of some aggregate data on health spending and financing in Uganda provides useful context. According to WHO (2010), overall health expenditures in Uganda increased from Uganda Shilling (USh) 314,250 million in 1995 to USh 1,430,960 million in 2008 (corresponding to 6.0 percent and 6.8 percent of GDP, figure 5.4). Government expenditure on health within this period rose more or less in line with GDP. While private out-of-pocket spending declined, spending by nongovernmental organizations (NGOs) increased significantly, from USh 45 billion in 1995 to USh 524.1 billion in 2007 (from 0.9 percent of GDP to 2.5 percent). The role of prepaid schemes in Uganda is negligible; therefore they are not shown in figure 5.4.

Because Uganda is heavily dependent on budget support, which finances nearly half of government expenditures, foreign aid plays a dominant role in financing the response to HIV/AIDS. Figure 5.4 illustrates the evolution of

Figure 5.4: Total Health Expenditures by Source of Financing, 1995–2008



Sources: a. WHO (2010a). b. WHO (2010a) for health spending, IMF (2010a) for GDP per capita.
Note: Private prepaid spending is minimal and does not show between nonprofit and private out-of-pocket spending.

health expenditures and aid commitments based on data compiled by the WHO (2010a) and the OECD (2010).

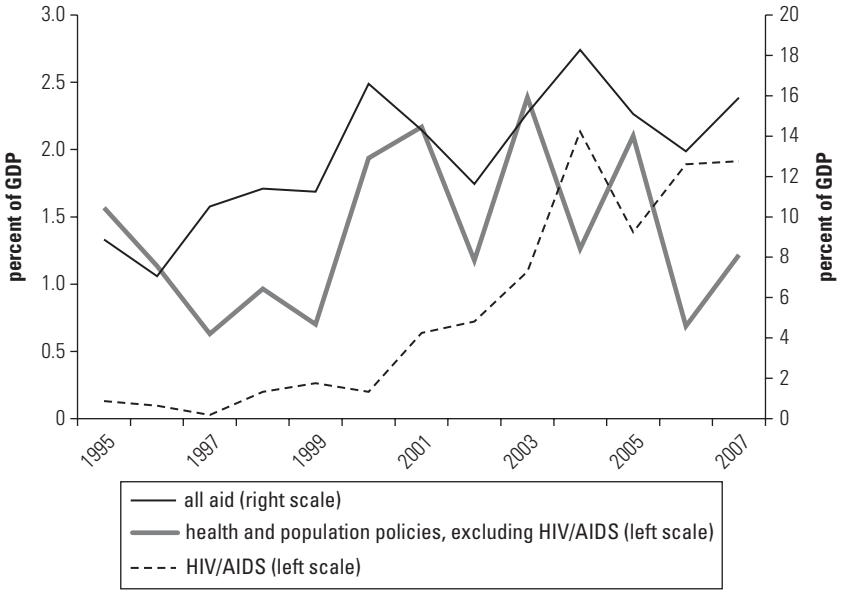
The increase in external financing (the dotted line in figure 5.4a) presumably plays a part in the overall increase of health expenditure. It is important to note that the primary delivery channel for aid-financed health

services appears to be the private sector—especially through NGOs—rather than the government. While there is a close correlation between health spending by NGOs and external aid, there is no such correlation between aid and government health expenditures.

Another important point to emphasize is the difference between the net and gross impact of external aid. While aid-financed expenditures have increased, private out-of-pocket expenditures have declined. Apparently the (non-NGO) private sector has been crowded out by externally financed NGO health services.

Figure 5.5 allows a more specific look at the sources of the increase of external aid. Since relative reliable data on disbursements from the OECD Creditor Reporting System database are available for latter years only, this study had to use aid commitments for a closer examination of longer-term trends. Figure 5.5 shows that the increase of overall aid in the areas of health and population control is driven by the increase of aid toward the control of sexually transmitted diseases (STDs; term STDs is essentially synonymous with HIV/AIDS-related aid in the OECD data).

Figure 5.5: Aid Commitments



Source: Authors' calculations, based on OECD (2010) and IMF (2010a).

The National Response to HIV/AIDS

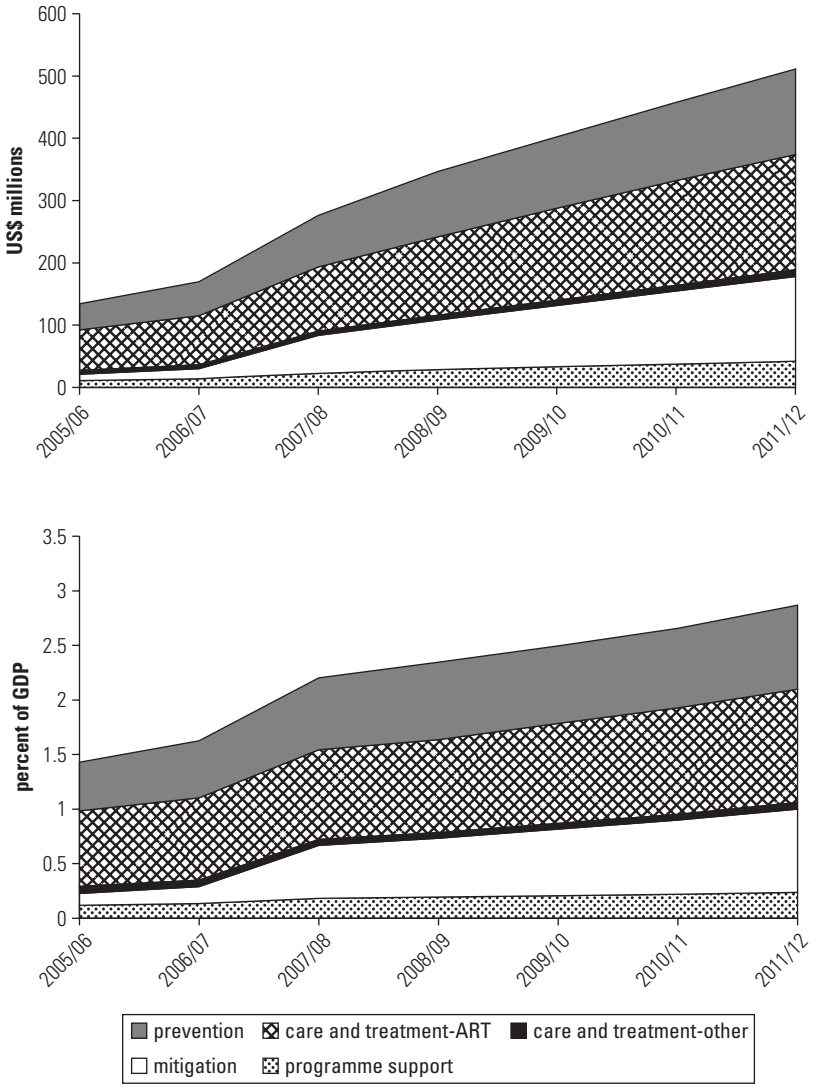
The national response to HIV/AIDS is organized around the NSP for HIV/AIDS for 2007/8–2011/12 (UAC 2007). The NSP specifies goals in four areas:

- Reducing the incidence rate of HIV by 40 percent by the year 2012.
- Improving the quality of life of people living with HIV/AIDS by mitigating the health effects of HIV and AIDS by 2012, including by extending access to treatment from 91,500 (coverage rate of 39 percent) to 240,000 (coverage rate of 67 percent) by 2012, and improving prevention and treatment of opportunistic infections such as tuberculosis.
- Mitigating the social, cultural, and economic effects of HIV/AIDS at the individual, household, and community levels by extending material and psychosocial support to people affected by HIV/AIDS.
- Building an effective support system that ensures quality, equitable, and timely service delivery by effectively managing and coordinating the national response and mobilizing adequate resources.

The targets specified under the NSP—updated as necessary based on the 2010 United Nations General Assembly Special Session (UNGASS) progress report (Government of Uganda 2010)—and the projected costs are a principal source of this study's projections. The projected costs are summarized in figure 5.6. Under the NSP, required spending is expected to rise from about $134 million in 2005/6 to $511 million in 2011/12, corresponding to an increase from 1.4 percent of GDP in 2005/6 to 2.9 percent of GDP in 2011/12. The costs of scaling up treatment play an important role, rising from $65 million to $185 million (36 percent of total costs in 2011/12). The largest increase in projected resource needs occurs in the area of mitigation, with projected costs rising from $10 million to $136 million. Based on actual and anticipated commitments, the NSP envisages that about 85 percent of funding will come from external sources, and the remaining 15 percent be provided by the Uganda government.

The UNGASS progress report (Government of Uganda 2010) also provides an opportunity to compare projected resource needs under the NSP (figure 5.6) to actual spending for the fiscal years 2007/8 and 2008/9 (table 5.3). In 2007/8, actual spending appears mostly in line with the NSP, both regarding overall spending (NSP projection of 2.2 percent of

Figure 5.6: Projected Spending under the National Strategic Plan 2007/8–2011/12



Sources: a. UAC (2007). b. UAC (2007) for HIV/AIDS spending, IMF (2010a) for GDP.

GDP, actual 2.3 percent of GDP) and the composition of spending. However, for 2008/9, actual spending (2.0 percent of GDP) is lower than envisaged (2.3 percent of GDP), and spending by category diverges from NSP projections, with higher actual allocations to program support (overhead)

Table 5.3: Actual HIV/AIDS-Related Spending, 2005/6–2008/9

	2005/6	2006/7	2007/8	2008/9
	US$ millions			
Total	134.4	169.8	289.8	297.8
Prevention	41.9	54.6	75.5	65.3
Care and treatment	71.2	85.0	123.7	147.5
Mitigation	10.2	16.2	31.9	20.2
Program support	11.1	14.0	58.7	64.8
	Percent of GDP			
Total	1.4	1.6	2.3	2.0
Prevention	0.4	0.5	0.6	0.4
Care and treatment	0.8	0.8	1.0	1.0
Mitigation	0.1	0.2	0.3	0.1
Program support	0.1	0.1	0.5	0.4

Sources: Authors' calculations, based on UAC (2007), Uganda (2010), and IMF (2010a).

than envisaged in the NSP, and reduced spending on mitigation and prevention. These numbers should be interpreted with some caution—the government of Uganda notes that the coverage of data is incomplete regarding certain NGO activities and activities funded by private entities. Additionally, transforming the data into U.S. dollars based on incomplete information may introduce some error. For this reason, this study's estimates and projections of the fiscal dimension of HIV/AIDS presented below continue to be based on the NSP.

External support plays a critical role in the national response to HIV/AIDS, both in funding the costs of the national response and in implementing it (table 5.4). Over the period 2003/4 to 2008/9, external financing accounted for 84–98 percent of total funding. The Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM) played a relatively large role early on, but in recent years, the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) has become the dominant source of external financing, accounting for 82 percent of total spending and 89 percent of external funding in 2007/8 and 2008/9. Another aspect of the high level of external support regards the implementation of the HIV/AIDS program. During 2003/4–2006/7, only about one-fifth of spending was directly administered by the government of Uganda, the remainder was administered essentially through NGOs that frequently obtained funding directly from external donors.

Table 5.4: HIV/AIDS Funding and Spending, 2003/4–2008/9

	2003/4 EST.	2004/5 EST.	2005/6 EST.	2006/7[a] EST.	2007/8[b] EST.	2008/9[b] EST.
			US$ millions			
Total funding	38.4	103.3	150.5	164.4	273.8	302.7
Govt. of Uganda	6.0	7.0	8.2	8.1	6.5	34.7
External	32.4	96.3	142.4	156.3	267.3	268.0
U.S. government	10.1	44.8	113.7	139.9	248.0	227.5
GFATM	13.3	20.1	0.0	0.0	0.0	2.1
Other	9.0	31.4	28.6	16.5	19.3	38.4
Total spending	38.4	103.3	150.5	164.4	—	—
Govt. of Uganda	9.1	25.6	38.8	20.7	—	—
Other (NGOs)	29.2	77.7	111.7	143.7	—	—
			Percent of total funding			
Total funding	100.0	100.0	100.0	100.0	100.0	100.0
Govt. of Uganda	15.6	6.8	5.4	4.9	2.4	11.5
External	84.4	93.2	94.6	95.1	97.6	88.5
			Percent of GDP			
Total funding	0.6	1.3	1.6	1.6	2.2	2.0
Govt. of Uganda	0.1	0.1	0.1	0.1	0.1	0.2
External	0.5	1.2	1.5	1.5	2.1	1.8
Total funding	0.6	1.3	1.6	1.6	—	—
Govt. of Uganda	0.1	0.3	0.4	0.2	—	—
Other (NGOs)	0.4	0.9	1.2	1.4	—	—

Sources: Lake and Mwjuka (2006), Uganda (2010), and IMF (2010a, 2010b).

Note: — = not available; EST = estimated.

a. Data for 2006/7 are based on projections included in Lake and Mwjuki (2006), actual spending and funding might differ.

b. Data for 2007/8 and 2008/9 are based on domestic currency data from Uganda (2010), and are converted to U.S. dollars using the average exchange rate for the respective fiscal year.

Impact of HIV/AIDS on Government Employees

HIV/AIDS results in increased morbidity and mortality among government employees, and therefore adds to the fiscal costs of HIV/AIDS. These costs can arise as a consequence of increased absenteeism and sick leave, recruitment of new staff due to increased attrition, and medical and death-related benefits. These costs are generally more difficult to quantify than the costs of a national HIV/AIDS program, for several reasons:

- Data on increased mortality and morbidity among government employees are rarely available in the public domain.[9]
- Some of the employment-related costs of HIV/AIDS take the form of additional expenditures and some result in productivity losses (for example,

sick leave). The study follows the literature on the costs of HIV/AIDS to businesses, which treats these disruptions as costs, even though the principal effect could be a decline in the quality of government services rather than an increase in personnel expenditures.

- For some categories of costs (such as increased absenteeism), only very crude estimates are available.

HIV/AIDS increases personnel costs and/or reduces efficiency on the job through increased use of sick leave and reduced productivity on the job. Data on sick leave taken are not available. Public servants are entitled to 90 days of sick leave on full pay over a 12-month period. These 90 days can be extended to 180 days if the officer is expected to be fit to resume duty afterwards, and a special leave of absence can be granted to public officers living with HIV/AIDS (Ministry of Public Service 2007). Additionally, impaired health can lead to deteriorating performance on the job. There is a strand of literature estimating the impact of HIV/AIDS on productivity in the private sector. For example, Rosen and others (2004) report productivity losses on the job of between 22 and 63 percent in the last year of service (before retiring for health reasons or dying) for seven companies in South Africa and Botswana. These estimates, however, do not necessarily carry over across countries or to public service, where output is frequently less tangible and sick leave allowances are more generous. Overall, the study makes an allowance equivalent to 90 days of salary per AIDS death, intended to capture sick leave taken in the year before death, shorter episodes of sick leave earlier on, and productivity losses on the job. Additionally, the study assumes that government employees receiving antiretroviral treatment take 10 days of sick leave annually, which would cover the occasional visit to a clinic[10] and spells of illness.

An important cause of **absenteeism** resulting from HIV/AIDS is funeral attendance. As episodes of sick leave are, on average, shorter than episodes of leave for medical reasons, these data suggest that absenteeism and compassionate leave for funeral attendance would amount to about half of the level of leave for medical reasons. To estimate the extent of absenteeism for funeral attendance, the study adopts an assumption used by Haacker (2004), whereby each death results in 40 person days of funeral attendance.

Another element of the costs arising from the impact of HIV/AIDS on public servants are the costs of **increased turnover of government employees**. These costs include the costs of administering the exit (due to

death or retirement) of employees, advertising and filling a position (including financial costs as well as the time of staff for selecting candidates and processing appointments), and productivity losses resulting from new employees (or people moving to a new assignment) who are learning on the job. Regarding the costs of administering the exit of an employee, these costs are assumed to be one month of salary of the position.[11] Regarding the costs of learning on the job, the productivity of a new employee is assumed to be 25 percent lower during the first year on the job, which is at the lower end of the range reported by Rosen and others (2004) for the private sector.[12] Additionally, vacancy periods can add to the disruptions in associated public services. However, because there is no salary incurred during a vacancy period, this is not included in the estimates.

Increased staff turnover due to **higher attrition** associated with HIV/AIDS may incur additional training costs. For example, if a job requires one year of training (for example, a college teacher), an agency employs 1,000 people, and the time a newly trained employee can be expected to stay on the job declines from 10 years to 8 years, the number of people that need to be trained annually increases from 100 to 125 in order to fill all positions. Jefferis and others (2008) estimate that the education of an average worker in public administration costs around USh 4.7 million. Due to data constraints, and in light of some conceptual issues, modeling the increased need for training owing to higher mortality is beyond the scope of this paper. Nevertheless, as a token item for the costs of training for half a year of working time is included in the estimates of the costs of increased attrition.[13]

Finally, it is important to acknowledge one potentially large gap in the analysis—this study was not able, with the data available, to assess the impact of HIV/AIDS on the costs of **pensions and death-related benefits.** Public sector pensions are administered through the Public Sector Pension Fund as a defined-benefit scheme.[14] While increased mortality owing to HIV/AIDS reduces the number of public servants reaching retirement age, it results in a steep increase in the number of survivors' pensions (equivalent to 100 percent of the pension entitlement of the deceased, for up to 15 years), and could result in an increase in the number of public servants who retire and qualify for the pension on medical grounds. A death gratuity (three months of salary) is paid if the pension claim of a deceased public servant is not sufficiently high. Additionally, this study's estimates of payroll-related costs do not include an allowance for **medical benefits**,

because the costs of treatment are captured in the analysis of the costs of the HIV/AIDS program. Because medical benefits are a large aspect of the costs of the impact of HIV/AIDS on public servants, this study nevertheless reports estimates as a memorandum item.

Table 5.5 summarizes study estimates of the costs of the impact of HIV/AIDS on public servants in 2007, based on an HIV/AIDS-related mortality of 0.5 percent and a number of government employees receiving treatment corresponding to about 1 percent of the number of civil servants.[15] The study finds that the costs of the HIV/AIDS impact on public servants (excluding medical costs) are fairly small, accounting for 0.8 percent of wages and salaries, and about 0.03 percent of GDP.[16] Including an imputation for medical and related costs, the costs of the HIV/AIDS impact on public servants come to 0.2 percent of GDP, or 4.3 percent of wages and salaries, of which medical costs account for more than four-fifths.[17]

IV. The Fiscal Dimension of HIV/AIDS

The purpose of this analysis is to capture the implications of HIV/AIDS and the HIV/AIDS program for public finance. In terms of the scope of the analysis, there are several differences between this study and a costing study of an HIV/AIDS program. First, this study draws a wider net and (subject to data constraints) aims to capture the full impact of HIV/AIDS on the fiscal balance. Second, this study accounts for the long-term nature of fiscal commitments undertaken through the country's HIV/AIDS

Table 5.5: Cost of the HIV/AIDS Impacts on Public Servants

	IN PERCENT OF . . .		
GOVERNMENT COSTS	WAGES AND SALARIES	GOVERNMENT EXPENDITURES	GDP
Sick leave and productivity loss	0.2	0.06	0.01
Funeral attendance	0.1	0.02	0.00
Increased turnover	0.2	0.04	0.01
Training	0.3	0.06	0.01
Total (excl. medical costs)	0.8	0.20	0.03
Medical benefits (imputed)	3.6	0.90	0.20
Total (incl. medical costs)	4.3	1.10	0.20

Source: Authors' estimates.

policy. This means that current spending carries limited and incomplete information regarding the magnitude of and potential changes in the fiscal burden. To get a better idea of the evolving costs of HIV/AIDS and the trade-offs inherent in the program, this study describes the costs of HIV/AIDS as a quasi-liability (similar to pension obligations). Third, due to the large role of external financing, it is important to be explicit about the limits of the state and to differentiate between the overall costs of HIV/AIDS and the extent to which these affect the fiscal space of the national government. This analysis is based on the premise that the national government is responsible for addressing the increased demand for health services. Therefore, the initial focus is on the overall costs of HIV/AIDS and the HIV/AIDS program. Finally, the study then accounts for the extent of external support and provides an analysis of the vulnerability of the national government to changes in the availability of external financing.

The analysis is divided into four sections: first, the underlying methodology; second, the epidemiological projections regarding the state of the HIV epidemic, upon which the study's projections of the demand for HIV/AIDS-related services are based; third, the estimates of the fiscal costs of HIV/AIDS and a discussion on the role of external financing; and fourth, the evolving fiscal burden of HIV/AIDS as a "quasi-liability," which, under the targets of the HIV/AIDS program, is incurred by and at the time of new HIV infections, and results in increased future spending.

Methodology

This study's estimates of the demand for HIV/AIDS-related services builds on estimates and projections of the state of the epidemic. These epidemiological estimates were generated from a model calibrated to replicate estimates of the state of the epidemic from Hladik and others (2008) and UNAIDS (2010a, 2010b), describing the disease progression from infection to treatment need, treatment failure, second-line treatment, and death, and that generates estimates and projections of the number of children living with HIV/AIDS and children orphaned as a result of AIDS-related deaths.[18] Unlike a full demographic/epidemiological model, this study does not differentiate between people living with HIV/AIDS by age, only by epidemiological state and time spent in the respective state.[19] Therefore the

framework used in this study can be easily calibrated, even when only summary data on the state of the HIV epidemic are available.

Especially over the longer run, fiscal analysis also needs to account for the **macroeconomic consequences** of HIV/AIDS. Notably, the working-age population grows more slowly as a consequence of HIV/AIDS, and the studies of the macroeconomic impact of HIV/AIDS discussed earlier indicate that this translates into lower GDP growth (and thus lower government revenues). For this reason, there is a simple macroeconomic model running in the background of the analysis (see the appendix for more information). While the denominator of the costs of HIV/AIDS over time is thus affected by the state of the epidemic and the policy response, higher government revenue that might arise as a consequence of reduced impacts of HIV/AIDS (more treatment, lower incidence) to offset some of the fiscal costs is not counted, because a larger population (for example, as a result of lower mortality) also translates into a higher demand for government services across the board, so that higher tax revenues in consequence of an HIV/AIDS intervention cannot generally be assigned to offset the costs of the HIV/AIDS program.

The **fiscal costs** are projected and based mainly on the estimates of the state of the epidemic, applying certain coverage rates for HIV/AIDS-related services (for example, treatment, different types of social mitigation, prevention of mother-to-child transmission) and the relevant unit costs.[20] Additionally, the analysis takes into account the categories of fiscal costs that are population-based and not directly tied to any epidemiological variables (certain types of prevention efforts and community-based measures). One important assumption underlying the approach regards the specifications of the NSP and the projections further out. In this analysis, these are specified in terms of coverage rates of services rather than targets in absolute numbers. This is consistent with the practice in the NSP, which frequently describes targets in terms of coverage rates; moreover, for this analysis over the medium and longer term, coverage rates are appealing as they can be interpreted as indicators for the quality of the response to HIV/AIDS.

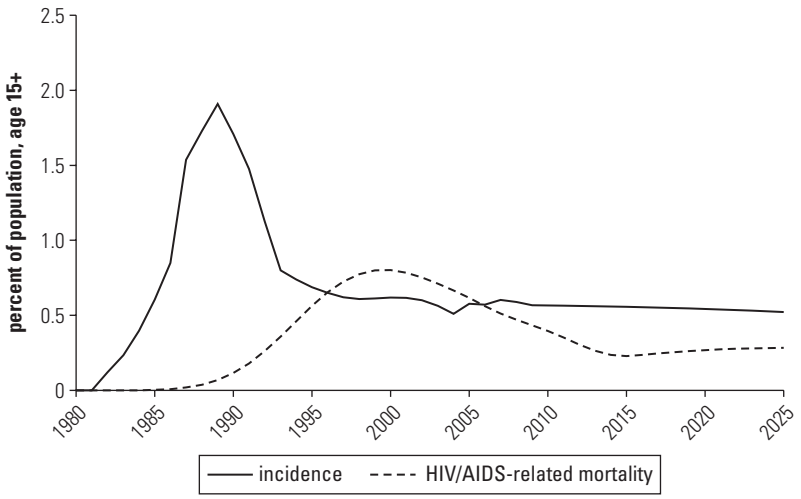
The unit costs are obtained from several sources and are set in line with targets and overall costs specified in the NSP. Because this would provide only a very crude extrapolation, the study also uses material based on Jefferis and Matovu (2008) and some material from other sources (for example, regarding the evolution of treatment costs) to refine the analysis.

The State and Course of the Epidemic

Figures 5.7 and 5.8 summarize this study's estimates and projections on the state of the epidemic for the adult population (ages 15+). After HIV incidence peaked in the mid-1990s, it is possible to distinguish two phases. Between 1996 and 2007, HIV/AIDS-related mortality rose higher than the number of new infections; the number of people living with HIV/AIDS was therefore decreasing. After 2000, HIV/AIDS-related mortality dropped sharply from its peak of 0.80 percent to 0.21 percent in 2015. This decrease can be attributed to the scaling-up of antiretroviral treatment.[21] After 2015, mortality due to HIV/AIDS is projected to increase again slowly to about 0.25 percent in 2025. Because HIV incidence is expected to be higher than HIV/AIDS-related mortality from 2008 to 2025, the number of people living with AIDS is going to rise within this second phase, even though incidence is still declining.

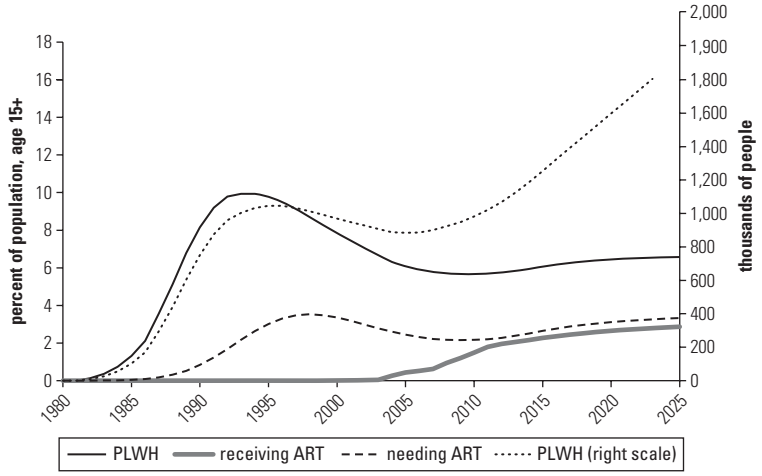
For the reasons stated, the projections show a gradual increase in the number of people living with HIV/AIDS, from 866,000 in 2006/7 to 1,742,000 in 2025. However, the increase is almost as high as the increase of the population growth (for this age group), so that HIV prevalence

Figure 5.7: HIV Incidence and HIV/AIDS-Related Mortality, 1980–2025



Source: Authors' calculations, based on Hladik and others (2008), UNAIDS (2010b), and WHO (2010b).

Figure 5.8: Evolution of HIV Epidemic, 1980–2025



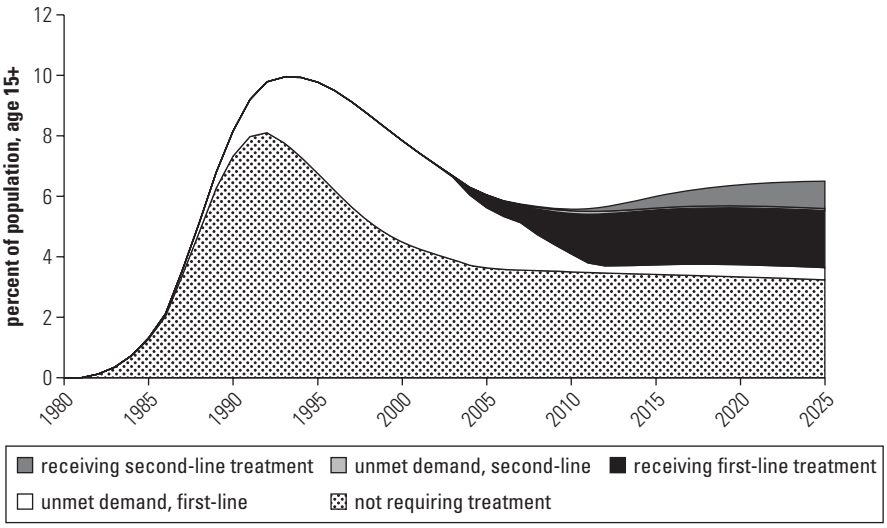
Source: Authors' calculations, based on Hladik and others (2008), UNAIDS (2010b), and WHO (2010b).
Note: ART = antiretroviral therapy; PLWH = people living with AIDS.

increases moderately from 5.3 percent in 2009 to 5.9 percent in 2025.[22] Figure 5.8 also illustrates the role of the increase in access to treatment, with coverage rising from 12 percent to 54 percent in 2009. Looking ahead, the number of people receiving treatment is projected to increase from 1.2 percent of the population in 2009 to 2.6 percent of the population in 2025, that is, from 200,000 people to 764,000 people in absolute numbers.[23]

One implication of the increased access to antiretroviral treatment is a shift in the composition of people living with HIV/AIDS, who on average are surviving much longer compared to before 2002, when access to treatment was still very limited. This is evident from figure 5.9, which summarizes the results of study projections on the number of people living with HIV/AIDS and access to treatment. Reflecting the preceding decline in HIV incidence, the number of people living with HIV/AIDS but not (yet) requiring treatment is declining strongly, from a peak of 8.1 percent of the adult population to 2.9 percent by the end of the projection period.

At the same time, the number of people receiving treatment increases steadily. The number of people receiving first-line antiretroviral treatment levels off at about 1.7 percent after 2013. The number of people receiving second-line antiretroviral treatment is small at present (about 3.6 percent of

Figure 5.9: People Living with HIV/AIDS, 1980–2025

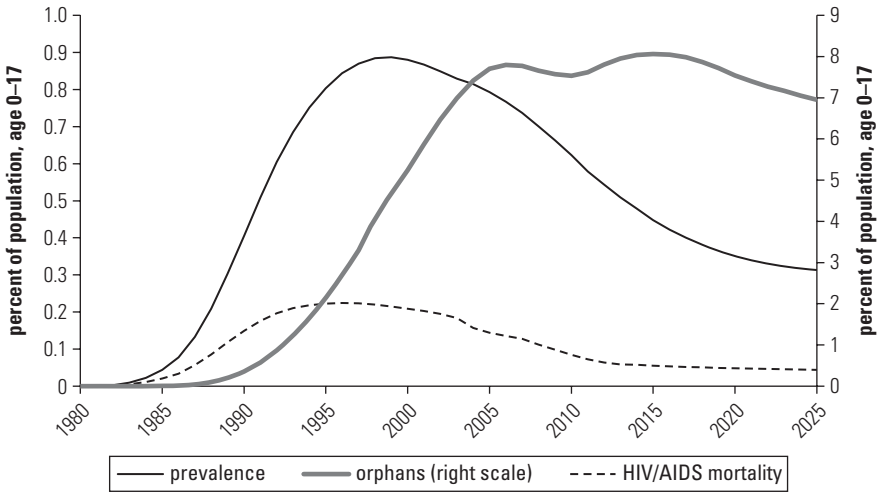


Source: Authors' calculations, based on Hladik and others (2008), UNAIDS (2010b), and WHO (2010b).

the number of people receiving treatment in 2009). The role of second-line therapy, however, is projected to increase, as a rising number of people receiving first-line therapy reach a point of treatment failure. An important note to the fiscal projections is that average unit costs for antiretroviral treatment increase over the projection period, reflecting the increasing role of more expensive treatment regimes.

One important aspect of the demographic impact of HIV/AIDS is the youth population (figure 5.10), including mother-to-child transmission (in utero, at birth, or through breastfeeding) and increased mortality among young adults, which translates into an increasing number of orphans. The impact of HIV/AIDS on the youth population substantially differs from trends in the general population for two reasons: (i) HIV prevalence among the youth population declines steeply because of the effectiveness of prevention of mother-to-child transmission;[24] and (ii) the number of orphans remains close to its peak until about 2015—while increased survival rates for young adults by themselves would reduce orphan rates, HIV incidence among the youth population declines steeply, and survival rates among the youth population living with HIV/AIDS improve. The latter two factors explain the continuing high orphan rates.

Figure 5.10: Impact of HIV/AIDS on Youth, 1980–2025



Source: Authors' calculations.

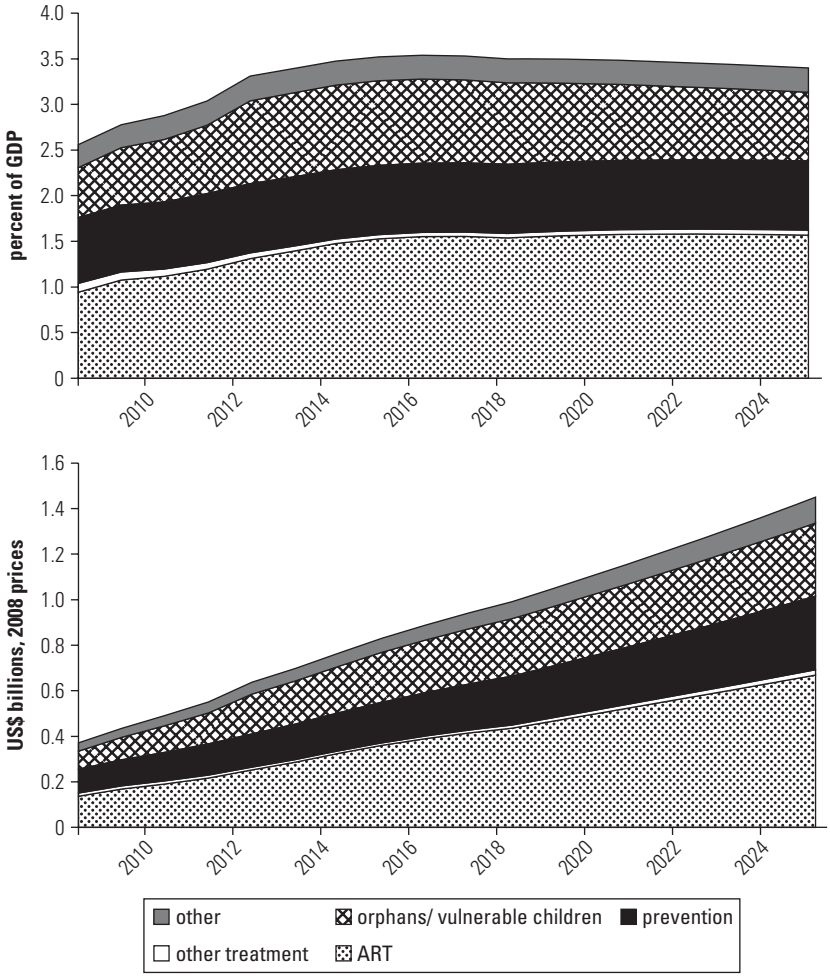
Fiscal Dimension of HIV/AIDS and the HIV/AIDS Program

The estimates and projections of the costs of the national response to HIV/AIDS are based on the demographic and epidemiological projections presented earlier; information available at the time of writing regarding the objectives of the national HIV/AIDS program; actual or intended budget allocations; and other information available in the public domain regarding the costs of key components of the national HIV/AIDS program, notably the costs of treatment.[25]

Figure 5.11 summarizes projections on the costs of the national HIV/AIDS program. Initially, fiscal costs increase from 2.6 percent of GDP in 2008 to 3.4 percent of GDP for 2015–17. After 2017, total costs are expected to decrease gradually relative to GDP and reach around 2.9 percent of GDP by the end of the projection period. Uganda is a fast-growing country,[26] and the relatively stable costs of HIV/AIDS relative to GDP mask a steep increase in absolute terms, from $0.35 billion in 2008 to $1.4 billion by 2025. One consequence of this steep increase in absolute terms is that donor allocations to Uganda's HIV/AIDS program would need to increase relative to donor GDP to maintain a constant share of external financing.

The most important factor behind the increase in the fiscal costs of HIV/AIDS is the cost of antiretroviral treatment, reflecting both the

Figure 5.11: Projected Costs of HIV/AIDS Program, 2008–25



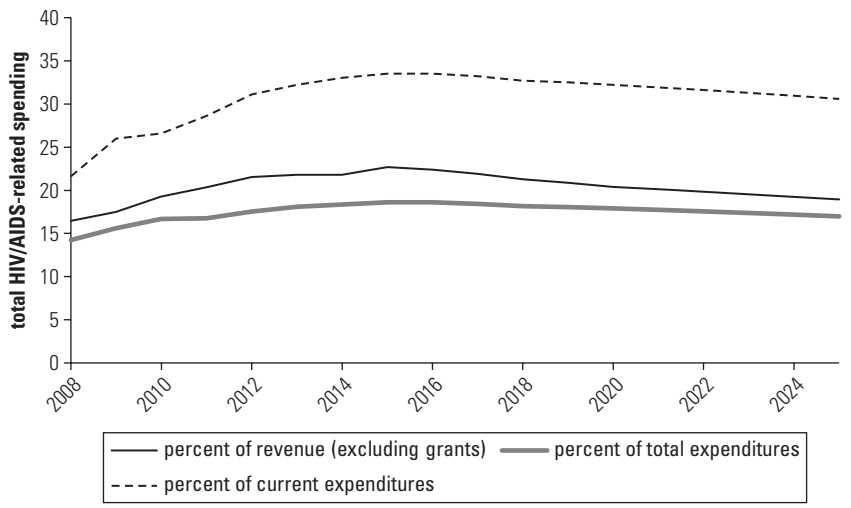
Source: Authors' calculations.

increase in the number of people receiving treatment and the increasing role of more expensive treatment regimens (figure 5.9). Another component of the fiscal costs of HIV/AIDS that increases steeply, at least over the first half of the projection period, is the cost of support to orphans and vulnerable children. Other treatment costs decline relative to GDP, a familiar consequence of increased access to antiretroviral treatment, but do not play a large role in the aggregate costs.

One factor to keep in mind when assessing the fiscal dimension of HIV/AIDS is the fact that the size of government is relatively small, with total expenditures at about 18 percent of GDP, and domestic revenues at about 12 percent of GDP (external financing, primarily through grants, accounts for the bulk of the difference). This means that the estimated and projected costs of HIV/AIDS are very large relative to the size of government (figure 5.12). For example, the estimated costs of HIV/AIDS increase to the equivalent of over 20 percent of government revenues (excluding grants) and over 30 percent of current expenditures.[27] Whether or not HIV/AIDS-related services are administered through the budget and delivered through public service or primarily through NGOs financed directly from external sources, the response to HIV/AIDS thus represents a large aspect of public services—casting the term "public" widely, to include all services financed from domestic or external public sources—delivered in Uganda.

In recent years, **external financing** has accounted for about 85 percent of total spending on HIV/AIDS, and the current NSP projects that this level of external financing will be maintained for the near future. While this analysis interprets the fiscal costs of HIV/AIDS on a gross basis—as a demand for public services and a policy commitment for which the national government is accountable—the analysis of the fiscal burden of HIV/AIDS also needs to take into account the role of external financing in mitigating

Figure 5.12: Fiscal Context of HIV/AIDS Program

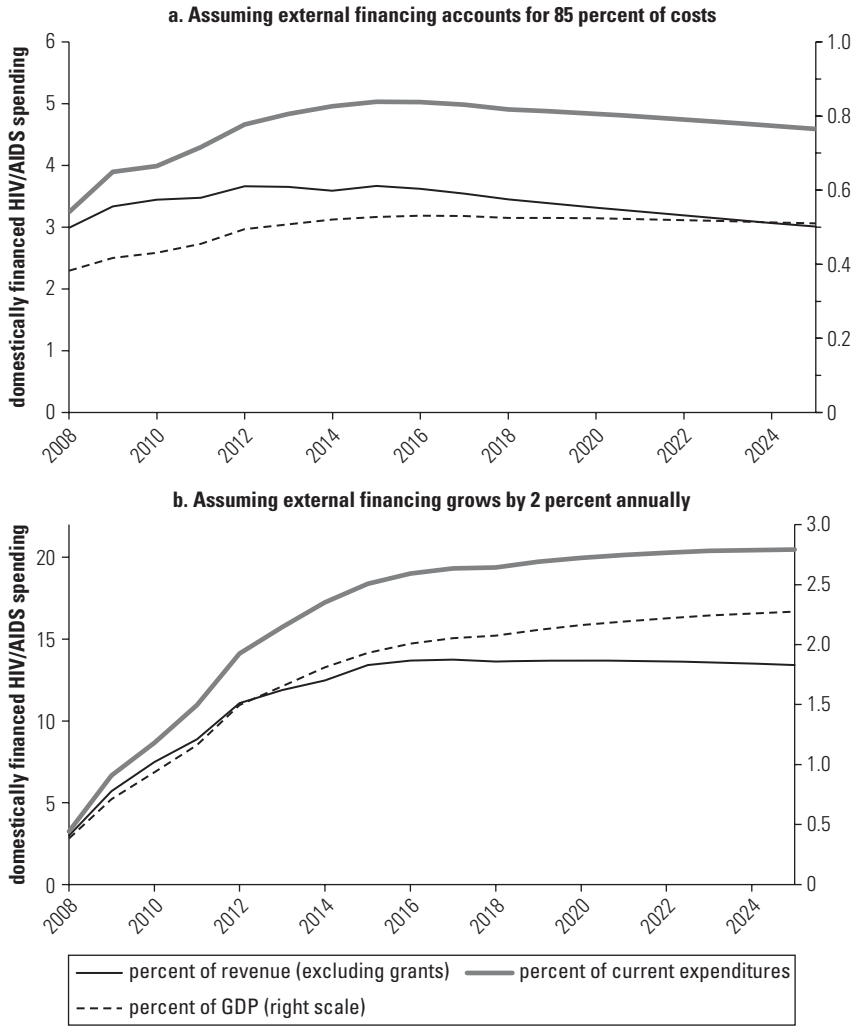


Sources: Authors' calculations, and IMF and World Bank (2010).

this burden. At the same time, the high dependence on external financing, in addition to the large fiscal costs of HIV/AIDS, implies risks for public finance and to the viability of the HIV/AIDS program in case the external financing does not materialize as envisaged.

Figure 5.13 illustrates the role of external financing using two alternative assumptions. First, the current rates of external financing (about 85 percent of the overall costs) are used as a benchmark, as envisaged in the current

Figure 5.13: Domestically and Externally Financed HIV/AIDS Spending



Source: Authors' calculations.

NSP. Second, a scenario is developed in which external financing is constrained by donor countries' GDP and fiscal resources, and grows at a rate of 2.5 percent annually.[28]

If external financing remains at 85 percent of the total costs of the HIV/AIDS program, external financing for the national HIV/AIDS program will rise to 2.9 percent of GDP by 2015, from 2.2 percent, as the total costs of the HIV/AIDS program rise to 3.4 percent of GDP. This implies that HIV/AIDS-related financing would have to rise substantially in nominal terms, from about $370 million in 2008 to $800 million by 2015 (in constant 2008 prices), growing at an average annual rate of 8 percent. In this case, domestic financing of the HIV/AIDS program would rise to 0.5 percent of GDP by 2015, absorbing up to 3.5 percent of government revenues.

Alternatively, if aid allocations are constrained to not grow faster than the GDP of main donor countries, domestic financing needs will increase steeply, rising to 2 percent of GDP by 2020, equivalent to 12.5 percent of total government revenues, and remain at about that level through 2025.

HIV/AIDS as a Fiscal Liability

One of the characteristics of HIV/AIDS and the response to HIV/AIDS is the fact that the expenditures incurred are highly persistent. An HIV infection has consequences for the demand for public services that can persist over several decades. From a macro perspective, the response to HIV/AIDS therefore represents a fiscal commitment that extends over many years.

Because of the long duration of the fiscal commitments caused by a single infection, and the response to HIV/AIDS overall, current spending on HIV/AIDS gives an incomplete or even misleading picture of the fiscal implications of HIV/AIDS, because it responds to a demand for public services brought on by HIV infections that occurred in the past. For current expenditure planning, the assessment of the fiscal implications of HIV/AIDS needs to take into account the number of new HIV infections to determine the magnitude of the fiscal burden.

This means that the fiscal commitments of HIV/AIDS have many of the same characteristics as a liability: under the targets and standards specified in the HIV/AIDS policy, an HIV/AIDS infection results in a commitment for future government spending, and the commitment to provide certain services translates into future spending commitments. Therefore HIV/AIDS can be described as a "quasi-liability," not a debt *de jure*—but

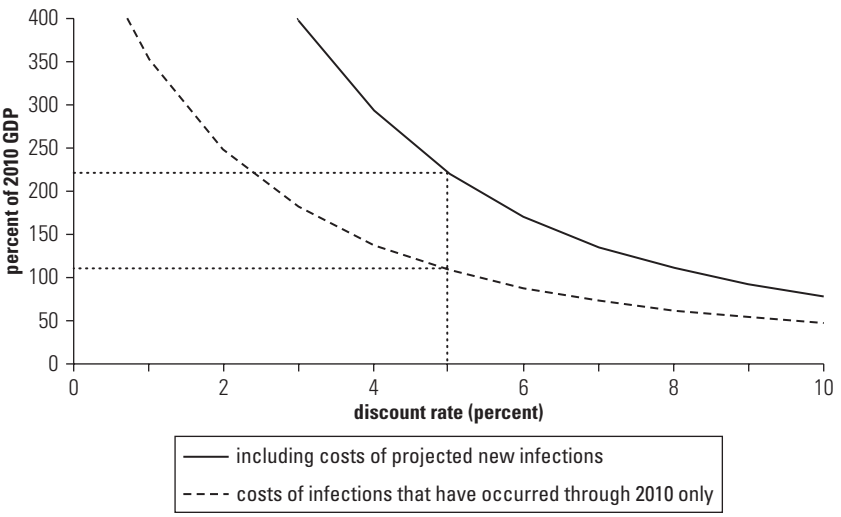
a political and fiscal commitment that binds fiscal resources in the future and that cannot easily be changed, similar to a pension obligation or certain social grants or services.

This study explores this concept in three directions. First, the analysis estimates the overall value of the fiscal quasi-liability posed by the commitments under the HIV/AIDS program and discusses its magnitude. Second, the costs incurred under the HIV/AIDS program by a single infection are analyzed. Third, the previous two strands are combined in an analysis of the evolving fiscal burden over time, in which the fiscal commitments under the HIV/AIDS program are incurred by new infections and paid off as the HIV/AIDS-related services are delivered.

The **present discounted value** of the fiscal costs of HIV/AIDS is a useful indicator for the overall fiscal burden; it accounts for the costs in any period, including the fact that the costs are highly persistent and extend over several decades (figure 5.14). For this reason, the fiscal consequences of HIV/AIDS are much larger than those of a one-off shock that affects the fiscal balance for only one or two years.

The present discounted value transforms the fiscal costs of HIV/AIDS over time into a one-off cost, applying a discount rate to transform future costs into current costs (as if they were a loan that needs to be paid at a later

Figure 5.14: Present Discounted Value of the Fiscal Costs of HIV/AIDS, as of 2010



Source: Authors' estimates and projections.

date). This discount rate can be derived from the real interest on public debt. However, as Uganda borrows little externally and domestic debt is issued principally for monetary policy purposes, there is no obvious interest to use from that angle. Instead, a discount rate of 5 percent is used, as used in the recent IMF/World Bank debt sustainability analysis (IMF and World Bank 2010). If this is applied, the value of the quasi-liability implied by the fiscal costs of HIV/AIDS comes out at 212 percent of GDP ($36 billion) as of 2010. About half of these costs (equivalent to 111 percent of GDP) are incurred as a consequence of infections that have already occurred through 2010 (thus contingent on the parameters of the national HIV/AIDS program), the balance (equivalent to 101 percent of GDP) reflects the costs of projected future infections, and therefore not only depends on the targeted coverage rates of HIV/AIDS-related services, but also the success of the HIV/AIDS program to contain the number of new infections.

To illustrate the macroeconomic dimension of these estimates, it is useful to compare them to the level of public debt (which also binds future fiscal resources). IMF and the World Bank (2010) estimate Uganda's total public debt at 22.2 percent of GDP (including external debt of 13.8 percent of GDP).[29] The costs of the HIV/AIDS program thus correspond to about nine times the level of public debt. One reason for the low level of Uganda's external debt is the debt relief received through the HIPC Initiative and MDRI, totaling about $5 billion. This means that the magnitude of the fiscal costs of the HIV/AIDS program ($36 billion) are several times higher than all debt relief granted in recent years.

Another useful reference point is the costs of national disasters (also a prominent trigger for external assistance). Rasmussen (2004) estimates that natural disasters have, "on average, affected over 2 percent of the population each year and caused more than one half of 1 percent of GDP in damage" in developing countries. This means that the overall economic costs of natural disasters are normally lower than the fiscal costs of HIV/AIDS that occur in Uganda each year.

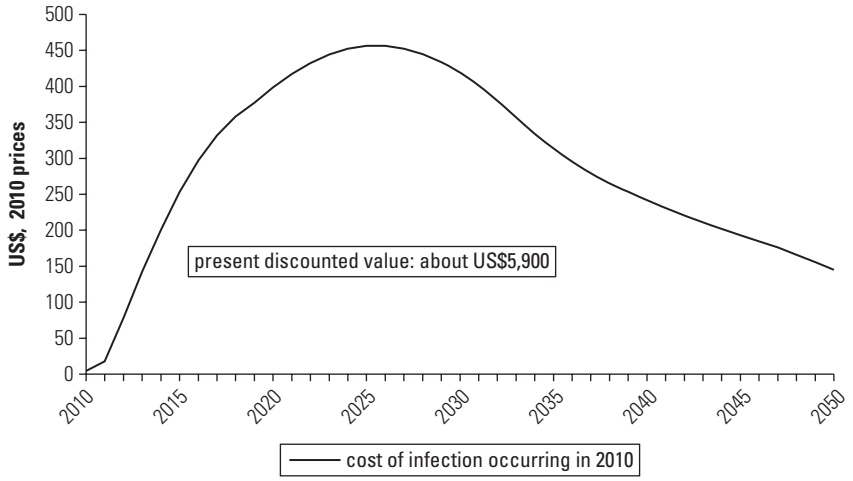
Most of the fiscal costs of HIV/AIDS can be traced back to HIV infections that occurred in the past.[30] Combining (i) epidemiological information, for example, the transition to treatment need, incidence of mother-to-child-transmission, mortality, and incidence of orphanhood; (ii) targets under the HIV/AIDS program, for example, coverage rate of antiretroviral treatment at 67 percent, coverage of antiretroviral therapy to prevent mother-to-child transmission at 80 percent, and access to support services;

and (iii) relevant unit costs, it is possible to estimate the expected costs of HIV/AIDS over time.

Figure 5.15 presents the estimate of the costs of one additional HIV infection, assumed to occur in 2008, including the costs of treatment as well as the indirect consequences such as the costs of orphan support and of pediatric treatment (as a result of mother-to-child transmission).[31] Study estimates suggest that the expected annual costs associated with an additional HIV infection occurring in 2010 rise to about $450 by 2025, and decline subsequently as a declining survival probability results in lower expected costs of treatment. However, as those patients surviving for a very long time are almost certainly those receiving more expensive second-line treatment, the decline in costs is slower than survival probabilities over a long time. The present discounted value of an additional infection, based on a discount rate of 5 percent, amounts to $5,900, corresponding to about 12 times GDP per capita (as of 2010).

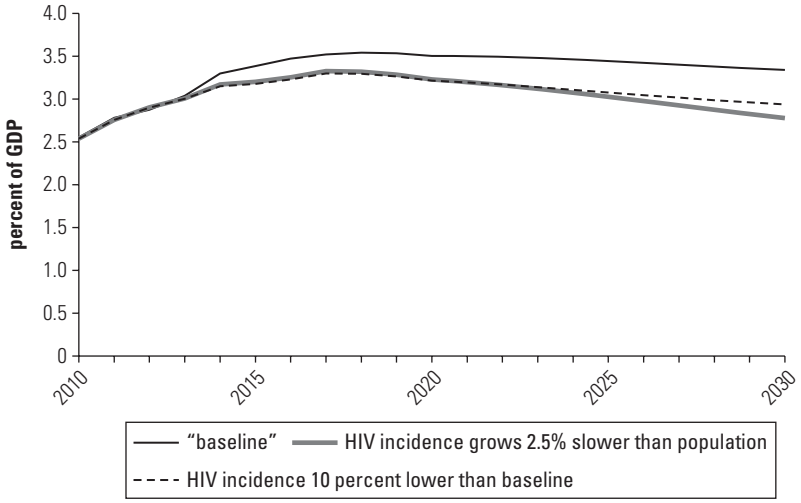
One of the consequences of the long lags between infection and treatment need is the absence of any immediate links between prevention efforts and the costs of the HIV/AIDS program (other than the costs of the prevention efforts). This point is illustrated in figure 5.16, showing the fiscal costs of HIV/AIDS under different assumptions about the underlying path

Figure 5.15: Costs of Additional Infection



Source: Authors' calculations.

Figure 5.16: HIV Incidence and Costs of HIV/AIDS Program



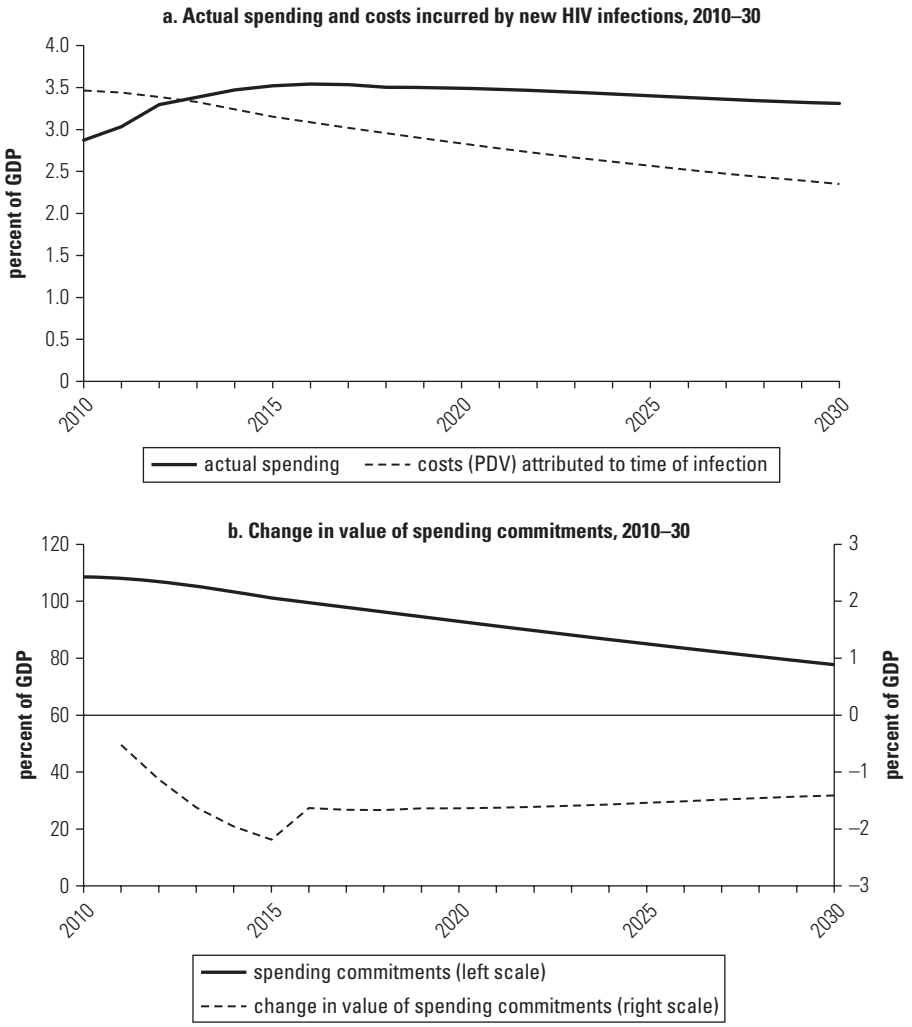
Source: Authors' calculations.

of HIV incidence (a drop by 10 percent, and a slowdown in the growth rate of 2.5 percent, both from 2010). For the first 10 years following the change, it is hard to make out any difference in the costs of the HIV/AIDS program even though new infections have come down substantially.

In contrast, the previous analysis suggested that the costs incurred by an additional infection are substantial. To get a better understanding on the link between HIV infections and the evolving fiscal burden of HIV/AIDS, the analysis of HIV/AIDS as a fiscal quasi-liability can be extended to the macroeconomic level. To this end, it is possible to obtain aggregate estimates of the costs incurred by new infections by multiplying the costs incurred by a single infection (as illustrated in figure 5.15, evaluated for each year) with the number of infections. Costs incurred by new infections are the amount the government would have to put aside to cover future costs (discounted by the relevant interest rate) of all HIV/AIDS-related services required to address the consequences of these new infections. As a second step, this analysis estimates fiscal quasi-liability over time, because new infections add to the liability incurred under the HIV/AIDS program, while the liability is "paid off" as the projected HIV/AIDS-related services are delivered.

Figure 5.17a compares the costs incurred by new infections and the costs of HIV/AIDS in terms of current spending. The costs incurred by new

Figure 5.17: Costs Incurred by New HIV Infections and the Fiscal Burden of HIV/AIDS



Source: Authors' estimates and projections.
Note: PDV = present discounted value.

infections decline steadily, from about 3.4 percent of GDP in 2010 to 2.3 percent of GDP in 2030. There are two principal reasons behind the decline in the costs incurred by new infections. First, HIV incidence gradually declines over time. Second, the costs incurred by a new infection grow more slowly than GDP per capita. Apart from the first two years, the costs incurred by new infections are lower than current spending,

by an increasing gap, suggesting that the fiscal burden of HIV/AIDS, measured as a quasi-liability, might be decreasing.

Figure 5.17b describes how the quasi-liability of the fiscal costs of HIV/AIDS evolves over time. There are two factors driving the change in the value of spending commitments (that is, the liability): the difference between actual spending and the spending commitments incurred by new infections (figure 5.17a) and the rate of GDP growth.[32] The rate of GDP growth matters because the fiscal quasi-liability implied by the spending commitments is measured in percent of GDP, and this ratio declines as GDP grows.

The value of the quasi-liability declines throughout the projection period. During the first years, the rate of decline is somewhat uneven because an annual growth rate is used, based on IMF (2010), which varies from year to year until 2015, when the growth model takes over, producing smoother growth rates. From 2016, the quasi-liability declines by about 1.5 percent of GDP annually, because the value of the new spending commitment is lower than spending (contributing about 1 percent of GDP annually to the decline), and because GDP growth remains high (accounting for about .5 percent of GDP annually of the decline). Overall, the quasi-fiscal liability implied by HIV/AIDS and the HIV/AIDS program declines from 109 percent of GDP in 2010 to 78 percent of GDP in 2030.

V. Conclusions

While the level of HIV prevalence in Uganda is now much lower than in some other countries in the region, notably in southern Africa, the national response to HIV/AIDS poses considerable fiscal challenges. In particular, even though costs are lower in absolute terms, the cost of treatment relative to GDP per capita is higher in Uganda than in the (middle-income) countries with the highest rates of HIV prevalence. As a result, the projected costs of the national HIV/AIDS program, at around 4 percent of GDP, are large from a macroeconomic or fiscal perspective, and the country depends heavily on external grants, which currently account for about 85 percent of the costs of HIV/AIDS program, to finance HIV/AIDS-related expenditures.

This study was conducted to further the analysis of the fiscal dimension of HIV/AIDS to inform both medium-term fiscal planning and the

planning and management of the national HIV/AIDS response. In light of the large role external assistance plays in financing the national HIV/AIDS response in Uganda, this analysis also provides a basis for defining the role of external assistance in the evolving response to HIV/AIDS. To this end, the study focuses on three areas:

i. Providing estimates of the fiscal costs of HIV/AIDS and the HIV/AIDS program over the period 2010–30, highlighting the persistence of the fiscal costs of HIV/AIDS and the HIV/AIDS program, and discussing them in the context of the state of public finance.

ii. Illustrating and discussing the role of external assistance against the backdrop of the growing financing needs of the national HIV/AIDS program.

iii. Because of the long-term nature of the fiscal costs of HIV/AIDS and the long lags between HIV infection and the resulting demand for services, an analysis of HIV/AIDS as a quasi-liability was developed, which can be analyzed in the same fashion as pension obligations or public debt.

This study estimates that the costs of HIV/AIDS increase from 2.6 percent of GDP to 3.4 percent of GDP between 2008 and 2015–17. After 2017, the total costs are expected to decrease gradually relative to GDP and reach around 2.9 percent of GDP by the end of the projection period. Uganda is a fast-growing country,[33] and the relatively stable costs of HIV/AIDS relative to GDP mask a steep increase in absolute terms, from $0.35 billion in 2008 to $1.4 billion by 2025. The most important factor behind the increase in the fiscal costs of HIV/AIDS is the cost of antiretroviral treatment and the cost of support for orphans and vulnerable children. Measured against the size of government, which has domestic revenues of about 12 percent of GDP and total expenditures of around 18 percent of GDP, the costs of HIV/AIDS are large, growing to the equivalent of over 20 percent of government revenues (excluding grants) and over 30 percent of current expenditure by 2015.

Due to the large burden of meeting the demand for public services caused by HIV/AIDS and Uganda's limited economic and fiscal resources, donors have played a critical role in financing around 90 percent of the costs of the national response to HIV/AIDS. As a result, while HIV/AIDS-related spending has increased from 0.8 percent of GDP in 2003/4 to 2.0 percent of GDP in 2008/9, the share contributed from the government's domestic resources has remained around 0.1 to 0.2 percent

of GDP. If external support continues at a rate of 85 percent of the total costs of the program (as envisaged by the Uganda AIDS Commission through 2011/12), the share of the costs financed from domestic resources would remain below 0.5 percent of GDP. This would require that donors greatly increase their funding in line with the rising costs of the HIV/AIDS program. To illustrate the vulnerability of public finances to a slowdown in donor support, a scenario was developed in which donor support grew in proportion with donor GDP only. In this case, the fiscal costs of HIV/AIDS financed from domestic resources would increase to about 2 percent of GDP by 2020, equivalent to 12.5 percent of the government's domestic revenues.

Current expenditures do not give an accurate picture of the evolving fiscal burden of HIV/AIDS—almost all of current spending is in response to the demand for services resulting from HIV infections that occurred years or even decades earlier, whereas the future demand for public services increasingly depends on the current rate of new HIV infections. Starting from this observation, HIV/AIDS is described as a quasi-liability (similar to a pension obligation). The value of this quasi-liability is large from a macroeconomic perspective, corresponding to 111 percent of GDP (counting only infections that have already occurred), or 212 percent of GDP (also making an allowance for the costs of current and projected future HIV infections), and this analysis estimates the costs incurred by a single infection at $5,900 (about 12 times GDP per capita) as of 2010.

Based on these estimates, the evolution of the fiscal quasi-liability implied by the HIV/AIDS program over time is analyzed, resulting in the finding that the value of the liability declines from 111 percent of GDP in 2010 to 75 percent of GDP by 2030. Of this decline, about two-thirds can be attributed to the fact that lower HIV incidence has resulted in a decline in the costs incurred by new infections, and one-third to the fact that projected GDP growth is relatively high, contributing to reducing the value of the liability expressed in percent of GDP.

This analysis suggests an opportunity to consider the following policy aspects to contain the fiscal costs of HIV/AIDS or better utilize the existing funding sources: improve allocative and operational efficiency within the national HIV response; explore innovative financing mechanisms; strengthen institutions and health systems to improve service delivery; develop policy reforms to generate private savings for health and social insurance; and conduct more cost-effectiveness, cost-benefit,

and microeconomic studies to improve program efficiency and effectiveness.

VI. Annex

The main paper describes the behavior of the model for given endowments that—along with assumptions regarding capital accumulation, changes in the labor supply, and other parameters that could be affected by a health event—can be used to analyze the behavior of the economy over time. This appendix describes the steady-state solution of the model, and parameterizes the model so that the steady-state solution resembles key features of the Uganda economy. Looking ahead, growth rates were not broadly in line with IMF and World Bank (2010).

Output per capita in the informal sector (based on equation [2]) is given by $y_i = A_i k_i^{\alpha_i} e_U$. (5A.1)

In steady state, $s_i y_i = (\delta + n) k_i$ and output per capita and the (unskilled) wage rate are equal to

$$y_i^* = (A_i)^{\frac{1}{\gamma_i}} \left(\frac{s_i}{\delta + n} \right)^{\frac{\alpha_i}{\gamma_i}} e_U \tag{5A.2}$$

$$\text{and} \quad w_{U,i}^* = \gamma_i (A_i)^{\frac{1}{\gamma_i}} \left(\frac{s_i}{\delta + n} \right)^{\frac{\alpha_i}{\gamma_i}} e_U \quad \text{respectively} \tag{5A.3}$$

To obtain the steady-state level of output for the formal sector, it is first necessary to take into account that the allocation of unskilled labor is endogenous.

$$y_f = A_f^{\frac{1}{\alpha_f + \beta_f}} D \left[\frac{\lambda \gamma_i (A_i)^{\frac{1}{\gamma_i}}}{\gamma_f} \left(\frac{s_i}{\delta + n} \right)^{\frac{\alpha_i}{\gamma_i}} \right]^{\frac{-\gamma_f}{\alpha_f + \beta_f}} k_f^{\frac{\alpha_f}{\alpha_f + \beta_f}} \tag{5A.4}$$

where Y_f is output per efficiency unit of skilled labor $Y_f / e_H L_H$, k_f is the level of capital per efficiency unit of skilled labor, $K_f / e_H L_H$. With $s_f y_f = (\delta + n) k_f$ in a steady state,

$$y_f^* = A_f^{\frac{1}{\beta_f}} D^{\frac{\alpha_f+\beta_f}{\beta_f}} \left[\frac{\lambda \gamma_i (A_i)^{\frac{1}{\gamma_i}}}{\gamma_f} \left(\frac{s_i}{\delta + n} \right)^{\frac{\alpha_i}{\gamma_i}} \right]^{\frac{-\gamma_f}{\beta_f}} \left[\frac{s_f}{\delta + n} \right]^{\frac{\alpha_f}{\beta_f}}. \quad \text{(5A.5)}$$

To obtain steady-state output (and the level of output in the informal sector), it is necessary to determine the allocation of unskilled labor between the informal and formal sector. Using equations (5A.3) and (5A.5) and the constant returns property of the production function, the share of unskilled workers working in the informal sector can be derived as

$$\frac{e_U L_{U,i}}{e_U L_U} = 1 - A_f^{\frac{1}{\beta_f}} D^{\frac{\alpha_f}{\beta_f}} \left[\frac{\lambda \gamma_i (A_i)^{\frac{1}{\gamma_i}}}{\gamma_f} \left(\frac{s_i}{\delta + n} \right)^{\frac{\alpha_i}{\gamma_i}} \right]^{-\frac{\beta_f+\gamma_f}{\beta_f}} \left[\frac{s_f}{\delta + n} \right]^{\frac{\alpha_f}{\beta_f}} \frac{e_H L_H}{e_U L_U}. \quad \text{(5A.6)}$$

The total level of output can then easily be obtained using equations (5A.2), (5A.5), and (5A.6).

Table 5.A1: Macroeconomic Model: Summary of Key Parameters

COMMON PARAMETERS			
δ	8 percent	Dependency ratio	100 percent
n	2 percent	λ	1.25
L_h / L	0.2		
Informal sector		Formal sector	
A_i	325.8[a]	A_f	201.6[a]
S_i	10 percent	S_f	25 percent
α_i	0.2	α_f	0.4
γ_i	0.8	β_f	0.5
e_u	1	γ_i	0.13
		e_h	1
		e_u	1

Source: Author's calculations and assumptions, as explained in text.
a. As of 2008.

Notes

1. HIV prevalence is 6.5 percent of the population aged 15-49, according to UNAIDS (2010a, 2010b).
2. For example, the size of the population has grown at an annual average of 3.3 percent between 2000 and 2010, and the population size has increased by about 60 percent between 1995 and 2010 (United Nations Population Division 2009).
3. See Parkhurst (2010) for a recent discussion of the socioeconomic profile of HIV/AIDS across 14 countries.
4. The averages for 2000–2005 already include a small reversal in mortality as treatment became more widely available toward the end of this period, covering 67,000 people in 2005. Note that the estimates for 2005–10 are partly based on the projections of the United Nations Population Division (2009) and reflect data and expectations as of 2008.
5. For a more extensive discussion of the state of orphans and vulnerable children in Uganda, see Kalibala and Elson (2010).
6. For example, Fortson (2010) finds that educational attainment was about 0.5 years lower in a region with an HIV prevalence rate of 10 percent (as opposed to zero), based on DHS data from 15 countries (not including Uganda).
7. Armstrong (1995) and Bollinger, Stover, and Kibirige (1999) also address the macroeconomic impact of HIV/AIDS in Botswana. However, these studies are outdated by now and do not provide an overall quantitative assessment of the macroeconomic consequences of HIV/AIDS.

8. Specifically, Jefferis and Matovu (2008) assume that total factor productivity will decline by 0.2 percentage points (to 0.8 percent annually), that the investment rate in the nonagricultural sector declines from 28 percent to 25.4 percent, and that the investment rate in the agricultural sector declines from 10 percent to 6.3 percent.
9. One approach that is frequently used to address (or circumvent) this problem is the adoption of estimates of the impact of HIV/AIDS on the general population as a proxy for the impact of HIV/AIDS on public servants. This, however, is misleading if HIV prevalence among public servants is different from the general population (see discussion by Jefferis and Matovu [2008] on this point), or if they have privileged access to antiretroviral treatment. The only study available for Uganda (Ministry of Public Service 2000) estimates half of the deaths of government employees from 1995 to 1999 could be attributed to HIV/AIDS.
10. For South Africa, Rosen and others (2007) assume that six patient visits are required during the first year of treatment. Harling, Bekker, and Wood (2007) report a total of 10,137 patient visits in a site with 11,569 patient months of treatment, which would imply about 10.5 visits per patient per year.
11. Rosen and others (2004) report that the death of an employee incurs a cost of between 7 and 25 days of supervisory time.
12. Rosen and others (2004) report a "reduction in productivity due to new employee's learning curve" of between 25 and 60 percent for skilled workers, and between 20 and 55 percent for unskilled workers. In many cases, a person filling a vacated position will come from a related position within the government (which may incur a lower learning cost), but would need to be replaced in his or her previous position. This study's assumption implies that the learning costs of a new appointment and the costs of shifts between positions, possibly including a new appointment further down the chain, are equivalent.
13. Haacker (2004) provides a more extensive discussion of the impacts of HIV/AIDS on training costs and the returns to training.
14. The outline draws on Bogomolova, Impavido, and Pallares-Miralles (2007), who provide an extensive review of Uganda's public pension system.
15. These data are based on population averages, calculated using estimates from Stover (2009) and United Nations Population Division (2009). One factor that cannot be accounted for (due to lack of data) is the possibility that access to antiretroviral treatment among government employees is higher than it is for the general population. Population average could understate the impact of HIV/AIDS on public servants because HIV prevalence could be higher among the labor force and higher-skilled people (Jefferis and Matovu 2008) or because public servants are disproportionately located in urban areas where prevalence is higher (compare to figure 5.2 and table 5.1).
16. Sarzin's (2006) estimates of the costs of mortality for employees of the Kampala City Council arrive at a similar order of magnitude. According to Sarzin, the cost of a new

HIV infection (evaluated at discount rate of 3 percent) corresponds to between 142 and 213 percent of an annual salary, depending on employment category.

17. Government wages and salaries account for a relatively small proportion of GDP. It is possible that this study underestimates the payroll-related costs of HIV/AIDS to the Uganda government, if other current expenditures or development expenditures include labor services, the costs of which could rise as a result of increased mortality and morbidity.
18. This study was largely completed before UNAIDS (2010a, 2010b) were published. The projections therefore build largely on Hladik and others (2008). However, estimates of HIV incidence and access to treatment through 2009 were updated in line with UNAIDS (2010b) and WHO (2010b).
19. These epidemiological states would include "HIV positive (no treatment need)," "needing and receiving first-line treatment," "needing and not receiving first-line treatment," "needing and receiving second-line treatment," "needing and not receiving second-line treatment," and "premature death."
20. In turn, the coverage rates of certain HIV/AIDS-related services appear in the epidemiological module.
21. The drop in mortality that can be attributed to antiretroviral treatment is higher than this comparison suggests, because HIV/AIDS-related mortality would have increased further in the absence of scaling-up of antiretroviral treatment.
22. Note that these prevalence rates refer to the population older than age 15, and come out somewhat lower than the more commonly quoted HIV prevalence rates for ages 15–49.
23. These estimates illustrate the role of increased access to treatment as a determinant of HIV prevalence. Without the scale-up of treatment, the number of surviving people living with HIV/AIDS would increase only slowly, and HIV prevalence would decline steeply over the projection period.
24. According to the government of Uganda (2010), 52 percent of HIV-positive pregnant women received antiretroviral medication to prevent mother-to-child transmission (year unclear, reference is to a report issued in 2009) and 9.9 percent of children born to HIV-positive mothers were HIV positive, comparing to a rate of about 30 percent without interventions.
25. Projections are based on an assumed unit cost of $750 for first-line therapy and pediatric treatment in 2008, assumed to decline to $550 in 2011 and stay constant thereafter. The costs of second-line therapy are assumed to decline from $1,800 in 2008 to $1,200 in 2018 and stay constant thereafter (see, for example, Stover [2009]). However, as the share of people receiving second-line therapy is expected to increase over the projection horizon, the average unit cost of treatment increases from about $600 in 2011 to $750 in 2025.
26. IMF and World Bank (2010) expect that GDP in Uganda will grow by an average of 7 percent annually between 2010 and 2030.

27. The long-term fiscal projections underlying figure 5.12 are in line with IMF and World Bank (2010).
28. This assumed rate is close to the growth rate projected by IMF (2010a) for the G-7 economies in the medium term (2.4 percent annually, on average, for 2012–15).
29. As the government of Uganda borrows predominantly on concessional terms, the present discounted value of public external debt (8.3 percent of GDP) is lower than the face value (13.8 percent of GDP).
30. The exceptions are certain prevention or support measures targeting the population overall, which normally account for a small proportion of the costs of HIV/AIDS.
31. Because the consequences of an HIV infection differ between men and women (risk of mother-to-child transmission), who have somewhat different mortality patterns, figure 5.17 shows the weighted average of the costs of an additional infection for men and women, respectively.
32. A third factor is the interest rate used to discount the future spending commitment. As the time a liability falls due comes closer, its present discounted value increases, at a rate determined by the discount rate.
33. IMF and World Bank (2010) expect that GDP in Uganda will grow by an average of 7 percent annually between 2010 and 2030.

References

Allen, Tim. 2005. "AIDS and Evidence: Interrogating Some Ugandan Myths." *Journal of Biosocial Science* 38 (1): 1–22.

Allen, Tim, and Suzette Heald. 2004. "HIV/AIDS Policy in Africa: What Has Worked in Uganda and What Has Failed in Botswana?" *Journal of International Development* 16: 1141–54.

Armstrong, J. 1995. "Uganda's AIDS Crisis: Its Implications for Development." World Bank Discussion Paper 298, Washington, DC.

Bogomolova, Tatyana, Gregorio Impavido, and Montserrat Pallares-Miralles. 2007. "An Assessment of Reform Options for the Public Service Pension Fund in Uganda." World Bank Policy Research Paper 4091, Washington, DC.

Bollinger, L., J. Stover, and V. Kibirige. 1999. "The Economic Impact of HIV/AIDS in Uganda." The Futures Group.

Bureau of Statistics, and Macro International. 2007. *Uganda Demographic and Health Survey 2006*. Kampala and Calverton, MD: Bureau of Statistics and Macro International.

Fortson, Jane G. 2010. "Mortality Risk and Human Capital Investment: The Impact of HIV/AIDS in Sub-Saharan Africa." *Review of Economics and Statistics* 93 (1): 1–15. (posted online July 9).

Government of Uganda. 2010. *UNGASS Country Progress Report Uganda, January 2008–December 2009*. Kampala: Government of Uganda.

Haacker, Markus. 2004. "The Impact of HIV/AIDS on Government Finance and Public Services." In *The Macroeconomics of HIV/AIDS*, ed. M. Haacker. Washington, DC: IMF.

Harling, G., L. G. Bekker, and R. Wood. 2007. "Cost of a Dedicated ART Clinic." *South African Medical Journal* 97(8): 593–96.

Hladik, Wolfgang, Joshua Musinguzi, Wilford Kirungi, Alex Opio, John Stover, Frank Kaharuza, Rebecca Bunnell, Jessica Kafuko, and Jonathan Mermin. 2008. "The Estimated Burden of HIV/AIDS in Uganda, 2005–2010." *AIDS* 22 (4): 503–10.

IMF (International Monetary Fund). 2010a. World Economic Outlook Database, October 2010 Edition. Washington, DC.

———. 2010b. *Uganda: Seventh Review under the Policy Support Instrument, Request for a New Policy Support Instrument and Cancellation of Current Policy Support Instrument—Staff Report*. IMF Country Report No. 10/132, Washington, DC.

IMF, and World Bank. 2010. *Joint IMF/World Bank Debt Sustainability Analysis Prepared by the Staffs of the International Monetary Fund and the International Development Association.* Washington, DC: IMF and World Bank.

Jefferis, Keith, Sebastian Baine, Jimrex Byamushiga, and Justine Nannyonjo. 2008. *Assessing the Macroeconomic Impact of HIV/AIDS in Uganda, Phase II—Report: Selected Studies*. Kampala: Ministry of Finance Planning and Economic Development.

Jefferis, Keith, and John Matovu. 2008. *Assessing the Macroeconomic Impact of HIV/AIDS in Uganda, Phase III—Analysis of Macroeconomic Impact*. Kampala: Ministry of Finance Planning and Economic Development.

Jefferis, Keith, Justine Nannyonjo, Jimrex Byamushiga, and Sebastian Baine. 2007. *Assessing the Macroeconomic Impact of HIV/AIDS in Uganda, Phase I—Literature Review: the Macroeconomic Impact of HIV/AIDS*. Kampala: Ministry of Finance Planning and Economic Development.

Kalibala, Samuel, and Lynne Elson. 2010. "Situation Analysis of Vulnerable Children in Uganda." Population Council, New York.

Lake, Sally, and Bernad Mwijuka. 2006. *Sector-Based Assessment of AIDS Spending in Uganda, Final Report*. European Commission, November.

MOH (Uganda Ministry of Health). 2009. *HIV/AIDS Epidemiological Surveillance Report 2005–07*. Kampala.

MOH, and ORC Macro. 2006. *Uganda HIV/AIDS Sero-Behavioural Survey 2004–2005*. Kampala, Uganda, and Calverton, Md., U.S.

Ministry of Public Service (Uganda). 2000. *Baseline Survey of the Trends and Impact of HIV/AIDS on the Public Service in Uganda*. Kampala.

———. 2007. *The Uganda Public Service HIV/AIDS Policy*. Kampala.

OECD (Organisation for Economic Co-operation and Development). 2010. Aid Activities (CRS) online database. Accessed August 15, 2010,http://stats.oecd.org

Parkhurst, Justin O. 2010. "Understanding the Correlations between Wealth, Poverty and Human Immunodeficiency Virus Infection in African Countries." *Bulletin of the World Health Organization* 88 (7): 519–26.

Rasmussen, Tobias N. 2004. "Macroeconomic Implications of Natural Disasters in the Caribbean." IMF Working Paper No. 04/224, Washington, DC.

Rosen, Sydney, Jeffrey R. Vincent, William MacLeod, and others. 2004. "The Cost of HIV/AIDS to Businesses in Southern Africa." *AIDS* 18 (2): 317–24.

Rosen, Sydney, Mpefe Ketlhapile, Ian Sanne, and Mary Bachman DeSilva. 2007. "Cost to Patients of Obtaining Treatment for HIV/AIDS in South Africa." *South African Medical Journal* 97 (7): 524–29.

Sarzin, Zara. 2006. "The Impact of Morbidity and Mortality on Municipal Human Resources and Service Delivery—An Analysis of 3 African Cities." Africa Region Working Paper No. 100, World Bank, Washington, DC.

Stover, John. 2009. "Spectrum—Estimating the Need for ART and the Resources Required," presented at Department of Health ART Costing Meeting, Pretoria, March 26–27.

UAC (Uganda AIDS Commission). 2007. *Moving Toward Universal Access: National HIV & AIDS Strategic Plan 2007/8–2011/12*. Kampala.

UNAIDS (Joint United Nations Programme on HIV/AIDS). 2010a. 2010 *Report on the Global AIDS Epidemi*c. Geneva: UNAIDS.

———. 2010b. UNAIDS Estimates 2010, AIDS Info Database. Accessed November 25. http://www.aidsinfoonline.org/

United Nations Population Division. 2009. *World Population Prospects: The 2008 Revision—Population Database*. New York: United Nations.

WHO (World Health Organization). 2009. "Mortality and Burden of Disease Estimates for WHO Member States in 2004." http://www.who.int.

———. 2010a. *Uganda: National Expenditure on Health 1995–2008*. Geneva: WHO. Accessed on November 25, 2010, http://www.who.int/nha/en/.

———. 2010b. ART and PMTCT Coverage Data. Accessed January 29, 2011, http://www.aidsinfoonline.org.

WHO, UNAIDS, and UNICEF (United Nations Fund for Children). 2008. "Epidemiological Fact Sheet on HIV and AIDS—Core Data on Epidemiology and Response: Uganda (2008 Update)." WHO, Geneva.

———. 2009. *Towards Universal Access—Scaling Up Priority HIV/AIDS Interventions in the Health Sector.* Geneva: WHO.

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HIV/AIDS continues to take a tremendous toll in Sub-Saharan Africa. In some countries with high HIV prevalence rates, life expectancy has declined by 10 to 20 years or more. Even where HIV prevalence is about 5 percent (close to the region's average), the epidemic has reversed gains in life expectancy and other health outcomes achieved over one or two decades.

This timely book highlights work conducted under the umbrella of a World Bank work program on "The Fiscal Dimension of HIV/AIDS," featuring country studies on Botswana, South Africa, Swaziland, and Uganda. The groundbreaking findings of this book translate the reality of the epidemiological context into the short- and long-term fiscal implications these countries currently face. The book states and builds on three observations. First, it notes the large fiscal costs of the epidemic in a number of countries. This observation establishes the impact of and the response to HIV/AIDS as relevant factors in medium- and long-term fiscal planning; it also shows that the domestic and external fiscal context is relevant for planning sustainable financing of HIV/AIDS programs.

Second, the book observes that HIV/AIDS has a long-term impact on public finance. It follows that current spending is an incomplete and potentially misleading indicator of the fiscal burden of HIV/AIDS.

Third, the book shows that most of the fiscal costs of HIV/AIDS are ultimately caused by new infections, and presents an analysis that further estimates the fiscal resources committed (or saved) by an additional (or a prevented) HIV infection. *The Fiscal Dimension of HIV/AIDS in Botswana, South Africa, Swaziland, and Uganda* will benefit stakeholders involved in planning, developing, and implementing national responses to HIV/AIDS, as well as those planning, analyzing, or observing the international response.

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