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## The Economics of HIV/AIDS in the Southern Africa Region

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### 2.1 Introduction

Since the 1990s and into the beginning of the new millennium, dealing with HIV/AIDS and its effects has become a major public policy issue in most African countries, especially in Southern Africa. While the epidemic was previously interpreted as fundamentally a health issue, the impact of HIV/AIDS goes far beyond health because of its widespread human, social and economic effects. The hardest hit geographical region is Africa. According to statistics, of the 33.4 million people who were living with HIV/AIDS at the end of 2008, 24 million or 66 per cent were residents of Africa (UNAIDS, 2009). UNAIDS (2008) notes that sub-Saharan Africa disproportionately leads the share of global HIV: 35 per cent of HIV infections and 38 per cent of AIDS deaths in 2007 occurred in the sub-region. Altogether, 67 per cent of all the people living with HIV/AIDS live in sub-Saharan Africa. The trend in HIV infection shows that median HIV/AIDS prevalence increased from 20.3 per cent in 1997–1998 to 25.7 per cent in 2001–2002. During the same period, prevalence rates declined slightly for East Africa, from 13.7 to 11.4 per cent, and remained stable in West Africa at 4.35 per cent (Shisana and Letlapa, 2004).

Several countries in the region have HIV prevalence rates of more than 20 per cent of the adult population, with the highest reported adult HIV prevalence rates of more than 30 per cent (see Table 2.1). UNAIDS (2009) states that ‘Sub-Saharan Africa remains the region most heavily affected by HIV. In 2008, sub-Saharan Africa accounted for 67 per cent of HIV infections worldwide, 68 per cent of new HIV infections among adults and 91 per cent of new HIV infections among children. The region also accounted for 72 per cent of the world’s AIDS-related deaths in 2008’. As a result, it is estimated that nearly two-thirds of all HIV-positive people in the world live in sub-Saharan Africa. The number stands at a staggering 22.5 million. In South Africa where there is the highest number of HIV-positive people of any country in the world, there were 5.6 million PLWHA in 2009. This compares with India where, in the same year, there were 2.4 million PLWHA.

It is noteworthy that within Southern Africa, HIV/AIDS prevalence ratios differ substantially. As Table 2.1 shows, Swaziland, Botswana, Lesotho and Zimbabwe have rates higher than 20 per cent, with Swaziland having the highest percentage at 32.4 per cent followed by Botswana at 24 per cent. It is worth noting that these statistics are based on sentinel surveys of pregnant women attending antenatal clinics for care (ANC), which may bias the results upwards given that this is already a risk group. In Botswana for instance, the Botswana AIDS Impact Survey of 2006 estimates the prevalence rate to be 17.1 per cent of the total population, which is significantly lower than the 24 per cent recorded from ANC for the same period. Preliminary results from the 2008 Botswana AIDS Impact Survey estimate the national prevalence rate at 17.6 per cent (CSO/NACA, 2009).

**Table 2.1** Country-specific HIV/AIDS estimates, Southern Africa, 2008

Country	Estimated number of people living with HIV				AIDS deaths	Orphans due to AIDS
	HIV+ adults and children, 2008	HIV+ adults (15+), 2008	Adult (15–49) HIV rate (%), 2008	Adult (15–49) HIV rate (%), 2003	Deaths in adults and children, 2008	Orphans (0–17) currently living, 2008
<b>Sub-Saharan Africa</b>	<b>24,500,000</b>	<b>22 400,000</b>	<b>6.1</b>	<b>6.2</b>	<b>2,000,000</b>	<b>12,000,000</b>
Angola	190,000	180,000	2.1	3.7	11,000	50,000
Botswana	300,000	280,000	23.9	24.0	11,000	95,000
Congo DR	(1,000,000)	(890,000)	(3.2)	3.2	(90,000)	(680,000)
Lesotho	270,000	260,000	23.2	23.7	18,000	110,000
Madagascar	14,000	13,000	0.1	0.5	770	34,000
Malawi	930,000	840,000	11.9	14.2	68,000	560,000
Mauritius	13,000	13,000	1.7	0.2	<500	<500...
Mozambique	1,500,000	1,400,000	12.5	16.0	81,000	400,000
Namibia	200,000	210,000	15.3	19.5	5,100	665,000
South Africa	5,700,000	5,400,000	18.1	18.6	350,000	1,400,000
Swaziland	190,000	210,000	26.1	32.4	10,000	56000
Tanzania	(1,400,000)	(1,300,000)	(6.5)	6.6	(140,000)	(1,100,000)
Zambia	1,100,000	980,000	15.2	16.9	56,000	600,000
Zimbabwe	1,300,000	1,200,000	15.3	22.1	140,000	1,000,000
<b>Global</b>	<b>38,600,000</b>	<b>36,300,000</b>	<b>1.0</b>	<b>1.0</b>	<b>2,800,000</b>	<b>15,200,000</b>

Source: UNAIDS (2009)

Until very recently, HIV prevalence seemed to have been following a steady upward trend, although there is now some evidence of stabilisation – and even reversal – of prevalence rates. In Botswana, for instance, the Ministry of Health (MoH, 2006) recorded that the percentage of 20–24-year-old attendees to ANC who were HIV infected declined from 38.7 per cent in 2001 to 27.9 per cent in 2007. A decline of about 10.5 per cent between 2001 and 2006 has been observed among pregnant women (MoH, 2006). In particular, the prevalence among the age group 15 to 19 years has declined from 24.7 per cent in 2001 to 17.5 in 2006 (MoH, 2006).

This chapter analyses the economic issues associated with HIV/AIDS in small states of Southern Africa that have high HIV/AIDS prevalence rates. In particular, we examine the economic impact of the epidemic, consider the different responses to it and finally make recommendations for the future. The countries covered are Botswana, Lesotho, Namibia and Swaziland. These countries all have HIV/AIDS prevalence rates of more than 15 per cent. We analyse the economic determinants of transmission and the effects of the pandemic on key macroeconomic indicators. We then take Botswana as a case study to carry out an analysis using a growth model to measure the impact of HIV/AIDS on the economy in terms of its macroeconomic aggregates, including economic growth and poverty. The response section deals with best practices from the region in terms of policies and programmes for coping with the pandemic. In looking to the future, we consider the issue of financing of the HIV/AIDS pandemic and the effectiveness of donor institutions in addressing HIV/

AIDS in the region. We then conclude the chapter with a few specific recommendations for action by the small states of sub-Saharan Africa and by donors.

## **2.2 The HIV/AIDS status of small Commonwealth states in sub-Saharan Africa**

The Southern African region is currently the region most affected by HIV/AIDS, accounting for almost 32 per cent of all new infections and AIDS-related deaths globally. Eight countries of the region have prevalence rates exceeding 15 per cent: Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. Of these countries, four are small Commonwealth states – Botswana, Lesotho, Namibia and Swaziland – and are the countries that this chapter will specifically analyse in terms of the impact of the epidemic and the coping mechanisms they have developed. For most of these small states, however, the epidemic seems to have reached a plateau as prevalence rates are either stabilising or declining (UNAIDS, 2009). This partly reflects the effect of policies and programmes that these countries have put in place and the natural tendencies for epidemics to peak as they mature over time.

For Botswana, the infection rates among pregnant women declined from 36 per cent in 2001 to 32 per cent in 2006. There is also evidence that prevalence rates among young pregnant women are decreasing, suggesting a possible decrease in new infections. There is evidence that condom use among teenagers has increased (UNAIDS, 2007). From the 2006 population-based survey, Botswana AIDS Impact Survey (BIAS II), the national average prevalence was estimated at 17.1 per cent, while for those aged 15–49 years, it was estimated that 24 per cent was HIV-positive (CSO/NACA, 2005). A third population-based survey was completed and preliminary results have just been released indicating some slight increase in prevalence to 17.6 per cent (CSO/NACA, 2009).

Lesotho's HIV prevalence rates remain high, with 23.2 per cent of adults aged 15–49 years being HIV-positive in 2007. Women account for a majority – about 57 per cent – of people living with HIV/AIDS. Just like Botswana, Lesotho has been experiencing declines in infection levels among young pregnant women, falling from 25 per cent in 2003 to 21 per cent in 2005. According to UNAIDS (2007), prevention efforts have not been very effective given the poor knowledge of HIV and general reluctance to use condoms among sexually active youths.

Namibia is reported to have stabilised at 20 per cent HIV prevalence rate in 2006 (UNAIDS, 2007).

Swaziland has the highest HIV prevalence rate in the world. Current data from a population-based survey estimate the prevalence rate at 26 per cent of the population aged 15–49 years. The prevalence rates are higher for women, at 31 per cent, than for men, at 20 per cent. Even though HIV/AIDS knowledge is good in Swaziland, this does not correlate with use of condoms. More than 50 per cent of adult men and women who reported having more than two sexual partners in the previous year used a condom the last time they had sex (UNAIDS, 2007).

## **2.3 Economic determinants of HIV/AIDS transmission**

Sub-Saharan Africa in general has high HIV prevalence rates. One of the major differences identified in the spread in these countries is probably due to different types of HIV. HIV-1 is the dominant type of infection found in the sub-Saharan region, accounting for more than 98 per cent of all infections. HIV-2 is more common in West Africa. It is argued that HIV-1 is more easily transmissible sexually and from mother to child than HIV-2. HIV-2 is also more stable, and victims do not

progress as quickly from HIV to AIDS as with HIV-1. This could be one possible way to explain the high prevalence rates in sub-Saharan Africa, given the dominance of the HIV-1 type (Shisana and Letlapa, 2004).

Apart from behavioural determinants of HIV/AIDS that include multiple partners, dry sex<sup>1</sup> etc., there are other circumstances in sub-Saharan Africa that could help explain the high infection rates. Some of these issues are the migratory labour system, socio-cultural environment, poor housing and poverty. The migratory labour system requires men to be separated from their wives and families for long periods of time. For example, it used to be common for men to migrate to South African mines for 12-month contract periods, with their families not allowed to accompany them. Migration to South African mines was a typical practice for men from a number of Southern African countries that included Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe. Because these men came without their spouses, they became the major clients of female prostitutes, which increased the risk of both the miners and the prostitutes of contracting the virus and the risk to partners left at home when the men returned. The women who were left at home might also seek male partners elsewhere. This migratory system, although reduced in magnitude, continued during the HIV/AIDS era, which increased the risk of infection.

Upon attaining independence, these countries continued the practice of migrant labour in a different way, whereby men left rural areas to look for jobs in the towns. Because there was seldom proper housing, men had to leave their wives and families behind when seeking better opportunities. Women also started to migrate to urban areas as they started joining the labour force, sometimes facing high unemployment in the towns and cities. Migrant men provide the major market for sex from women with no work or inadequate income, who may become sex workers to generate or supplement their income. Such behaviour has also increased the risk of HIV/AIDS in the region.

Another major driving force to increased transmission of HIV/AIDS in sub-Saharan Africa is development itself, especially infrastructural development that allowed for the smooth movement of people between regions and between urban and rural sectors. In the transport industry, for instance, it is quite common for men to travel for weeks collecting and delivering goods between places away from their homes. On the way, these men rest at truck stops where women who are either unemployed or have little money turn to prostitution, often having unprotected sex. The men often become infected and pass the virus to their wives and other partners. The sex workers also face the risk of HIV infection from the truck drivers. Another example is that of major projects, for instance the building of a road or major dam. Such projects are usually carried out by contractors who have left their families elsewhere. This normally increases the temptation of having other sexual partners, thus increasing the risk of contracting HIV and transmitting the virus to wives and husbands at home.

Studies carried out in the past (for example, Greener et al., 2000) indicate a causality between HIV/AIDS and poverty. Poor people may be at greater risk of HIV infections since they are possibly more likely to engage in risky sexual behaviour. Because of low income or a low level of education, there is the tendency for poor people to engage in commercial sex to supplement their meagre income. Moreover, because of their low level of education they are more likely to have unprotected sex and correspondingly less likely to insist on condom use by partners. Evidence from Bloom and Sevilla (2001) suggests that the non-poor tend to be more vulnerable during the early part of the epidemic, as they are more mobile and have more income to engage in risky behaviour. However, as the epidemic develops, the non-poor learn to reduce their risk-taking behaviour while the poor remain vulnerable. As HIV/AIDS develops, it therefore becomes increasingly concentrated

among the poor. Nonetheless, the relationships between poverty and HIV/AIDS and education and HIV/AIDS are not simple, since HIV/AIDS is also influenced by behavioural issues. Countries like Botswana, for instance, that have high literacy rates and high income per capita, albeit with high income inequality, have tended to still have high prevalence rates.

Studies carried out in many countries suggest that globally there is a negative relationship between gross domestic product (GDP) and HIV prevalence. This means that countries that are wealthier as measured by the GDP are likely to have low HIV prevalence rates. However, that relationship does not hold for Africa, as shown in Bloom and Sevilla (2001); for Africa, the relationship is positive suggesting that it is the wealthier countries that tend to have higher HIV prevalence rates. As Bloom and Sevilla (2001) argue, this is a result of two outliers in Botswana and South Africa that have high GDP per capita and, at the same time, high HIV prevalence rates. This, as argued in Bloom and Sevilla (2001), may reflect the role of good infrastructure, which allows for population mobility. The Botswana case may in addition be a reflection of cultural and settlement patterns that allow for high mobility. Botswana normally have four settlements: one in the main village, another at the cattle post, one on the land and one other settlement at the place of work, usually in an urban area. It is not unusual for men to have multiple partners in each of these settlements, normally called 'small houses'.<sup>2</sup> Given the frequent movement between these settlements, facilitated by good infrastructure, the spread of HIV becomes faster.

There are also cultural issues relating to the inferior status of women in general, which has contributed to the higher prevalence rates among women and girls. Statistics show that in the sub-Saharan region, HIV prevalence is higher for women than for men, with 13 infected women for every 10 infected men (Shisana and Letlapa, 2004). Apart from the biological aspect of the disease, some African norms give women less negotiating power when it comes to sex. These norms include the payment of 'bride price' and polygamy. There are also barriers to accessing preventive methods. Such measures, for example condoms, are more accessible to men than to women, which allows men more control in sexual decision-making. At the same time, because of poverty and unemployment, women may also agree to have sex for financial support, which increases their risk of contracting HIV.

## **2.4 The economic impact of HIV/AIDS**

Since the epidemic reached crisis level a number of studies have been carried out to model and predict the impact of the disease on the economy. Some studies have employed micro-level analysis, while some have modelled the macroeconomic implications of the disease. It is obvious that the direct impact of HIV/AIDS is demographic in nature, as the disease – unlike other epidemics – tends to affect people in their most productive years. As a result of the disease, we have witnessed reversals in development gains on the health front, and these reversals are now difficult to arrest. Life expectancy has dropped to levels below what it was in 1960, and infant mortality and tuberculosis (TB) are on the increase. For example, in many of the countries in the region, life expectancy estimates have fallen to under 40 years (this from the over 60-year level recorded in the early 1980s). Botswana, for instance, currently has a UN estimated life expectancy of 41 years as compared with 65 years recorded in the 1980s.

The two major macroeconomic effects of HIV/AIDS are a reduction in the labour supply, especially the skilled labour supply, and increased costs. In terms of labour supply, HIV/AIDS leads to a loss of young adults in their most productive years (15–49 years), which affects overall economic growth. Economic growth itself is affected through various channels that include low productivity,

loss of skilled labour and replacement by less skilled labour, low savings rates which lead to low investment etc. As far as the increased costs are concerned, these include the direct costs of AIDS such as the costs for medical care, drugs and funeral expenses. There are also indirect costs relating to lost time due to illness, as well as the cost of recruitment and training to replace workers. Finally, there is also the productive time lost in taking care of many new orphans.

Generally, the impact of HIV/AIDS is felt at both the micro and macro levels. At the micro-economic level, the impact is at the level of the individual, the household and the enterprise or firm. At the individual level, the impact of being HIV-positive may be felt when banks or insurance companies decline loans or when an insurance company charges higher premiums for life coverage. At the macroeconomic level, the impact is in terms of the lower growth from reduced savings and lower productivity. This is compounded by increased spending on HIV/AIDS and therefore less money available for other economic activities, including the development of physical and human capital.

It is also true that individuals with fewer financial resources may only discover their status when they start to develop symptoms of the disease. Since most of them do not have insurance to secure their healthcare, they might have to deplete their resources to access medical attention, including that of traditional doctors. Ultimately, individuals become poorer as they deplete their resources and may end up destitute at the time of their death. Moreover, because of the stigma associated with HIV/AIDS, the individual may also be isolated and excluded from economic activity. It is possible that in the small states of Southern Africa many people fall into such circumstances. This is the source of the economic decline of families, communities, districts and countries.

At the household level, HIV/AIDS affects spouses, children and other relatives. The family has to face up to the direct costs of healthcare and funeral expenditure when the AIDS patient dies.<sup>3</sup> In respect of health, families have to pay for consultations, drugs and hospitalisation. In many cases, the PLWHA is likely to be the breadwinner of the family. Ultimately, due to the loss of income from the breadwinner and the loss of output/income from the caregivers, who are usually women, the income of the household declines and the household may become poor. Expenditures may also be diverted to cover medical costs, thereby reducing spending on food, housing and other necessities. Children may be forced to drop out of school to take care of sick parents or provide for the household, and when parents die, orphaned children either have to head the families (children-headed households) or are absorbed into extended households. These children may then be subjected to abuse by their new families. In Botswana, for instance, where there is government assistance provided to orphan children in the form of food and money, it is not unusual for people to take in orphans mainly because of the economic benefit that comes with them. Sometimes the main beneficiaries are deprived of care, with the resources diverted to the children of the householder. There have even been instances of people fighting over orphaned children, because of the benefits that come through the government's orphan care programme.

HIV/AIDS could have negative effects on business enterprise in the form of reduced productivity levels. The loss of skilled workers and their replacement with workers of less experience is likely to lead to a decline in the productivity of the enterprise. Lower productivity may also arise from the increase in sick leave and absenteeism on the part of HIV-positive workers who develop opportunistic diseases like pneumonia because of their impaired immunity. As family members become sick and later die, the active members spend a considerable amount of time caring for their loved ones at home and ultimately attending funerals. As less time is spent in production, firms have to rely on less skilled and experienced workers, and may overwork the remaining workers. This could lower their morale and reduce overall productivity again. When workers die and have to

be replaced, the business also has to face additional transactional costs related to the recruitment and training of new workers. The resultant high costs and low productivity are likely to reduce the competitiveness of firms nationally and regionally. In addition, firms and workers are likely to face greater costs as they are called upon to increase their contributions to pension funds and to life and medical insurance because of HIV/AIDS. As a result of the diversion of resources to deal with the HIV/AIDS epidemic, firms will have less money available to cater for the non-health benefits of workers.

Health systems, both public and private, have become overwhelmed by the needs of HIV/AIDS patients, and there has been a consequent squeeze on resources for treating other illnesses. Socially, the impact is devastating, given the human cost of illness and deaths, while the rise in the number of orphans and the breakdown of family structures pose challenges for both the state and social support systems. There will almost certainly be an increase in poverty as households with HIV/AIDS-infected persons face a reduction in income (as breadwinners become sick and die) and an increase in expenditure on medical and related costs. Some resort to traditional medicine, which may also be very costly, especially as the activities of most traditional medicine practitioners are not regulated.

A considerable macroeconomic impact is also to be expected, with HIV/AIDS affecting the size of the labour force, the availability of skills and productivity. Outside of its effects on the labour force and loss of human capital, HIV/AIDS causes resources to be diverted that would otherwise be used to finance investment. Hence, the impact of HIV/AIDS on macroeconomic variables such as economic growth, per capita incomes, savings, investment and employment is likely to be significant. When households are faced with unexpected expenditure on HIV/AIDS-related treatment and care along with corresponding reduced income, members may cash in their savings and sell their assets. Investment will also fall due to lower savings and therefore lead to lower economic growth. Economic growth is likely to be reduced significantly, especially in countries with high infection rates, such as the small Commonwealth states of Southern Africa. For governments, HIV/AIDS has an adverse fiscal impact as expenditures rise with higher spending on healthcare and social support and revenues are affected by slower economic growth. As a result of lower public sector investment and growth, tax receipts are also reduced and result in lower government revenue to meet development challenges.

A number of studies have been carried out to investigate the macroeconomic and microeconomic impact of HIV/AIDS in Africa. As summarised in Table 2.2, most of these studies show an insignificant impact of HIV/AIDS on GDP growth. The studies tend to show inconsistent impact, but most of them show zero or minimal macroeconomic impact. The differences seen may be due to variations in periods, methodologies and data sets. Table 2.2 shows the aggregate growth model approach, computable general equilibrium (CGE) approach and the macro-econometric approach to be the most common methodologies.

- The aggregate growth model looks at growth as a function of inputs, which include labour and capital. This approach then models the impact of HIV/AIDS on output, assuming a scenario with and one without HIV/AIDS.
- The CGE approach generally simulates the impact of HIV/AIDS on the economy, comparing the results 'with HIV/AIDS' and 'without HIV/AIDS'. The results are based on a consistent and balanced set of economy-wide accounts called the social accounting matrix (SAM), which links inputs to outputs by sector.
- The macro-econometric model links output to inputs over time, measuring the significance of relationships between inputs and outputs.



Most of the studies shown in Table 2.2 have produced results that show HIV/AIDS to have a small impact on the macro economies of Southern Africa. An exception is presented by List (2002). Even with methodological problems, List estimated the impact of the epidemic on African economies to be severe. Between 1992 and 2002, it is estimated that without HIV/AIDS the economies of 33 African countries would have grown by 1.1 per cent more. With HIV/AIDS, therefore, this represents 18 per cent less growth by 2020. An independent estimate put the size of the aggregate GDP loss at US\$144 billion (Shisana and Letlapa, 2004). Some researchers were dissatisfied with the macroeconomic results and began to do more work at the microeconomic level, producing some interesting results. Examples of such studies are Greener et al. (2000) and Jefferis et al. (2008).

**Table 2.2** Summary of results – the economic impact of HIV/AIDS

<i>Authors</i>	<i>Country</i>	<i>Method</i>	<i>Period covered</i>	<i>Impact on growth rates</i>	
				<i>GDP</i>	<i>GDP per cap.</i>
Over (1992)	30 sub-Saharan African countries	Econometric estimation and simulation	1990–2025	-0.56% to -1.08%	0.17% to -0.35%
	10 most advanced epidemics			-0.73% to -1.47%	0.13% to -0.60%
Kambou, Devarajan and Over (1992)	Cameroun	CGE	1987–1991	-1.9%	N/A
Bloom and Mahal (1995)	51 countries	Econometric estimation	1980–1992	-ve, but small	
Cuddington (1993 a,b)	Tanzania	Aggregate growth model	1985–2010	-0.6% to -1.1%	0.0% to -0.5%
Cuddington and Hancock (1994a,b)	Malawi	Aggregate growth model	1985–2010	-0.1% to -1.5%	-0.1% to -0.3%
BIDPA (2000)	Botswana	Aggregate growth model	1996–2021	-0.8% to -1.9%	+0.4% to -0.5%
Quatteck/Ing Barings (2000)	South Africa	Macro-econometric model	2001–2015	-0.3%	+ve
Arndt and Lewis (2000)	South Africa	CGE	2001–2010	-1.6%	-0.8%
Macfarlan and Sgherri (2001)	Botswana	Aggregate growth model	1999–2010	-3.5% to -4.5%	0% to -1%
Laubscher et al./BER (2001)	South Africa	Macro-econometric model	2001–2015	-0.33% to -0.63%	+0.7% to +1.0%
Bell, Devarajan and Gersbach (2003)	South Africa	Overlapping-generations model	1990–2080	N/A	-0.2% to -2.5% (†)
Lofgren, Thurlow and Robinson (2004)	Zambia	CGE	2001–2015	-0.4% to -0.9%	+0.2%
Masha, (2004)	Botswana	Aggregate growth model	1991–2016	-0.8% to 2%	N/A
BER (2006)	South Africa	Macro-econometric model	2000–2020	-0.4% to -0.6%	+0.3% to +0.4%

*Source:* updated from Table 4 in BER (2006)

*Notes:* † real income per family, derived from figures in paper



The economic effects of HIV/AIDS are felt unevenly across sectors, with some being affected more than others. One of the sectors that is highly affected is the informal sector. With low growth and rising unemployment, the informal sector has become an employer of a large section of the labour force. In most countries in the region, including the small states in the sub-Saharan part of Africa, the highest percentage of new jobs is in the informal sector. There is, however, a dearth of empirical research on the impact of HIV/AIDS on this sector. Because there are no healthcare facilities or social protection arrangements in the informal sector workplace, savings and investment are threatened by the demand to meet increased health expenditure when informal workers (or family members) become infected. As Shisana and Letlapa (2004) clearly puts it, their activities depend heavily on their labour, and because of the temporary nature of their workplace they are likely to lose that place as soon as they are away due to illness or the need to take care of a sick relative. HIV/AIDS can also destroy the enterprise when a key employee, owner or manager dies, as such knowledge and technical skills are hard to replace. The negative performance of the small enterprise may also come from time being diverted to caring for the sick and orphaned children. Savings and investment are therefore threatened by the demands on revenues for survival or healthcare expenditure. The enterprises may also become vulnerable to declining consumer demand as customers become sick and divert their income into healthcare of the sick, funerals and orphan care.

In terms of the private sector, HIV/AIDS generally reduces productivity and increases labour costs. Apart from the impact due to death, there is also loss in terms of increases in absenteeism, labour turnover and in costs of recruitment, training and staff welfare. The costs combine and reinforce each other to reduce the revenues and profits of the enterprise. Estimates documented in List (2002) estimate that productivity levels in the sub-region could decline by up to 50 per cent in the next five to ten years, with devastating consequences for profits.

In terms of industries in the private sector, evidence points to greater effects on the mining and metal processing sectors than on others, mainly because of the migratory system that forces men to leave their families in rural areas. Botswana, for instance, has a higher HIV prevalence rate among miners, at 24.6 per cent. The same is true in South Africa, Zambia, Lesotho and Swaziland.

In a study carried out by ECONSULT (2006) for Botswana, there was a general conclusion that HIV/AIDS has a greater impact on mining and manufacturing, especially textiles, construction and some service industries. There has generally been a larger loss of unskilled workers due to death and sickness in the last five years than of skilled workers. The financial sector, by comparison, was the least affected. This could be because the sector uses few unskilled workers. In terms of workers who are sick or working at sub-optimal levels, firms in manufacturing and mining have the highest averages, while those in retail has the lowest average. One reason why the incidence among unskilled workers may be greater stems from the tendency for these people to be less consistent with treatment once enrolled in antiretroviral (ARV) therapy programmes. Interviews with some managers revealed that where HIV has a non-significant impact, this does not necessarily mean there are few workers that are HIV-positive. Rather, such workers have taken care of themselves through a ARV programme which enables them to live and work almost as normal. Correspondingly, the interviews suggest that unskilled labour has a tendency not to adhere to treatment, hence a major impact of HIV/AIDS is felt in firms that use mainly unskilled workers. This includes firms in the textiles, construction and mining sectors. The low impact of HIV/AIDS on retail companies is mainly because they hire school leavers, who usually leave the company after two to three years. There is generally a high turnover for this group, since the search for other careers begins after a few years of work. By the time the youngsters leave, the negative impact of the disease may not have become serious enough to lead to sickness or high levels of absenteeism.

It is expected that there would be a reduced impact of the disease due to the availability of ARVs since 2001/02. Such availability would have reversed the effect of HIV/AIDS quite significantly for most firms. Firms have also been proactive in dealing with output and productivity losses through increased hiring, multi-skilling, overtraining etc. They have been actively involved in HIV/AIDS issues at the policy level and by providing training at work, while there have been instances of firms contributing generously to mitigating the effects of the disease by subsidising medical aid schemes, giving out free ARVs to their employees and participating in special aid schemes. However, the level of stigmatisation faced by HIV-positive staff within the firms and companies remains a major problem, and this inhibits open discussion of the impact of the disease and possible responses.

In terms of responses to impact on productivity levels by sector, firms in manufacturing argued that the disease has a marginal to significant impact on output. Textile firms, in particular, reported that they are regularly unable to meet deadlines for their orders due to sickness or death of workers. It has not been easy for them to quickly replace workers, even though training is seldom long term. This result may be an indication of the fact that most firms in manufacturing, especially textiles, are able to easily measure their output, given that they have targets for their markets and can discern if gaps exist between the supply of and demand for their goods. They also face a high turnover of workers, which further complicates their situation. In the mining sector, all firms reported being significantly impacted in terms of output. Firms in the financial, services and retail sectors reported smaller (nil or marginal) output losses, reflecting that these firms may have experienced few deaths or sick workers as a result of HIV/AIDS (ECONSULT, 2006).

It should be noted that these results are largely consistent with the results of surveys of larger companies on the impact of HIV/AIDS carried out in South Africa. The ordering of sectors by degree of impact is similar in Botswana and South Africa, with the retail/trade sector least affected and mining and manufacturing more seriously affected. The main contrast between the two countries relates to construction, which in the case of Botswana is the most seriously affected sector. However, compared with a sector like agriculture, construction is probably only mildly affected in South Africa.

Another sector that is significantly affected and is of major importance to the small economies of Southern Africa is agriculture. For some of these countries, agriculture is an important source of employment and export revenue. For instance, in Swaziland export farming generates 10 per cent of GDP and subsistence agriculture employs 80 per cent of the population. For Lesotho, more than 50 per cent of the working population and close to 60 per cent of working males are engaged in subsistence agriculture. For the Namibian economy, agriculture has been and still is the dominant sector in terms of employment, with 29 per cent of workers engaged in this sector in 2000. Similarly in Botswana, agriculture, especially subsistence agriculture, is the largest single employer of labour, employing about 30 per cent of the total labour force in 2005/06 (Siphambe, 2008).

As a result of the impact of HIV/AIDS, the agricultural sector is losing experienced labour, which in turn leads to a decline in production. According to Shisana and Letlapa (2004), the agricultural sector lost from 2.3 per cent to 12.8 per cent of its labour force in 2000 and this is expected to increase. This loss of labour, especially women, becomes a threat to food security as families may be forced to sell food grain, livestock and capital to cover AIDS-related expenses. The loss of knowledge and skills also has a negative effect on productivity. Moreover, the loss of adults may cause a switch from cash crops to subsistence farming with poor yields and less income. HIV and AIDS-affected households may also switch to less labour-intensive crops, which also tend to have lower nutritional value. This may worsen the economic situation of the already poor rural households and those living with HIV/AIDS.

Turning to the public sector, the epidemic undermines the sector's human capital and limits revenue available to finance development, which then lowers the quality and timely delivery of services by the public sector. Even though this affects public services generally, the most affected services are in the education and health sectors. With respect to the education sector, the effect is seen in the dropping out of children from school because of HIV/AIDS. This, of course, lowers demand for education. Some of the reasons for dropping out of school are that children need to support themselves and provide labour for the family. School enrolment is therefore on the decline for most of these countries due to the disease. For Swaziland, primary school enrolment is projected to decline until 2011 (Shisana and Letlapa, 2004). There is also a reduction in the supply of teachers and school managers, as they themselves become sick and die from the disease, leading to high student–teacher ratios. Finally, there is the loss of experience, which ultimately lowers the quality of the education.

Another component of the public sector that is adversely affected by HIV/AIDS is the health sector. The health sector is stretched to the limit because of the need to cater for HIV-related illnesses. Non-HIV patients are crowded out of the healthcare system, with other diseases receiving less attention. The disease is also reducing the number of health workers, and this contributes to a poorer quality of service.

## **BOTSWANA CASE**

### **2.5 Using a growth model approach to assess the impact of HIV/AIDS on the small state of Botswana**

Most macroeconomic studies assess the impact of HIV/AIDS on the economy using a growth model. The aim is normally to show the path of growth with and without the disease. We normally simulate the growth path of an economy over a 20-year period of time. Given that Botswana has since 2002 adopted a policy of providing antiretroviral therapy (ART) free through the public health system, it is appropriate that the growth model take into account this development. We therefore model the impact of the disease on the Botswana economy using three scenarios: 'without AIDS', 'AIDS with ART' and 'AIDS without ART', and make projections for key economic variables under each scenario, enabling comparisons between them. This modelling was carried out by a team under ECONSULT of which the author was a member, and the results are reproduced here rather than performing fresh modelling given that not much has changed since then (see ECONSULT, 2006, for further reading on these results).

#### **2.5.1 The macroeconomic simulation model**

##### **Model structure**

At the centre of the model is a production function, which enables output (GDP) to be calculated as a function of inputs (labour and capital) and productivity changes. If the inputs of the different factors of production can be projected (projections which will differ under the 'AIDS' and 'without AIDS' scenarios), then GDP can also be projected. The model goes beyond a simple, single production function by introducing the following innovations:

- The economy is divided into formal and informal sectors, with each modelled separately, and
- Labour is divided into skilled and unskilled categories.

The model therefore has three labour markets: skilled formal sector, unskilled formal sector and unskilled informal (it is assumed that all skilled workers are employed in the formal sector).<sup>4</sup> These labour markets behave differently:

- In the skilled formal sector, it is assumed that market forces work, and that wages adjust to equate demand and supply.
- In the unskilled formal sector, it is assumed that there is a minimum wage, which does not adjust in response to demand and supply; instead, it is assumed that the minimum wage continued to increase at its average rate over the past decade, which is around 1 per cent a year in real terms. As a result, the formal sector market for unskilled labour does not clear, and there is (formal sector) unemployment.
- Unskilled workers who are unemployed in the formal sector make up the supply of labour in the informal sector, where wages adjust to clear the market and equate demand and supply. In a sense, the economy ends up with full employment, even though some underemployment may be experienced in the informal sector.

The model therefore incorporates skilled and unskilled labour separately, along with unemployment and dual labour markets. Furthermore, labour is modelled in terms of effective (productivity-adjusted) labour supply, rather than simply providing numbers of workers. The advantages of this approach and the reasons for choosing it are as follows:

- The production function approach allows forecasts of output to be made according to the factor inputs (capital and labour) available, and hence forecasts of economic growth rates with different amounts of inputs,
- It permits modelling of labour markets, and consequently determination of the quantity of labour employed and its wage rate,
- The division into formal and informal sectors reflects the structure of sub-Saharan African economies in general, and the Botswana economy in particular,
- Labour and capital inputs can be changed to reflect the impact of AIDS, as can various other parameters,
- The incorporation of a sticky (unchanging) wage for unskilled labour in the formal sector, and market determination of wages in the informal sector, reflects the institutional structure of wage determination,
- The use of effective labour supply incorporates the productivity gains that come from workers' experience, as well as the impact of AIDS through the changing age structure of the workforce and the lower productivity of AIDS-infected workers, and
- The model is appropriate to the particular economic structure of Botswana (in particular the persistent shortage of skilled labour).

The production function takes the Cobb-Douglas form (this relates to the manner in which inputs are combined to produce output). In the formal sector, this is as follows:

$$Y_t^f = \alpha f \gamma^t Efs_t^{\beta_s} Efu_t^{\beta_u} Kf^{(1-\rho f)}$$

where  $Y_t^f$  represents output,  $Efs$  and  $Efu$  represent effective labour supplies of skilled and unskilled labour respectively (measured in efficiency units), and  $Kf$  is the capital stock. The shares of output attributable to each factor are  $\beta_s$ ,  $\beta_f$  and  $\rho f = 1 - \beta_s - \beta_u$ .  $\gamma^t$  represents an exogenous technological trend, while the constant  $\alpha f$  is a scale factor, which is used to calibrate the model in the base year (2000/01), so that it fits the actual data from that year.

The definition of output (GDP) used in the model is slightly different to the conventional definition in the national accounts, in that mineral rents – which comprise a significant proportion of GDP – are excluded. These rents are not directly attributable to capital or labour, but result from the monopoly status inherent in mineral deposits. The inclusion of the value of mineral rents in output would obscure the impact of HIV/AIDS on the economy, hence the exclusion. The value of mineral rents is proxied by government’s income from mineral revenues.<sup>5</sup> It should be noted that all projections are in real terms (in constant 2000/01 prices).

## 2.5.2 Impact of HIV/AIDS on the labour force

### (i) Size of the labour force

It is important to incorporate the impact of HIV/AIDS on the labour force, as this is one of the main channels through which the economic impact of HIV/AIDS occurs. The demographic projections have been used to project the growth of the total labour force over the period to 2021. If we assume (for simplicity) that the labour force participation rate remains unchanged, then the growth of the labour force will be as shown in Figure 2.1. This shows that under both of the ‘with AIDS’ scenarios, the labour force will be significantly smaller in 20 years than it would have been without AIDS. In the ‘without-AIDS’ scenario, the labour force in 2021 would total 1,109,622 (an increase of 89 per cent over the 2001 level), whereas in the ‘AIDS with ART’ scenario it would only total 888,838 (an increase of 61 per cent) and in the ‘AIDS without ART’ scenario it would increase by only 48 per cent. There is also a slight change in the age structure of the labour force. Without AIDS, the average age of the labour force increases from 33 years in 2001 to 35 in 2021; with AIDS it remains at 33 years. Hence AIDS has the effect of shifting the labour force to a slightly younger age structure giving us a ‘chimney’ kind of population pyramid structure.

### (ii) Labour efficiency units

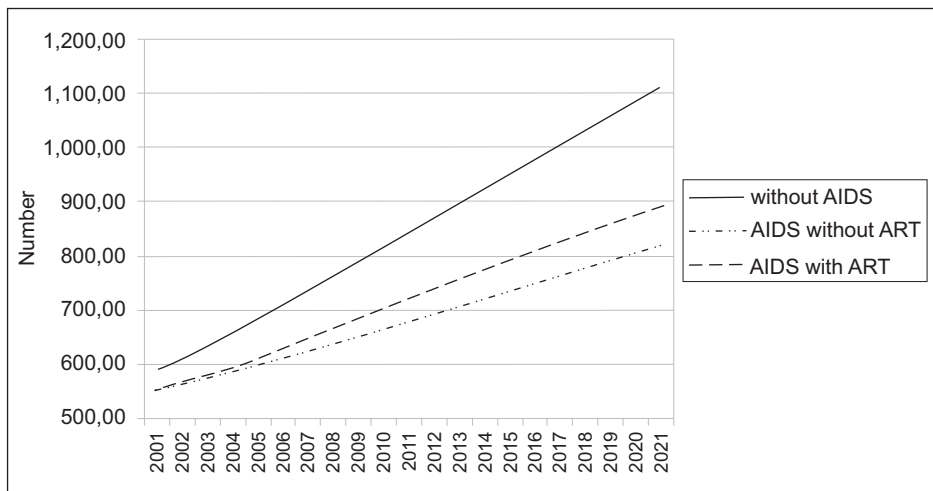


Figure 2.1 Labour force projections

Source: own calculations based on emographic impact study projections

Our approach models the labour force in terms of ‘labour efficiency units’, which incorporates the impact of work experience on productivity and efficiency. Because work experience is more important to skilled than unskilled labour, the shifting of the labour force to a younger age structure has a more dramatic effect on skilled workers.

The effective labour supply is measured in terms of labour efficiency units as follows:

$$E_t = \sum_{i=15}^{64} (1 - za_{it}) \rho_{it} L_{it}$$

Where  $L_{it}$  is the number of workers of age  $i$  at time  $t$ , and  $z$  is the fraction of the work-year lost per HIV-infected worker as a result of absence from work or reduced productivity due to sickness. This parameter can also take account of the impact of HIV and AIDS on the labour contribution of others, for instance if an uninfected spouse also has to stop working to provide care for an infected partner.  $a_{it}$  denotes the proportion of the labour force of age  $i$  that is HIV-positive at time  $t$ . Finally, the parameter  $\rho_{it}$  denotes the work experience of workers of age  $i$  at time  $t$ . This captures the productivity gains that come with experience on the job.

This formulation in terms of labour efficiency units captures the impact of AIDS on labour supply in two ways. First, AIDS has a demographic impact and alters the age composition of the population and the labour force. These changes in the numbers of workers of different ages are captured in the  $L_{it}$  term. A change in the age composition of the labour force alters the productivity of the labour force because of its impact on accumulated work experience, and this is captured in the  $\rho_i$  term. AIDS will affect effective labour supply both by reducing the absolute number of workers and by shifting the age structure in favour of younger, less experienced workers.

As the productivity gains from work experience cannot be measured directly, an indirect approach has to be used. Cuddington (1993a, b) notes that various studies suggest a positive, non-linear relationship between earnings (and, by inference, productivity) and experience, and hence measures the labour efficiency  $\rho_i$  of a worker of age  $i$  as follows:

$$\rho_i = \delta_1 + \delta_2 (i - 15) + \delta_3 (i - 15)^2$$

Here the parameters  $\delta_1$ ,  $\delta_2$  and  $\delta_3$  are estimated from an earnings function from 1995/96 Labour Force Survey data separately for skilled and unskilled labour.

### 2.5.3 Model results

#### (i) Base case

##### ‘Without AIDS’

**Output:** GDP (excluding mineral rents) grows at an average annual rate of 4.5 per cent between 2001 and 2021. With population growth averaging 1.9 per cent a year, however, GDP per capita grows more slowly than GDP, at 2.6 per cent a year. Economic growth in the formal sector (4.6 per cent p.a.) is faster than in the informal sector, which grows on average by 2.6 per cent a year.

**Labour market:** Relatively fast economic growth and increasing demand for labour in the formal sector pushes up real skilled wages slightly (0.4 per cent a year). Increased availability of skilled labour causes overall employment in the formal sector to increase faster (3.8 per cent a year) than the growth of the labour force (3.2 per cent a year), and hence employment in the informal sector declines as a proportion of the labour force (indicating falling un-/underemployment). Average wages rise by 1.1 per cent a year.

##### ‘AIDS without ART’

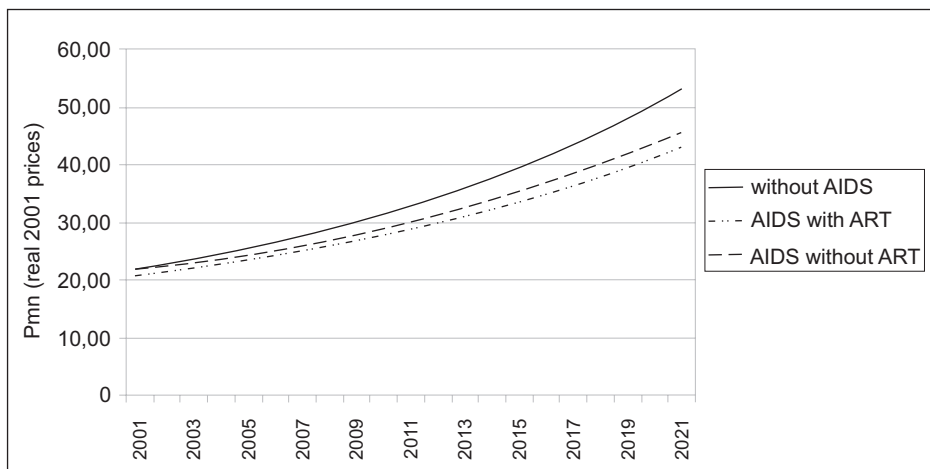


Figure 2.2 Base case – real GDP

Source: ECONSULT, 2006

**Output:** Average GDP growth is lower with AIDS, at 3.7 per cent – this is entirely to be expected, given the lower growth rate of the labour force. Average GDP per capita growth is slightly higher, at 2.8 per cent a year. The lower rate of GDP growth means that in 2021 GDP is 17.7 per cent smaller with AIDS than it would have been without AIDS, while the population is 23.0 per cent smaller, and as a result GDP per capita is 7.0 per cent higher.

#### (ii) Alternative case

The base case identifies the fundamental impact of HIV/AIDS on the economy through changes in the size and composition of the labour force. However, it does not include a number of likely effects that will change, and perhaps exacerbate, the negative economic impact of HIV/AIDS. These are considered in the alternative case scenario below.

**Labour force participation rate (LFPR):** As the results do not indicate a significant fall in un-underemployment in this case, we assume that the LFPR remains unchanged.

**Variations in HIV/AIDS prevalence across skill categories:** Sentinel survey results suggest that HIV prevalence rates vary across skill categories, with lower prevalence for skilled workers. Based on these results, it is assumed that skilled workers have a prevalence rate that is two-thirds of the rate of unskilled workers.

**Investment rates:** The base case assumes that gross investment rates are unaffected by HIV/AIDS. As discussed earlier, however, this is unlikely. The costs associated with HIV/AIDS are likely to reduce investment by causing diversion of expenditure. This is most obvious in the case of ART provision. The majority of these costs in Botswana's case are met by government, and given fiscal budget constraints the consequence of financing an extensive ART programme is likely to reduce spending elsewhere. It is assumed that the eventual costs of ART and other expenditure associated with HIV/AIDS (such as orphan welfare payments) could amount to 3.5 per cent of GDP at its peak, falling to just under 3 per cent by 2021. Initially, however, some of the costs are being met by donors, and hence the fiscal impact is reduced. The additional spending on HIV/AIDS can be met by reduced investment spending, reduced consumption spending, or through a budget deficit. It is assumed that the government will attempt to maintain fiscal discipline, and that there will not be



significant deficit budgeting, and therefore that HIV/AIDS costs are met by reducing expenditure in other areas. Under the 'AIDS with ART' scenario, it is assumed that the impact on investment climbs gradually to 2 per cent of GDP (by 2021) as donor support drops off.

The impact on private sector investment is likely to be greater in the 'AIDS without ART' scenario, as here the burden of HIV/AIDS-related costs falls on private firms, through greater healthcare costs, retraining costs etc., as a larger proportion of the workforce is negatively affected by HIV/AIDS. In addition, the greater uncertainties resulting from the 'AIDS without ART' scenario, and reduced profitability, are likely to negatively affect investment. If ART is widely available, these uncertainties are reduced, and hence private sector investment is likely to be higher under the 'with ART' scenario. The impact on the public sector will be slightly less, as costs in the 'AIDS without ART' scenario are lower. Hence the fiscal impact, measured by HIV/AIDS spending as a percentage of GDP, is similar in the two scenarios. In the 'AIDS without ART' scenario, therefore, there is both a significant fiscal impact, as well as a larger negative impact on the private sector. It is assumed that in the 'AIDS without ART' scenario, the reduction in investment is greater, and that formal sector investment falls to 22 per cent of GDP by 2021. In the informal sector, it is assumed that investment will fall from 10 per cent to 9 per cent of income with ART, and to 8 per cent without ART.

The results of this scenario are as follows:

#### 'Without AIDS'

**Output and labour market:** The results are the same as in the base case.

#### 'AIDS without ART'

**Output:** Average GDP growth is significantly lower with AIDS, at 2.3 per cent. This is due to the lower growth rate of the labour force, reduced investment and reduced productivity growth. Average GDP per capita growth is also lower, at 1.4 per cent a year. The lower rate of GDP growth means that in 2021, GDP is 37 per cent smaller with AIDS and without ART than it would have been without AIDS, while the population is 23 per cent smaller and GDP per capita is 19 per cent lower as a result.

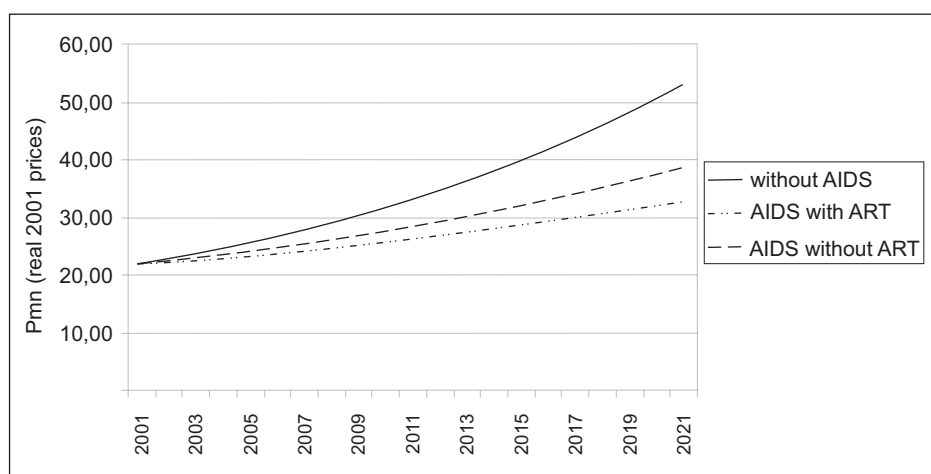


Figure 2.3 Alternative case – real GDP

Source: ECONSULT, 2006

**Labour market:** Given the lower rate of labour force growth with AIDS, formal sector employment only grows at 1.7 per cent a year. This is, however, marginally slower than labour force growth, and hence the informal sector grows in size (in relative terms), indicating rising un-/underemployment. Reduced investment and productivity growth cause wages to stagnate.

This scenario indicates that HIV/AIDS, through its impact on investment and productivity, as well as on population and the labour force, will reduce economic growth significantly, and will also reduce per capita incomes relative to the 'no AIDS' scenario. Both real wages and employment would be lower with AIDS. ART raises the economic growth rate and per capita incomes somewhat compared with the 'AIDS without ART' scenario.

### (iii) Summary of macroeconomic results

We can summarise these results as follows:

- AIDS will have a negative impact on the rate of economic growth in Botswana. If investment is strongly negatively affected, the rate of GDP growth will fall from a projected 4.5 per cent a year without AIDS to an estimated 3.2 per cent a year under the 'AIDS with ART' scenario, and after 20 years the economy will be 25 per cent smaller than it would have been without AIDS.
- The impact on the growth of average real incomes (per capita GDP) is also negative, if investment is strongly affected, averaging 2.0 per cent a year under the 'AIDS with ART' scenario, compared with 2.6 per cent a year without AIDS. Per capita GDP would be 9 per cent lower after 20 years (this contrasts with the results of some other studies, which found that GDP per capita could plausibly rise as a result of HIV/AIDS, on the basis that the reduction in GDP growth could be smaller than the reduction in population growth).
- Due to the sharp drop in investment (and hence weak demand for labour), wages stagnate.
- Without AIDS, underemployment falls from 32 per cent to 24 per cent of the labour force. With AIDS, the trend is much less favourable, and underemployment falls more slowly to 28 per cent in the 'AIDS with ART' scenario and rises to 34 per cent without ART, as the slower growth of the labour force is offset by the effect of lower investment and slower economic growth.

It is important to note that although both GDP and average income growth rates may fall as a result of AIDS, **they both remain positive**. In other words, in the scenarios chosen here, neither GDP nor average incomes will be lower in 20 years than they are now – they may simply be lower than they would have been without AIDS.

The reduction in growth as a result of HIV/AIDS can be distilled into its various components. The greatest impact is from reduced capital stock, which contributes 45 per cent of the fall in growth, with reduced total factor productivity (TFP) growth contributing 28 per cent, reduced supply of skilled labour 19 per cent and reduced supply of unskilled labour 8 per cent.

## 2.6 Impact of HIV/AIDS on poverty

As part of the exercise to assess the economic impact of HIV/AIDS on the economy, a simulation analysis was carried out on poverty to period 2016.<sup>6</sup> The analysis makes use of person-level data from the 2002/03 Household Income and Expenditure Survey (HIES). Each person was assigned a probability of being infected with HIV in accordance to the prevalence rates recorded by the Botswana AIDS Impact Survey II (BIAS II), which averaged 17.1 per cent nationally, but varied across the population according to demographic and other factors.<sup>7</sup> A random number between 0 and 1 was then assigned to each person. All people for whom the random number was less than or equal to the probability of being HIV-positive were deemed to be infected. This resulted in a

pattern of infection that resembled very closely that observed in the BIAS II survey. The person-level information was then aggregated back to household level in order to simulate the household impacts. Using certain assumptions about costs of HIV/AIDS to the affected households, the income effects, and the existence of orphan support programmes, we simulate the impact of HIV/AIDS on poverty, income per capita and income dependency ratios.

### (i) Expenditure effects

Table 2.3 presents a base case scenario in which HIV-related expenditure increases by 5 per cent for HIV/AIDS-affected households. We do not allow for all the other effects to take place. As a result of expenditures increasing by 5 per cent due to HIV/AIDS, poverty increases to 34 per cent, an increase of 1 percentage point. What these results indicate is not that poverty will be higher in 2016, but rather that it will be 1 percentage point higher than it would have been because of this effect. In other words, if poverty would have decreased to 15 per cent by 2016, it will be 16 per cent instead due to the 5 per cent increase in expenditure.

**Table 2.3** Changes in poverty rates – health expenditure effect

Region	Poverty rate		
	Without HIV/AIDS	With HIV/AIDS exp.	Change (% points)
Gaborone	0.07	0.07	0.00
Francistown	0.15	0.15	0.00
Other cities and towns	0.15	0.15	0.00
Rural south-east	0.33	0.33	0.00
Rural north-east	0.42	0.42	0.00
Rural north-west	0.46	0.46	0.00
Rural south-west	0.53	0.54	0.01
<b>National</b>	<b>0.33</b>	<b>0.34</b>	<b>0.01</b>

Source: ECONSULT, 2006

### (ii) Income effects

The income effects come into play when the HIV-infected person dies and household income begins to decline. Assuming no worker replacement, household income is assumed to fall by 45 per cent. The results are shown in Table 2.4. As a result, overall poverty rises by three percentage points.

**Table 2.4** Changes in poverty rates – income loss due to death

Region	Poverty rate		
	Without HIV/AIDS	With 45 per cent decline in income	Change (% points)
Gaborone	0.07	0.10	0.03
Francistown	0.15	0.19	0.04
Other cities and towns	0.15	0.16	0.01
Rural south-east	0.33	0.35	0.02
Rural north-east	0.42	0.46	0.04
Rural north-west	0.46	0.49	0.03
Rural south-west	0.53	0.56	0.03
<b>National</b>	<b>0.33</b>	<b>0.36</b>	<b>0.03</b>

Source: ECONSULT, 2006

If we allow for worker replacement, so that the household income only falls by 15 per cent, the poverty rate only changes slightly, with poverty at 34 per cent. There is still some slight increase in poverty due to the fact that the replacement worker does not have the same experience as the worker lost and therefore there is still some reduction in income.

### (iii) Combined expenditure and income effects

In Table 2.5 we have allowed the income of the worker in the household who is HIV-infected to fall by 45 per cent in two years, as well as having expenditure increase by 5 per cent for HIV/AIDS health-related costs. The income of the affected household is therefore declining by an effective total of 50 per cent. Overall, the poverty rate increases by 3 percentage points as a result of these changes. Over time, if we assume no ART, HIV/AIDS will have an influence of up to three percentage points in terms of increasing poverty of households.

**Table 2.5** Changes in poverty rates – expenditure and income effects combined

Region	Poverty rate		
	Without HIV/AIDS	With HIV/AIDS exp. and income effects	Change (% points)
Gaborone	0.07	0.10	0.03
Francistown	0.15	0.19	0.04
Other cities and towns	0.15	0.16	0.01
Rural south-east	0.33	0.35	0.02
Rural north-east	0.42	0.46	0.04
Rural north-west	0.46	0.49	0.03
Rural south-west	0.53	0.56	0.03
<b>National</b>	<b>0.33</b>	<b>0.36</b>	<b>0.03</b>

Source: ECONSULT, 2006

### (iv) Adding the impact of ART

Our earlier analysis assumed that HIV-positive household members die at the end of a 10-year period. In Table 2.6, we allow for some 38 per cent of the HIV-positive household members to still be alive after 10 years, as a result of successful ART, while 62 per cent of HIV-positive household members will die (in line with the ‘with ART’ demographic projections). In other words, we include a 62 per cent probability of dying, based on the demographic figures. What that means is that 62

**Table 2.6** Changes in poverty rates – adding the effect of ART

Region	Poverty rate		
	Without HIV/AIDS	With HIV/AIDS and ART	Change (% points)
Gaborone	0.07	0.08	0.01
Francistown	0.15	0.16	0.01
Other cities and towns	0.15	0.18	0.03
Rural south-east	0.33	0.34	0.01
Rural north-east	0.42	0.43	0.01
Rural north-west	0.46	0.48	0.02
Rural south-west	0.53	0.54	0.01
<b>National</b>	<b>0.33</b>	<b>0.35</b>	<b>0.02</b>

Source: ECONSULT, 2006

per cent of the HIV-positive households will experience income falls of up to 50 per cent, while the other 38 per cent only have a 5 per cent increase in their expenditure for medical costs. With ART, poverty would be 2 percentage points higher than without AIDS by 2016. The simulation results show that ART mitigates the impact of HIV/AIDS on poverty by about one percentage point.

## 2.7 Response to HIV/AIDS in the region

HIV prevalence rates have been declining or stabilising, which may be a positive response to the policies and programmes set up by the countries under consideration in this chapter. All the countries have declared HIV/AIDS to be national disaster, and the epidemic has been positioned at a high level on their national agendas. In Namibia, a multisectoral National AIDS Executive Committee, consisting of ministers and prominent leaders, drives the country's fight against HIV/AIDS. In Swaziland, the government established an HIV/AIDS Cabinet Committee and a multisectoral HIV/AIDS Crisis Management and Technical Committee under the Office of the Deputy Prime Minister. This was later upgraded to a council and was expanded to include more stakeholders. In Lesotho, the government set up the Lesotho AIDS Programme Coordinating Authority (LAPCA) in 2001, which was later replaced by a semi-autonomous National AIDS Commission (NAC) to make it more effective. In Botswana, a National AIDS Council was set up in 2000 under the chairmanship of the president, with the National AIDS Coordinating Agency (NACA) as the Secretariat. Not only is HIV/AIDS prioritised in terms of budget and policies, but Botswana also provides one of those few cases where the president of the country personally leads the national effort against the disease.

For all these countries, there are different types of HIV/AIDS prevention and mitigation for those already infected. Among the prevention methods are public education and awareness, educating the youth, condom distribution and education, targeting highly mobile populations, improved blood safety, prevention of mother-to-child transmission of HIV (PMTCT) and behavioural change campaigns. Additional activities include HIV testing and counselling as key programmes towards HIV-related prevention and care. Botswana, Lesotho and Swaziland, for instance, have introduced voluntary HIV counselling and testing (VCT), which has been led by campaigns such as 'Know Your Status' and 'Show You Care'. In some of these countries, these messages have been the subject of high-profile marketing through billboards, bus stops and sometimes using local languages. With the assistance of donors, the countries have established several counselling centres nationwide.

HIV testing is also provided as a routine part of check-ups in public and private clinics in Botswana. Botswana's Routine HIV Testing (RHT) was started in 2004 when it was assumed that this would reduce the stigma associated with the 'exclusivity' of HIV testing, enable early testing and allow more timely access to treatment. Even though RHT has provided an increase in the accessibility of HIV testing, there is some concern about its design since healthcare practitioners seemed to be inadequately trained. For example, there was still confusion in 2008 around key issues such as who should be offered RHT, what information or counselling should precede testing and what constitutes 'informed consent'. There was also concern prior to the announcement of RHT that the concepts of compulsory, routine and mandatory testing have been used interchangeably, leading to questions on human rights issues. For Lesotho, RHT was also introduced in 2004 with the aim of overcoming stigma and discrimination. However, by October 2006, the scheme had tested only 720 community volunteers, which was 0.06 per cent of the 1.3 million targeted. This was probably due to a lack of healthcare workers and failure to safeguard human rights issues. For Swaziland, RHT started in 2003, but had a limited coverage due to the centres being mainly located in urban areas. The major limitation to public testing of HIV in all these countries is the stigma associated with being HIV-positive, which is linked to sexual promiscuity. For some of the countries, efforts to break the silence were provided by public testing of public figures, even though very few would divulge their status, especially if they happened to be HIV-positive.

In terms of treatment, all the four countries provided free nationwide ARVs. Most started by providing ARVs at one centre and over time expanded to provide them at most public health centres. While success was achieved in terms of rolling out the ARV programmes to a larger population, these small states immediately found themselves facing serious problems in trying to expand the rollout. Among the major constraints was the shortage of human resources in the health system. This was due to some skilled personnel having been lost to HIV/AIDS, and some having left the country for better remuneration packages and working conditions, especially in highly industrialised countries. Botswana, for instance, responded by importing medical personnel from poorer parts of Africa, India and Cuba. Unfortunately, these medical personnel were limited in terms of their ability to communicate with patients, as they did not understand the local language, Setswana, let alone the culture. Policies also dictated who could initiate ART. Where nurses were allowed to initiate treatment, it was found that the programme rolled out more quickly.

Another result of HIV/AIDS in these countries has been an increase in the number of orphans. The countries have again come up with innovative responses, ranging from the setting up of charity projects in Lesotho to orphan care programmes in Botswana.

The private sector and NGOs have been proactive in terms of responding to the disease. Some firms, for instance, have trained and sensitised more workers on the dangers of HIV/AIDS, have provided free testing and subsidised ARVs, and have put HIV/AIDS policies in place at the workplace. The diamond mining company in Botswana, Debswana, is a typical example of a firm that has responded positively to the threat. After providing free testing for its workers in 1999, the company approved ARVs for all employees living with HIV/AIDS and subsidised the costs of monitoring viral loads and CD4<sup>8</sup> counts by paying 90 per cent of the costs, including those for the ARVs.

The responses from the countries in dealing with HIV/AIDS have shown some forward and dynamic thinking. However, plans have been limited in terms of implementation by financial and human resources constraints and, for some countries, by lack of proper infrastructure to allow health facilities to reach all areas. In the Southern African region, Botswana is among the countries that stand out as providing a 'best case' in terms of response to the HIV/AIDS epidemic. First, as regards priority, the country came up with a co-ordinating body chaired by the president of the country, who also took an active role in the HIV/AIDS campaign within the country and worldwide. Tackling HIV/AIDS therefore received much greater support than in other countries, both in terms of publicity and resources assignment. Botswana's institutional response to the epidemic has also been one of the more progressive and active among Southern African countries. The need for a multisectoral response was recognised early on as part of the response to international policy and advice, given the cross-cutting nature of HIV/AIDS and its widespread impact on society and the economy, as well as the obvious health issues. The second area in which Botswana provides a best case is in terms of its response to HIV/AIDS via its ambitious plan to roll-out treatment to its entire population, a strategy that was only later adopted by other countries in the region. This was of course facilitated by the availability of financial resources from the mining sector, even though donor funding was also important.

In the earlier phase of the epidemic, ART provision in other countries was largely limited to private medical facilities, charities and NGOs, and sporadic provision through the public health system. This was mainly because financing was almost entirely dependent upon donor support. One of Botswana's success stories is that the country has been able to provide universal access to ARV therapy for a while now. All people of Botswana who are eligible for ART can now access the treatment without payment. However, not all HIV-infected individuals are accessing treatment, as some roll-out is still needed before the ARV programme can be said to have reached all corners of

the country. The major constraining factors are the lack of human resources, stigma and intransigent sexual behaviour. The backlog of persons enrolled for ARV treatment has been whittled away, however, with some people gaining access via the private sector. On average, people are enrolled less than three weeks from the time a decision is made to put them on ARVs. The challenge that still exists is to get people to seek medical help in the first place, before they become weak and in spite of the stigma they might face. To sum up, although there are still some problems and challenges ahead, Botswana's response to the HIV/AIDS pandemic has been remarkable, with lessons that other countries may wish to emulate.

## 2.8 Financing HIV/AIDS in the region

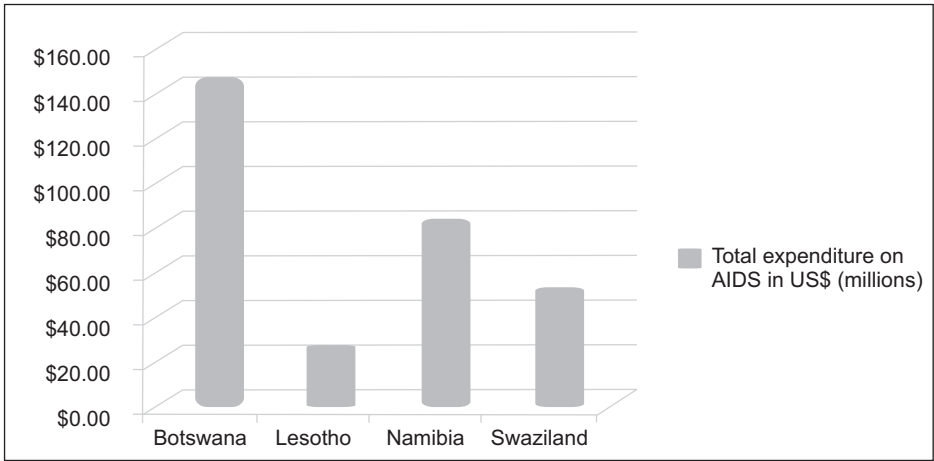
HIV/AIDS has had a huge effect on the fiscal operations of these small African countries. Before the epidemic, most countries had a small budget allocated to healthcare provision. It was on recognition of the need to curb the spread of the disease, as well as the need to deal with those affected, that African governments committed themselves to spending 15 per cent or more of their budgets on public health. Yet few countries have reached that target. By 2003, only Zimbabwe and South Africa had met the target, while Botswana had assigned 10.4 per cent of expenditure to health and Swaziland and Lesotho had each assigned 7.4 per cent (Shisana and Letlapa, 2004).

Data on expenditure on HIV are usually scarce or not available, making time series analysis difficult. In Botswana, based on some limited data and on interviews with key informants, it was found that the largest costs incurred by the government in the area of HIV and AIDS were those linked to ART, orphan support and home-based care. These costs amounted to an estimated 26 per cent (excluding donated ARV drugs), 33 per cent and 15 per cent of NACA expenditure, respectively, in 2004/05. Prevention activities (13 per cent) and management (9 per cent) made up the other main components. In 2006, the cost of ART regimens was estimated as follows: First Line 5,130 pula (P); Second Line P8,055; Third Line P12,205.<sup>9</sup> The cost of first line provision is very close to the cost reported for ART provision in Thailand, which was reported at US\$842 per patient per annum in 2004 (=P5,052 at an exchange rate of P6=US\$1) (ECONSULT, 2006).

A major issue in terms of rolling-out ARV drugs to the target population is the price of the drugs and the restrictions due to trade-related aspects of intellectual property rights (TRIPS) imposed when it comes to acquiring cheaper ones. Botswana, for instance, currently uses ten patented drugs in its national ARV therapy programme. It will be impossible for Botswana to scale up the programme, and achieve the national treatment target, if the price of ARV drugs and other essential medicines is not reduced significantly. The use of generic drugs – that is, those that are equivalent and interchangeable with patented ones – would reduce the cost of ARV treatment per patient, thereby allowing the treatment of more people. Hence it is important that flexibilities be built into the trade in drugs to save as many human lives as possible in these countries. The TRIPS agreement contains various flexibilities, which aim to reduce the adverse effects of intellectual property rights on the cost of drugs, and countries should take advantage of these flexibilities. These in general allow the manufacture and supply of affordable generic versions of new generation ARVs under certain conditions. However, the capacity to supply a specified list of generics under such conditions is limited and the use of such flexibilities in their current form remains complex and unattractive. This is because the pharmaceutical companies of Western countries are quite powerful in seeking to protect their patents.

In terms of total expenditure on HIV/AIDS, Botswana has the highest expenditure in the region at US\$143 million in 2006. The second largest expenditure is for Namibia, with US\$79 million in the same period, and the least is Lesotho with US\$24 million. These expenditures are summarised in Figure 2.4.



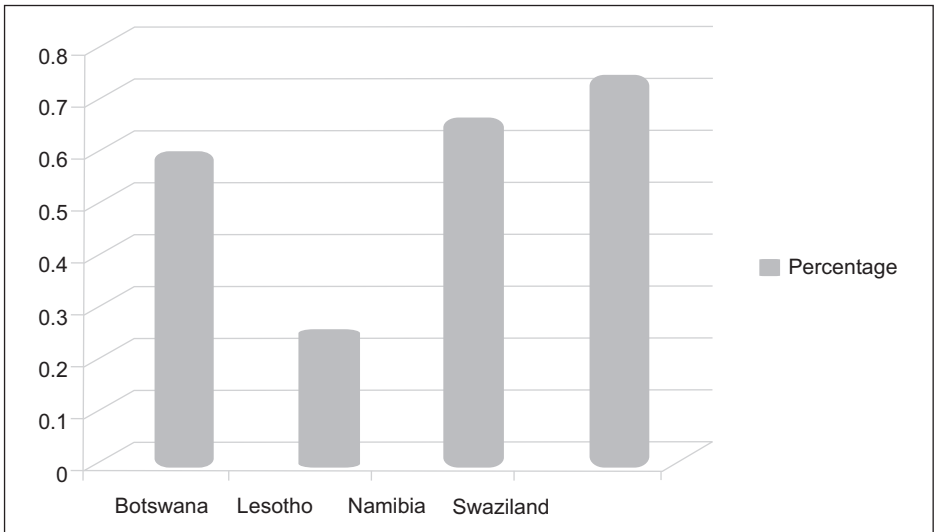


**Figure 2.4** Total expenditure on HIV/AIDS for small countries in the African region (US\$ millions)

Source: Various statistical bulletins

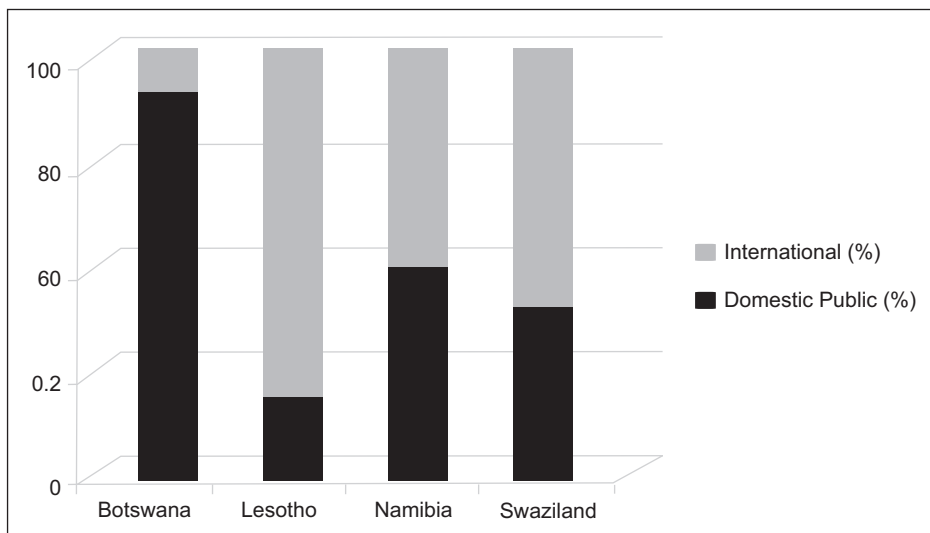
However, as a percentage of GDP, Swaziland has the largest share with 0.7 per cent of GDP being spent on HIV/AIDS. The second largest is Namibia with 0.6 per cent, with Lesotho the smallest in terms of share at 0.2 per cent of GDP. At an absolute level, with the highest prevalence rate, Swaziland's expenditure on health is too low. In 2007, for instance, only 0.25 per cent of the national budget was allocated to the HIV/AIDS epidemic, even though HIV/AIDS was declared a national disaster.

In terms of expenditure by source, with the exception of Botswana, international donors dominate the other countries' sources of funding for HIV/AIDS. In 2006, Botswana was funding 91 per cent of its HIV/AIDS expenditure and sourcing 9 per cent from international organisations. The country with the second largest HIV/AIDS budget funded domestically was Namibia, with 49 per cent funded from domestic public expenditure. Lesotho and Swaziland are dominated by international



**Figure 2.5** Total expenditure on HIV/AIDS as a percentage of GDP, 2006

Source: Various statistical bulletins



**Figure 2.6** Sources of HIV/AIDS finance, 2006

Source: Various statistical bulletins

**Table 2.7** Total expenditure on HIV/AIDS as a percentage of GDP, 2006

Country	HDI rank	Public expenditure on health (% of GDP)				Health expenditure per capita (ppp US\$)	GDP per capita (ppp US\$)	Human Poverty Index
		2003	2004	2005	2006	2009	2009	
Seychelles	57	5.8	6.2	6.8	6.8	602	16,771	–
Maldives	95	7.2	7.8	12.4	10.1	742	5,196	66
Swaziland	142	6.6	6.8	6.3	5.9	219	4,789	108
The Gambia	168	4.9	5.4	5.2	4.3	33	1,225	123
Botswana	125	6.4	7.7	8.3	7.2	487	13,604	81
Lesotho	156	6.6	6.4	5.5	6.7	88	1,541	106
Namibia	128	7.2	7.1	5.3	4.9	218	5,155	70
Mauritius	81	3.9	4.3	4.3	4.3	292	11,296	45

Source: UNDP (2009) Human Development Indicators (HDI) Statistics; World Health Organization (2009) Statistical-Information Systems (WHOSIS)

financing, with 81 per cent and 60 per cent of their funds originating from external sources respectively. These statistics are summarised in Figures 2.5 and 2.6.

A number of donor governments provide funding and other support for HIV/AIDS for the four small states of Southern Africa under review in this chapter. These include the United States of America, the United Kingdom, Ireland, France, Germany, Sweden, Japan, Finland, Belgium and the Netherlands. For Botswana, the largest single component of donor funding is channelled through the African Comprehensive HIV/AIDS Partnership (ACHAP), which receives funds from Merck and Company. Support is also obtained from the Bill and Melinda Gates Foundation. At the

time of writing, funding amounted to US\$96 million (approximately P600 million) – or around P80 million a year. Of this, around 30 per cent is devoted to each component of prevention of infection, treatment (ART) and programme management. Apart from being wealthier than other African countries and therefore better able to afford to spend more on HIV/AIDS-related activities, Botswana's commitments provide a best case example for the region. The amount of national resources and prioritisation in terms of campaigns by the country's leaders is in itself an effective way of attracting donor funding. Donors are always willing to participate where they can see credible commitment, as the Botswana case demonstrates.

From Table 2.7 it is apparent that Botswana's public expenditure on health as a percentage of GDP has generally been on the increase. The country has one of the highest health expenditures per capita in the region – US\$487 as of 2009. This is in contrast to some other countries in the region, where expenditures on health as a percentage of GDP declined from 2003 to 2006 except in The Gambia. For instance, figures for Namibia and Swaziland were 7.2 and 6.6 in 2003 and 4.9 and 5.9 in 2006 respectively (UNDP, 2009; WHO, 2009). There is therefore a greater need for an increase in public expenditure on health, more so with the rapid spread of HIV/AIDS in the region.

## 2.9 Policy recommendations: looking to the future

The four small states of Southern Africa under consideration here – Botswana, Lesotho, Namibia and Swaziland – all face high HIV prevalence rates, although these are reaching a plateau or declining. There are still many challenges, which will require more effort from themselves and donor countries. Some of the challenges are:

- Lack of response in terms of behavioural change,
- Lack of human and financial resources to tackle the epidemic effectively, and
- The stigma attached to the disease, which has limited the effectiveness of past efforts.

A number of policy options follow from the analysis presented in this chapter. The macroeconomic model carried out with Botswana's data has shown that HIV/AIDS is not only a health issue, but a development issue as well. Growth is shown to be lower than without HIV/AIDS, poverty levels are likely to increase, as are the other social and economic problems associated with poverty: low labour productivity, high unemployment and low incomes. What the analysis shows generally is that more needs to be done in terms of scaling up prevention and making it appropriate for the individual, education and treatment. All these efforts will require a lot of capacity-building assistance and resource mobilisation, which some of the countries cannot provide without donor assistance. Even the wealthier countries cannot effectively reduce the HIV prevalence without receiving more donor assistance. For example, in its costing of the MDGs, Botswana had to concede that it will need more assistance to deal effectively with the disease. It is estimated that a large proportion of its MDGs expenditure will be needed to deal with HIV/AIDS if the country is to meet the goal of reducing new infections and treating those who are already infected.

It is also necessary to deal effectively with the issue of stigma attached to the disease, if the war against HIV/AIDS is to be won. Partly as a result of the stigma, it is still difficult to get everyone tested and to access treatment, even where it is publicly available. Too many people seek testing and treatment late, making treatment less successful and people more likely to die despite being on ART. Early testing and establishment of treatment regimes is critical.

Routine HIV testing (RHT) has also had limited success due to lack of training of healthcare personnel and inaccessibility issues in some of the countries of the African region. There is therefore need for

a broad-based public campaign, which should ideally precede the introduction of RHT, especially given the human rights issues arising from misuse of such concepts as compulsory or mandatory testing (which were used interchangeably with routine testing). Dealing with individual behaviour change and stigma, for example, is important, as is addressing wider socio-economic factors behind increased susceptibility: the insecurities of migrant labour, gender and generational imbalances, and poverty.

Given that the per unit cost of drugs may be expensive because of the generally small numbers required, countries should also take advantage of the flexibilities built into trade related intellectual property rights, so that they can access cheaper drugs from the market.

In addition, there are major challenges with regard to dealing with HIV/AIDS at the workplace. It is important that HIV/AIDS is dealt with not only by government, but also by firms in terms of their developing HIV/AIDS policies at the workplace. There is also the challenge of dealing with the cultural and religious aspects that hinder the effectiveness of addressing the pandemic. It is quite common for religious organisations in some of the countries to encourage people who are already HIV-positive not to enrol in ART because their religious beliefs bar them from taking any medication. A number of people have died because they were persuaded to withdraw from the therapy. In such cases, efforts were made to have these individuals re-enter the ART programme; however, they had by that time developed opportunistic diseases that could not be treated.

International assistance will be necessary to be able to fund research that enables countries to understand the impact of the disease. It is critical for governments, supported by the international community, to increase the human, financial and medical care available to treat those already infected and affected. Some of the countries under review, such as Swaziland and Lesotho, do not have sufficient resources to be able to face the challenges without donor support. However, they need to demonstrate their resolve in terms of prioritising the health sector response and their level of commitment, which would in turn encourage the donor community to assist them. This has been the channel through which Botswana has been able to attract donor support to tackle the epidemic in recent years.

Countries should also learn from one another with regard to how they have responded to the disease, sharing their experiences.

## Notes

1. The sexual practice of having sexual intercourse with the woman not having vaginal lubrication.
2. 'Small house' is a word used in Botswana to describe an extra-marital relationship.
3. Funeral costs are known to be quite high in Africa, estimated at many times household monthly expenditure. See Sandra Freire, 'HIV/AIDS, Funeral Costs and wellbeing: Theory and Evidence from South Africa', p.15 where the point is made.
4. While there may be a few skilled workers employed in the informal sector, the numbers are considered small enough (in terms of the classification of skilled and unskilled workers used here) not to make any significant impact on the results, hence they are not included in the model.
5. The argument for excluding mineral rents from output, and the method of calculation, is taken from Bank of Botswana, 1993.
6. The simulation is made to 2016, the period marking the end of Vision 2016, which is Botswana's long-term vision. This, among other things, envisages zero absolute poverty in 2016.
7. Although there is a one to two year gap in the data sets, since BIAS II was done in 2004 while HIES was done in 2002/03, the relatively slow pace of change in HIV prevalence should result in little or no bias

being introduced in the results. Although contemporaneous HIV prevalence data for 2002/03 could have been obtained from the ANC sentinel surveillance surveys, as was done in the analysis for the BIDPA (2000) report, the much smaller sample size for the ANC sentinel surveillance, and the restriction of that survey to pregnant women, makes it much less suitable than the BIAS II data.

8. The CD4 count measures the number of CD4 cells in a sample of blood. Along with other tests, the CD4 count helps tell how strong a person's immune system is, indicates the stage of his/her HIV disease, guides treatment and predicts how the disease may progress.
9. Second and third line ARV treatment generally refers to subsequent ARV treatment provided when it has become clear that the first set of therapy is no longer effective in making the viral load undetectable to a patient. The second and third lines of therapy are usually much more expensive.

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