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
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, 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

<table>
<thead>
<tr>
<th>SOCIOECONOMIC FACTOR</th>
<th>WOMEN AGED 15–49</th>
<th>MEN AGED 15–49</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HIV POSITIVE (%)</td>
<td>NUMBER TESTED</td>
<td>HIV POSITIVE (%)</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>12.8</td>
<td>1,435</td>
<td>6.7</td>
</tr>
<tr>
<td>Rural</td>
<td>6.5</td>
<td>7,956</td>
<td>4.7</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No education</td>
<td>5.8</td>
<td>2,129</td>
<td>7.5</td>
</tr>
<tr>
<td>Primary incomplete</td>
<td>7.7</td>
<td>4,355</td>
<td>4.5</td>
</tr>
<tr>
<td>Primary complete</td>
<td>9.8</td>
<td>1,064</td>
<td>6.5</td>
</tr>
<tr>
<td>Secondary+</td>
<td>7.6</td>
<td>1,826</td>
<td>4.4</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently working</td>
<td>8.4</td>
<td>5,758</td>
<td>6.1</td>
</tr>
<tr>
<td>Not working</td>
<td>6.1</td>
<td>3,560</td>
<td>2.5</td>
</tr>
<tr>
<td>Wealth quintile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest</td>
<td>4.8</td>
<td>1,532</td>
<td>4.0</td>
</tr>
<tr>
<td>Second</td>
<td>6.6</td>
<td>1,911</td>
<td>4.2</td>
</tr>
<tr>
<td>Middle</td>
<td>6.7</td>
<td>1,760</td>
<td>5.1</td>
</tr>
<tr>
<td>Fourth</td>
<td>7.0</td>
<td>1,895</td>
<td>5.9</td>
</tr>
<tr>
<td>Highest</td>
<td>11.0</td>
<td>2,294</td>
<td>5.5</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently in union</td>
<td>5.9</td>
<td>5,977</td>
<td>6.8</td>
</tr>
<tr>
<td>Widowed</td>
<td>31.2</td>
<td>557</td>
<td>32.2</td>
</tr>
<tr>
<td>Divorced/separated</td>
<td>16.0</td>
<td>742</td>
<td>10.8</td>
</tr>
<tr>
<td>Never in union</td>
<td>2.7</td>
<td>2,075</td>
<td>0.8</td>
</tr>
<tr>
<td>Total for 15–49 age group</td>
<td>7.5</td>
<td>9,391</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Figure 5.2: HIV Prevalence across Population Groups and Over Time

a. HIV prevalence at antenatal clinic sites, 1989–2007

b. HIV prevalence among first-time testers aged 15–24, AIDS Information Centre Kampala

c. HIV prevalence by sex and age, percent of population (2004/05)


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. 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. 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

![Graph showing mortality by sex and age](image)

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.
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.
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

Table 5.2: Summary of Government Operations

<table>
<thead>
<tr>
<th></th>
<th>2006/7</th>
<th>2007/8</th>
<th>2008/9</th>
<th>2009/10*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Per cent of GDP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenues and grants</td>
<td>17.1</td>
<td>15.5</td>
<td>15.9</td>
<td>14.9</td>
</tr>
<tr>
<td>Domestic revenues</td>
<td>12.6</td>
<td>12.8</td>
<td>12.5</td>
<td>12.5</td>
</tr>
<tr>
<td>Grants</td>
<td>4.5</td>
<td>2.7</td>
<td>3.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Total expenditure and net lending</td>
<td>18.2</td>
<td>17.9</td>
<td>17.8</td>
<td>17.2</td>
</tr>
<tr>
<td>Current expenditure</td>
<td>11.5</td>
<td>11.8</td>
<td>10.7</td>
<td>10.8</td>
</tr>
<tr>
<td>Development expenditure</td>
<td>5.7</td>
<td>5.6</td>
<td>6.4</td>
<td>5.6</td>
</tr>
<tr>
<td>Other</td>
<td>0.9</td>
<td>0.5</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Overall balance</td>
<td>–1.1</td>
<td>–2.4</td>
<td>–1.9</td>
<td>–2.3</td>
</tr>
<tr>
<td>Financing</td>
<td>0.8</td>
<td>2.2</td>
<td>1.8</td>
<td>2.3</td>
</tr>
<tr>
<td>External</td>
<td>1.8</td>
<td>2.5</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Domestic</td>
<td>–1.0</td>
<td>–0.3</td>
<td>–0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Errors and omissions</td>
<td>0.3</td>
<td>0.2</td>
<td>–0.1</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Memorandum items (US$)**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP (fiscal year), billions</td>
<td>10.9</td>
<td>13.2</td>
<td>15.1</td>
<td>16.5</td>
</tr>
<tr>
<td>GDP per capita (fiscal year)</td>
<td>362.0</td>
<td>423.0</td>
<td>469.0</td>
<td>493.0</td>
</tr>
<tr>
<td>Government expenditures per capita</td>
<td>65.9</td>
<td>75.6</td>
<td>83.5</td>
<td>84.8</td>
</tr>
</tbody>
</table>

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 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**

![Graph showing aid commitments over time](image)

*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
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)
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 5.3: Actual HIV/AIDS-Related Spending, 2005/6–2008/9

<table>
<thead>
<tr>
<th></th>
<th>2005/6</th>
<th>2006/7</th>
<th>2007/8</th>
<th>2008/9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>US$ millions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>134.4</td>
<td>169.8</td>
<td>289.8</td>
<td>297.8</td>
</tr>
<tr>
<td>Prevention</td>
<td>41.9</td>
<td>54.6</td>
<td>75.5</td>
<td>65.3</td>
</tr>
<tr>
<td>Care and treatment</td>
<td>71.2</td>
<td>85.0</td>
<td>123.7</td>
<td>147.5</td>
</tr>
<tr>
<td>Mitigation</td>
<td>10.2</td>
<td>16.2</td>
<td>31.9</td>
<td>20.2</td>
</tr>
<tr>
<td>Program support</td>
<td>11.1</td>
<td>14.0</td>
<td>58.7</td>
<td>64.8</td>
</tr>
<tr>
<td><strong>Percent of GDP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1.4</td>
<td>1.6</td>
<td>2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Prevention</td>
<td>0.4</td>
<td>0.5</td>
<td>0.6</td>
<td>0.4</td>
</tr>
<tr>
<td>Care and treatment</td>
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<td>0.8</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Mitigation</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>Program support</td>
<td>0.1</td>
<td>0.1</td>
<td>0.5</td>
<td>0.4</td>
</tr>
</tbody>
</table>

*Sources: Authors’ calculations, based on UAC (2007), Uganda (2010), and IMF (2010a).*
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.

- Some of the employment-related costs of HIV/AIDS take the form of additional expenditures and some result in productivity losses (for example,

Table 5.4: HIV/AIDS Funding and Spending, 2003/4–2008/9

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total funding</td>
<td>38.4</td>
<td>103.3</td>
<td>150.5</td>
<td>164.4</td>
<td>273.8</td>
<td>302.7</td>
</tr>
<tr>
<td>Govt. of Uganda</td>
<td>6.0</td>
<td>7.0</td>
<td>8.2</td>
<td>8.1</td>
<td>6.5</td>
<td>34.7</td>
</tr>
<tr>
<td>External</td>
<td>32.4</td>
<td>96.3</td>
<td>142.4</td>
<td>156.3</td>
<td>267.3</td>
<td>268.0</td>
</tr>
<tr>
<td>U.S. government</td>
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<td>44.8</td>
<td>113.7</td>
<td>139.9</td>
<td>248.0</td>
<td>227.5</td>
</tr>
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<td>GFATM</td>
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<td>Other</td>
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<td>31.4</td>
<td>28.6</td>
<td>16.5</td>
<td>19.3</td>
<td>38.4</td>
</tr>
<tr>
<td>Total spending</td>
<td>38.4</td>
<td>103.3</td>
<td>150.5</td>
<td>164.4</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Govt. of Uganda</td>
<td>9.1</td>
<td>25.6</td>
<td>38.8</td>
<td>20.7</td>
<td>—</td>
<td>—</td>
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<td>Other (NGOs)</td>
<td>29.2</td>
<td>77.7</td>
<td>111.7</td>
<td>143.7</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Percent of 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

|                      | 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.
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 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
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. 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. 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.

**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>
<thead>
<tr>
<th>Table 5.5: Cost of the HIV/AIDS Impacts on Public Servants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GOVERNMENT COSTS</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Sick leave and productivity loss</td>
</tr>
<tr>
<td>Funeral attendance</td>
</tr>
<tr>
<td>Increased turnover</td>
</tr>
<tr>
<td>Training</td>
</tr>
<tr>
<td>Total (excl. medical costs)</td>
</tr>
<tr>
<td>Medical benefits (imputed)</td>
</tr>
<tr>
<td>Total (incl. medical costs)</td>
</tr>
</tbody>
</table>

*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. 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. 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. 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).
increases moderately from 5.3 percent in 2009 to 5.9 percent in 2025. 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.

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...
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 5.9: People Living with HIV/AIDS, 1980–2025

Source: Authors’ calculations, based on Hladik and others (2008), UNAIDS (2010b), and WHO (2010b).
The Fiscal Dimension of HIV/AIDS in Botswana, South Africa, Swaziland, and Uganda

**Figure 5.10: Impact of HIV/AIDS on Youth, 1980–2025**

![Graph showing the impact of HIV/AIDS on youth from 1980 to 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
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.

Source: Authors’ calculations.
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. 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**

(a) Assuming external financing accounts for 85 percent of costs

(b) Assuming external financing grows by 2 percent annually

*Source: Authors' calculations.*
The Fiscal Dimension of HIV/AIDS in Botswana, South Africa, Swaziland, and Uganda

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). 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. 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). 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

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**Figure 5.15: Costs of Additional Infection**

![Graph showing the costs of additional infection over time.](image)

- Present discounted value: about US$5,900
- Cost of infection occurring in 2010

*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
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. 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, 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

$$y_i = A_i k_i^\alpha_i e_i.$$

(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

$$y_i^* = (A_i)^{\frac{1}{\gamma_i}} \left( \frac{s_i}{\delta + n} \right)^{\frac{\alpha_i}{\gamma_i}} e_i$$

(5A.2)

and

$$w_{U,i}^* = \gamma_i (A_i)^{\frac{1}{\gamma_i}} \left( \frac{s_i}{\delta + n} \right)^{\frac{\alpha_i}{\gamma_i}} e_i$$

respectively

(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.

$$y_f = A_j^{\alpha_f + \beta_f} D \left[ \frac{\lambda_f (A_i)^{\gamma_i}}{\gamma_f} \left( \frac{s_i}{\delta + n} \right)^{\frac{\alpha_i}{\gamma_i}} \left( k_f^{\frac{\alpha_f}{\gamma_f + \beta_f}} k_f^{\frac{\alpha_f}{\gamma_f + \beta_f}} \right)^{-\gamma_f} \right]$$

(5A.4)

where $Y_f$ is output per efficiency unit of skilled labor $Y_f / e_i L_{iH}$, $k_f$ is the level of capital per efficiency unit of skilled labor, $K_j / e_i L_{iH}$. With $s_j y_j = (\delta + n) k_f$ in a steady state,
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

\[
\hat{\gamma}_f = \frac{1}{A_f^\beta_f} \frac{\alpha_f + \beta_f}{\beta_f} \left( \frac{\lambda \gamma_f (A_f)^{\gamma_f}}{\gamma_f} \left( \frac{s_f}{s_f + \gamma_f} \right)^{\alpha_f} \right) \left( \frac{s_f}{s_f + \gamma_f} \right)^{\gamma_f} \left( \frac{s_f}{\delta + n} \right)^{\gamma_f}. \tag{5A.5}
\]

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

<table>
<thead>
<tr>
<th>COMMON PARAMETERS</th>
<th>Informal sector</th>
<th>Formal sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>δ</td>
<td>8 percent</td>
<td>100 percent</td>
</tr>
<tr>
<td>n</td>
<td>2 percent</td>
<td>1.25</td>
</tr>
<tr>
<td>l_i / L</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Ai</td>
<td>325.8^a</td>
<td>201.6^a</td>
</tr>
<tr>
<td>Si</td>
<td>10 percent</td>
<td>25 percent</td>
</tr>
<tr>
<td>α_i</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>γ_i</td>
<td>0.8</td>
<td>0.5</td>
</tr>
<tr>
<td>e_u</td>
<td>1</td>
<td>0.13</td>
</tr>
<tr>
<td>e_n</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>e_o</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

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).


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.


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.


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


