

VIII. IMPACT ON ECONOMIC GROWTH

The impact of the HIV/AIDS epidemic on the economy has been a concern since the beginning of the pandemic. Some believe that the HIV/AIDS epidemic is responsible for slowing the rate of growth of the gross national product of many heavily affected countries and that in some cases, GNP growth could decrease by more than 1 percentage point for every 10 per cent HIV prevalence. Others take the view that HIV/AIDS has had little impact on the macroeconomy so far. It is difficult to estimate empirically the effect of HIV/AIDS on economic performance since so many factors other than HIV/AIDS affect economic growth. The countries most seriously affected by the epidemic are also faced with drought, war and other problems.

Development, as set out in the Declaration on the Right to Development (General Assembly resolution 41/128, annex), “is a comprehensive economic, social, cultural and political process, which aims at the constant improvement of the well-being of the entire population and of all individuals on the basis of their active, free and meaningful participation”. While economic growth is an important element of the development process, it is not by itself an adequate yardstick of development. A fuller understanding of the effects of HIV/AIDS on the prospects for development requires looking beyond the conventional indicators of macroeconomic performance.

In the first section, the present chapter presents an analytic framework based on previous studies of the impact of HIV/AIDS on the economy. The second section outlines approaches to estimating the effects of HIV/AIDS and the third section examines the currently available evidence on the impact of HIV/AIDS on economic growth rates, including the uncertainties associated with those estimates, and also briefly reviews attempts to address impacts on broader indicators of welfare and development. The final section summarizes the current state of knowledge regarding the effects of HIV/AIDS on the macroeconomy.

A. CONCEPTUAL FRAMEWORK FOR THE IMPACT OF HIV/AIDS ON ECONOMIC GROWTH

The HIV/AIDS epidemic can affect the economy in a number of ways:

- The AIDS epidemic will slow or reverse growth in the labour supply. The economic impact can vary according to the sector of the economy, the degree to which HIV/AIDS affects hard-to-replace skilled labour and whether or not there is a substantial pool of “surplus labour”.
- Savings and investments of families will be reduced owing to the increase in HIV/AIDS-related health expenditures. If children’s education, health and nutrition suffer as a result, prospects for longer-run economic growth and development will decline.
- The AIDS epidemic may also divert public spending from investments in physical and human capital to health expenditures, leading over time to slower growth of the gross domestic product. Foreign and domestic private investment might also decline if potential investors become convinced that the epidemic is seriously undermining the rate of return to investment.
- The HIV/AIDS epidemic may also deepen the poverty of the most affected countries by decreasing the growth rate of per capita income and by selectively impoverishing the individuals and families that are directly affected.

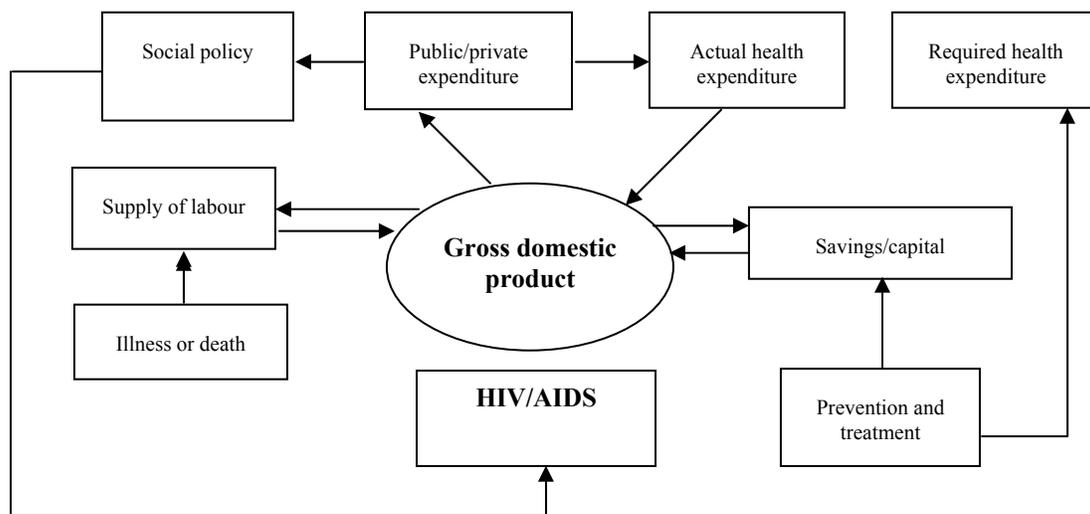
Cohen (1997), among others, stresses the effect of HIV on the size of the working population, which tends to reduce total output and worsen the dependency ratio. More children and elderly peo-

ple may have to be supported by a smaller active labour force. In addition, the composition of the labour force may change with respect to skills, education and experience, which would decrease the productivity of labour.

Theodore (2001), in a model applied to several Caribbean countries, identified four channels through which HIV/AIDS may affect the economy: the production channel; the allocation channel; the distribution channel; and the regeneration channel (figure 13). The production channel refers to the mechanisms through which HIV/AIDS affects the main factors of production—labour and capital—causing the production process to be less fruitful than it would have been in the absence of HIV/AIDS. The second channel through which HIV/AIDS may affect the economy is the allocation channel. One of the most important functions of the economic system is to ensure an efficient allocation of resources. HIV/AIDS reroutes some of those resources to medical expenses and away

from other productive uses. The third assumed channel through which HIV/AIDS affects the economy is the distribution channel, specifically, the distribution of income. In the face of an epidemic that increases health expenditures and weakens the income base, the lowest income groups may fare the worst. While the rich may have other assets—savings, land or capital—often the only productive asset of the poor is their own labour, which HIV/AIDS attacks. The upper income groups, though they are also affected, may be better placed to protect themselves and better able to afford treatment. Thus, the HIV/AIDS epidemic has the potential not only to affect all groups but also to widen the gap between different social strata. The fourth channel, the regeneration channel, refers to the investments in human capital, physical capital and new technology that are needed to keep the economy growing. If the HIV/AIDS epidemic compromises the saving capacity and the human capital of the economy, it will undercut the process of economic development.

Figure 13. Conceptual framework for the impact of HIV/AIDS on the economy



Source: Karl Theodore, "HIV/AIDS in the Caribbean: economic issues—impact and investment response". Commission on Macroeconomics and Health Working Paper Series, Paper No. WG1:1 (Cambridge, Massachusetts, Harvard University, Center for International Developments; and Geneva, World Health Organization, 2001).

B. APPROACHES TO ESTIMATING THE EFFECTS OF HIV/AIDS

A variety of economic modelling approaches have been employed to estimate the macroeconomic effects of the HIV/AIDS epidemic. In general, the task is to estimate how the economy would have performed in the absence of AIDS and contrast that result with an estimate of economic performance, given the estimated or projected number of HIV/AIDS cases. The economic outcome studied is typically growth in total gross domestic product per capita and/or growth in total GDP. Sometimes intermediate outcomes, such as effects on savings rates, have also been estimated. Sometimes the analyst is interested as much in trying to gain insight into the epidemic's differential effects on particular sectors of the economy as in estimating its effects on GDP as a whole.

Some studies have employed cross-national data, which may pertain to a single time period or to a time series. In those analyses, regression analysis was used to estimate the effects of one or more indicators of the volume of HIV/AIDS infections or deaths on economic outcomes, controlling for other variables that previous work had identified as having an important effect on economic growth.

Other analyses have employed an economic model fitted to the data of a particular country and, usually, projected for 10 or 15 years into the future. In a typical neoclassical growth model, AIDS affects total output directly, by decreasing the number and efficiency of workers, and also indirectly, by decreasing savings and investment. Since HIV/AIDS also results in a lower population than would otherwise have existed, the effect on GDP per capita is smaller than the effect on total output; at least in principal, there could be situations in which the net effect on GDP per capita would be nil or even positive. Since it is commonly the case that the values of some of the model's key parameters are not precisely known, analyses often include various scenarios, assuming different plausible values for the unknown parameters.

Some analyses have further elaborated the model by positing a dual-sector economy, in

which there is a relatively well-paying and productive formal sector, which tends to employ the more highly skilled workers, and a relatively low-wage, low-productivity informal sector that employs labour that is in surplus to the needs of the formal sector. With such a dual-sector model, the predicted economic effects of the HIV/AIDS pandemic can vary significantly depending on the degree to which infections are assumed to be concentrated in the more skilled workers that are key to the functioning of the formal sector. If a country has a substantial pool of surplus labour with very low marginal productivity, and if HIV/AIDS is highly concentrated in the pool of unskilled labour, then even a substantial prevalence of HIV/AIDS might have only a small effect on performance of the macroeconomy, while if the same number of infections were to occur in the skilled labour force, the macroeconomic effect could be large.

The latter type of model has, however, been criticized by some analysts (for example, Cohen, 2002) for downplaying the importance of the informal sector as an engine of economic advancement and also for downplaying the degree of expertise embodied in informal-sector employees and entrepreneurs, whose knowledge may be as difficult to replace as that of the skilled workers of the formal sector. Even if a substantial loss of unskilled labour were to have only a minor impact the growth of GDP in a particular economy, the impact on the families that depended on such labour would be dire. Many families depend on low-wage workers to maintain a basic level of subsistence, and the loss of those workers will deepen their poverty (see chapter III).

Other, more elaborated models have also been used to analyse how the impacts of HIV/AIDS on different sectors of an economy relate to overall economic performance. For instance, Kambou, Devarajan and Over (1992) applied an eleven-sector computable general equilibrium (CGE) model to estimate the economic effects of HIV/AIDS in Cameroon. The model is based on a snapshot picture of an economy contained in a social accounting matrix. CGE models are rich in sectoral and distributional data as compared with time-series-based and aggregated macroeconomic models, and are widely used to evaluate

trade and expenditure, since they commonly have differential impacts within society. Again, a lack of knowledge about many of the variables and their relationships often makes it necessary to make assumptions or borrow estimates from other situations in order to apply the models to the situations of particular countries affected by HIV/AIDS.

Another approach is to focus only on those directly affected by the epidemic, excluding from consideration the rest of the society. For example, Broomberg (1993) estimated the cost of HIV/AIDS in South Africa. The costs are divided into direct costs and indirect costs, where direct costs include the costs of health services provided by both public and private sectors to the persons living with AIDS at all stages of the disease, including testing costs, prevention research and education. The indirect costs include the economic value of disability and premature mortality as a result of HIV/AIDS, estimated as the present value of lost future earnings. The approach leaves out such macroeconomic effects as reduced investment as resources are diverted from other economic areas in order to cope with HIV/AIDS. Good-quality estimates of the direct and indirect costs of dealing with the epidemic are, however, much needed in order to derive sound estimates of the full macroeconomic effects.

C. EVIDENCE OF THE IMPACT OF HIV/AIDS

Many of the available studies on the impact of AIDS on the economy have covered the southern part of Africa, which currently has the highest levels of HIV prevalence. Some studies have also been conducted on countries in Eastern Africa, the region with the second-highest HIV prevalence, and some have covered other regions.

The macroeconomic effects of HIV/AIDS are explored below in terms of the differences in projected annual growth rates between “with-AIDS” and “no-AIDS” scenarios. It should be borne in mind that the effects of lower growth rates will cumulate over time since, unlike epidemics of such contagious diseases as influenza, HIV/AIDS will continue to exert its effects for many years into the future. For example, if the growth rate of GDP is lowered by HIV/AIDS by 1, 2 or 3 per-

centage points per year, in 15 years it will produce an economy that is smaller by about 15, 25 or 35 per cent respectively than it would have been in the absence of AIDS.

Dixon, McDonald and Roberts (2002) and Cornia and Zagonari (2002) reviewed studies that attempted to quantify the effect of HIV/AIDS on growth of GDP and GDP per capita in Africa. According to Dixon, McDonald and Roberts (2002, p. 233), “the consensus from these studies is that the net effect on the growth of GDP per capita will be negative and substantial. The more recent studies show greater effects; and the most recent estimates indicate that the pandemic has reduced average national growth rates by 2-4 [percentage points] a year across Africa”. Impacts on GDP per capita are smaller, and range from substantially negative to negligible or even positive impacts over the medium term of 10 or 15 years. The results of selected studies are summarized below and in table 18:

- Among the earlier papers, studies by Cuddington (1993a and 1993b) and Cuddington and Hancock (1994), using a neoclassical one-sector, two-factor growth model to predict economic growth in Malawi and the United Republic of Tanzania, found that over the period 1985-2010, GDP growth would be reduced by up to 1.5 percentage points in Malawi and 1.1 percentage points in the United Republic of Tanzania. Assuming that AIDS treatment costs would be entirely financed from savings, the AIDS epidemic would reduce per capita GDP growth by 0.3 percentage points in Malawi and by 0.1 percentage points per year in the United Republic of Tanzania.
- Applying an eleven-sector computable general equilibrium model to the analysis of the impact of AIDS in Cameroon, Kambou, Devarajan and Over (1992) found that over a period of five years the loss of an urban worker had seven times the negative impact on production as would the loss of a rural worker. In the capital goods, construction and ser-

TABLE 18. SUMMARY OF STUDIES OF THE MACROECONOMIC IMPACT OF HIV/AIDS IN AFRICA

Study	Countries and period of economic data	Period of most recently used HIV/AIDS data	Results (comparison with non-HIV/AIDS scenario)	
			Growth of GDP	Growth of GDP per capita
Dixon, McDonald and Roberts (2001)	41 countries (1960-1998)	Late 1990s	GDP growth rates reduced by 2-4% per year; large variation across countries, in line with prevalence of HIV	
World Bank (2001b)	Swaziland	Early 1990s	Average annual growth rate of GDP during 1991-2015 will be 1.3% lower	Average annual growth rate of GDP per capita during 1991-2015 will be 0.2% higher
World Bank (2001a)	Namibia	Early 1990s	Average annual growth rate of GDP in 1991-2015 will be 0.8% lower	Average annual growth rate of GDP per capita during 1999-2015 will be 0.1% higher
World Bank (2000)	Lesotho	Early 1990s	Average annual growth rate of GDP during 1999-2015 will be 1.4% lower	Average annual growth rate of GDP per capita during 1999-2015 will be 0.3% lower
Bonnel (2000)	About 50 countries (1990-1997)	Mid 1990s		Rate of growth of GDP per capita in Africa reduced by 0.7% per year in the 1990s (1.2% for a country with HIV prevalence of 20%)
Quattek and Fourie (2000)	South Africa	Mid 1990s	Average rate of GDP growth over next 15 years will be 0.3-0.4% lower per year	
Arndt and Lewis (2000)	South Africa	–	Annual growth rate of GDP is lowered by about 0.5% in the late 1990s, rising to 2.5-2.6% during 2008-2010	GDP per capita will be 8% lower in 2010 than in the absence of AIDS; implies that AIDS lowers average annual growth rate of GDP per capita by 0.7% during 1997-2010
Greener, Jefferis and Sifambe (2001)	Botswana	Late 1990s	During 1996-2021, annual growth rate of GDP reduced by 1.1-2.1%, 1.5% in the scenario considered most likely	Little effect: annual per capita GDP growth rate between 0.6% lower and 0.4% higher due to AIDS; 0.1% lower in the scenario considered most likely
BIDPA (2000a)	Botswana	Late 1990s	Average rate of growth of GDP in 2000-2010 reduced by 1.5% per year	
Bloom and Mahal (1995)	51 countries (1980-1992)	Early 1990s	Statistically insignificant effect on income growth	
Cuddington and Hancock (1994)	Malawi	Early 1990s	Average rate of growth of GDP in 1985-2010 reduced by up to 1.5% per year	Average growth of per capita GDP reduced by up to 0.3% per year ^a
Cuddington (1993a, 1993b)	United Republic of Tanzania	Early 1990s	Average annual rate of growth of GDP in 1985-2010 reduced by up to 1.1%	Average annual growth reduced by up to 0.5%
Kambou, Devarajan and Over (1992)	Cameroon	–	GDP growth rate over 1986-1991 reduced by 1.9% per year	
Over (1992)	30 sub-Saharan countries	Early 1990s	Average annual growth rate of GDP during 1990-2025 reduced by 0.9% on average (up to 1.5% in 10 worst affected countries)	Average annual growth rate of GDP per capita reduced by 0.15% per year (up to 0.6% in 10 worst affected countries)

Sources: Based on S. Dixon, S. McDonald and J. Roberts, "AIDS and economic growth in Africa: a panel data analysis", *Journal of International Development*, vol. 13 (2002); G. Cornia and F. Zagonari, "The HIV/AIDS impact on the rural and urban economy", in *AIDS, Public Policy and Child Well-Being* (Florence, Italy, UNICEF Innocenti Research Centre, 2002); and the studies cited in the table.

NOTES: A hyphen (-) indicates "not applicable". References to effect on GDP growth rates refer to average annual growth rates for the period mentioned, expressed as percentage point differences from a "no-AIDS" scenario.

^a For "extreme" assumption about future AIDS prevalence.

vices sectors, the negative impact would be 100 times larger when the lost workers were skilled and urban.

- Over (1992), using a model that distinguished between three classes of workers and between rural and urban production, projected the macroeconomic impact of AIDS on the growth trajectories of 30 countries in sub-Saharan Africa over the period 1990-2025. The macroeconomic impact varied depending on assumptions about relative levels of HIV infection in educated and uneducated workers and on the amount of the treatment costs taken from savings. For the assumptions the author regarded as most plausible (that 50 per cent of the treatment costs were financed out of savings and that each education class of workers has double the risk of the one beneath it), the net effect of the AIDS epidemic on the annual growth rate of per capita GDP was a reduction of about 0.15 percentage point on average and one third percentage point in the ten countries with the most advanced epidemics. The effect in the 10 most affected countries would be 0.6 percentage point if all the treatment costs were financed from savings.
- More recently, Theodore (2001) estimated the economic losses associated with HIV in three Caribbean countries (Jamaica, Saint Lucia and Trinidad and Tobago). He found that by 2005 HIV/AIDS would lead to a reduction of GDP, by comparison with a “no-AIDS” scenario, of 4.9 per cent in Jamaica, 2.1 per cent in Saint Lucia and 5.6 per cent in Trinidad and Tobago. Those estimates assume that all infected persons would be medically covered, with an estimated per capita treatment cost of \$4,000.
- Bonnel (2000) used cross-national regressions to estimate relationships among economic growth, policy, institutional variables and HIV/AIDS. He

estimated that, for a sub-Saharan country with HIV prevalence of 20 per cent, the annual growth rate of GDP per capita during the period 1990 to 1997 would have been 1.2 per cent higher without HIV/AIDS.

- Robalino, Jenkins and El-Maroufi (2002) developed a growth model to assess the risks of an HIV/AIDS epidemic and its potential economic consequences in nine countries in Western Asia and Northern Africa: Algeria, Djibouti, Egypt, Iran, Jordan, Lebanon, Morocco, Tunisia and Yemen. Adult HIV prevalence is still low in those countries, and prospects for future transmission are highly uncertain. However, given the mean values from the authors’ simulations, HIV prevalence may reach 3-4 per cent of the adult population by 2015 (higher in Djibouti), and over the period 2000-2025, the annual growth rate of GDP would be 0.3-0.4 percentage points lower than in the absence of AIDS (1.6 points in Djibouti).
- A 2002 World Bank study of the economic impact of HIV/AIDS in the Russian Federation showed that GDP in 2010 could be up to 4 per cent lower and that without intervention the loss could rise to 10 per cent by 2020 (Ruhl, Pokrovsky and Vinogradov, 2002). The study projected that the most significant impact for long-term development was the uninhibited spread of HIV, which would diminish the economy’s long-term growth rate, taking off half a percentage point annually by 2010 and a full percentage point annually by 2020. Another result of the study was that investment would decline more than production. In the pessimistic scenario, its level would decline by 5.5 per cent in 2010 and 14.5 per cent in 2020.

How large are these effects in comparison to other factors affecting economic growth? Some analysts note that other factors can produce effects

on economic growth that are at least as large as those estimated to result from the spread of HIV/AIDS. For instance, Greener (2002) states that a reduction in the rate of growth of GDP by between 0.5 and 2.6 percentage points, which encompasses the size of the effect indicated by most studies, “is within the range of variation that could be caused by poor economic management or fiscal policy. This implies that the macroeconomic impacts of HIV/AIDS, in themselves, can be substantially reduced by appropriate policy interventions” (Greener, 2002, p. 49). Nevertheless, such observations cannot bring much comfort, since such factors as poor economic management, war or drought are likely to make it all the more difficult to mount an effective response to the threat of HIV/AIDS.

In interpreting the estimates, it should be borne in mind that economic forecasting is not an exact science. It is not unusual to find economists—even those engaged in such analyses—adding cautionary notes about the reliability of the analytic outcomes. For instance, Cohen (1992) states, “It cannot be said that econometric modelling...has a good track record. Also, it should be readily admitted that we know relatively little about those structural relationships which are important for estimating the impact of HIV on development”.

One manifestation of this uncertainty is that analysts may come to substantially different conclusions about the impact of HIV/AIDS on a particular economy as a result of differing assumptions built into their economic models. For instance, Haacker (2002b) observes that studies of South Africa by Quattek and Fourie (2000) and Arndt and Lewis (2000) drew on the same demographic projections; however, the first study predicted that GDP per capita would be 7.5 percentage points higher by 2010 than in the absence of AIDS, but the second study projected that GDP per capita would be 8 percentage points lower by 2010 than in the absence of AIDS.

Haacker (2000a and 2000b) argues that many analyses have ignored the potential negative impact of HIV/AIDS on foreign investment and that this has probably led to an underestimate of the negative effect of the epidemic on the macroecon-

omy. Specifically, many of the analyses employing one-sector and dual-economy neoclassical growth models imply that the rate of return to capital would decline, but the analyses usually do not take account of the declines in foreign investment and the outflow of domestic capital that may occur in response. Haacker’s own estimates indicate that the effect could be large.

Some of the macroeconomic estimates presented above are themselves part of more comprehensive assessments that examine sector-specific impacts of HIV/AIDS and consider the effects on different strata of society. Such reports sometimes give a graver assessment of impacts on particular areas of the economy than might be supposed from the relatively modest size of the projected macroeconomic effects. Examples include the following:

- The World Bank study of Swaziland cited in table 18 estimated that HIV/AIDS would have the greatest impact on the agricultural, manufacturing and distribution sectors, which together accounted for over 60 per cent of value added in the national economy, with a likely devastating impact of AIDS on the productive sectors of the economy (World Bank, 2001b, p. 17). At the same time, the macroeconomic model employed projected essentially no effect on growth of GDP per capita over the period 1991-2015.
- In Botswana, related analyses by the Botswana Institute for Development Policy Analysis (2000a) and Greener, Jefferis and Siphambe (2001) conclude that even though per capita GDP will be little affected by the epidemic over the period 1996-2021, HIV/AIDS will come to dominate health systems, and AIDS patients may crowd out those with other illnesses. There will be an increase in poverty, and the degree of poverty will deepen. Up to half of households are likely to have at least one infected member, and one quarter of households are likely to lose an income earner within 10 years. In this

case, the divergence between the serious effects projected for households and the health sector and the relatively modest projected macroeconomic results can be attributed to the circumstance that Botswana's macroeconomic performance and its Government income are heavily dependent on its diamond industry, which is capital intensive and whose revenue probably will not be greatly affected by AIDS. Most of the impact is likely to fall on households, whose per capita income may fall by 8-12 per cent over the period 1996-2021 (Greener, Jefferis and Siphambe, 2001).

A number of researchers have argued that analyses of the epidemic's macroeconomic effects tend to give an overly sanguine assessment of the eventual economic impact of the epidemic because they fail to take account of effects on human capital and social capital that will become increasingly prominent as time goes on. According to Bell, Devarajan and Gersbach (2003, p. 2), "not only does AIDS destroy existing human capital, but by killing mostly young adults, it also weakens the mechanism through which knowledge and abilities are transmitted from one generation to the next; for the children of AIDS victims will be left without one or both parents to love, raise and educate them". A report by McPherson (2003, p. 4) states: "None of the models has adequately allowed for the erosion of networks and information channels that are fundamental to labour specialization and the maintenance of social capital".

That the available estimates are open to question does not detract from the importance of trying to assess overall economic effects of the epidemic (Greener, 2002). Policy makers need to have some understanding of how the epidemic will affect the economy and government income if they are to make sound choices in combating the epidemic and its effects.

D. BEYOND GROSS DOMESTIC PRODUCT: INCOME DISTRIBUTION AND WELFARE

Gross domestic product is not itself a measure of welfare. For one thing, the costs of responding to manmade or natural disasters add to GDP, even though well-being would have been greater had that spending not been needed. According to Greener (2002, p. 50), "activities such as increased household and government expenditure on health care related to HIV...will be counted as a part of GDP, even though they are not part of what would normally be thought of as a productive activity. Impact should perhaps be measured in terms of a more satisfactory indicator of socially productive economic activity". Another limitation is that conventional macroeconomic indicators are not by themselves informative about trends in the distribution of income nor, in particular, about the extent of and trends in poverty. In addition, as mentioned previously, the concept of "development" is too broad to be captured by measures of material welfare alone.

Most economists who have commented on the issue think that HIV/AIDS in developing countries will tend to make income distribution more unequal and will increase poverty, notably by impoverishing many of the households directly affected by the disease (see chapter III). Such effects can be dire for the well-being of the population and yet might have relatively little impact on GDP as conventionally measured: the fraction of national income represented by the poor is much smaller than the fraction they represent in the total population, and it follows that the deepening impoverishment of those who were already poor may have little effect on macroeconomic statistics.

With respect to indicators of welfare broader than GDP, a few studies used the human development index developed in the early 1990s by the United Nations Development Programme as an indicator to assess the impact of HIV/AIDS (Cohen, 1998; Gaigbe-Togbe, 2001). AIDS af-

fects the index through its effects on life expectancy, which is a component of the index.

Another approach is to try to include the economic value of health as an aspect of “economic welfare”, which by definition is not a matter of income alone. Jamison, Sachs and Wang (2001) attempted to assess the contribution of mortality changes in sub-Saharan Africa to such a broader measure of economic welfare. The first step is to estimate in monetary terms the value that societies place on improved longevity and then to use such valuations to derive a more inclusive measure of trends in economic welfare that incorporates trends in both mortality and GDP per capita. Empirical assessments of societies' willingness to pay to avert an adult death have found values ranging from about 75 to over 180 times per capita GDP (Jamison, Sachs and Wang, 2001). Therefore, the value attached to actual mortality changes can be large in relation to the size of conventionally measured trends in GDP. Estimates for five countries that have been heavily impacted by HIV/AIDS (Botswana, Kenya, Malawi, Zambia and Zimbabwe) show that between 1960 and 1985, when mortality was falling, the impact of lower mortality was to add a welfare value that was between 1.7 and 2.7 percentage points per annum above the growth rate of per capita GDP alone. However, between 1985 and 2000 the impact of the AIDS-induced increase in mortality was to subtract between 5 and 8 per cent annually, producing substantial reductions in the combined GDP/mortality measure of change in economic welfare. Crafts and Haacker (2003) adopted a similar approach to estimate the economic value of the loss in life expectancy attributable to HIV/AIDS, expressed as a percentage of GDP. They estimated that the value of welfare losses in 2003 resulting from lower life expectancy was substantial even in countries where HIV prevalence was 1-3 per cent and “horrific” in the countries with the highest prevalence. For instance, in the countries with adult HIV prevalence above 10 per cent, the estimated welfare loss caused by higher mortality has already resulted in a loss of welfare of over 40 per cent of GDP, and in Botswana this figure is about 80 per cent. The direct welfare effects of HIV/AIDS through increased mortality substantially outweigh even the worst

projections of the impact on GDP per capita (Crafts and Haacker, 2003, p. 17).

E. CONCLUSIONS

At present there is little agreement among economists about the extent of the effects on national economies that are directly attributable to the HIV/AIDS epidemic. The most enduring impact of AIDS on a country's economic development may be the loss of human capital, which represents a long-term investment and is rarely captured in economic models. The major findings of chapter VIII are summarized below:

- **Estimated effects of the epidemic on the rate of growth of GDP in affected countries range from “small” to annual GDP growth rates of 2-4 percentage points lower than in the absence of AIDS.** Estimates of the macroeconomic effects of HIV/AIDS are subject to a wide range of uncertainty. Differences in models and in assumptions sometimes lead to substantially different economic projections for the same country.
- **More recent analyses have tended to produce larger predicted impacts.** The projections may mainly show that HIV prevalence is rising over time and that earlier projections of HIV prevalence have in many cases proven to be too low.
- **The longer-term effects on the economy may be more serious than most macroeconomic estimates suggest.** Estimates of AIDS' effects on macroeconomic performance usually take no account of the loss of “social capital” or of the long-term damage that is accruing to human capital, as children's education, nutrition and health suffer directly and indirectly as a consequence of HIV/AIDS. The effects of lowered investment in the human capital of the younger generation will affect economic performance over future decades,

well beyond the time frame of most economic analyses.

- **Beyond its effects on growth of GDP, the HIV/AIDS epidemic is likely to exacerbate income inequality and increase poverty.**
- **The effects of HIV/AIDS on a population's welfare are not reducible to effects on GDP per capita.** Based on empirical evidence of societies' economic valuation of a death, the epidemic's effect on mortality itself repre-

sents a loss of welfare that dwarfs the estimated effects of HIV/AIDS on GDP.

Despite the uncertainties that surround such estimates, there remains a need for policymakers to understand the impacts that HIV/AIDS will have on overall performance of economies and budgets. In the most affected countries, the HIV/AIDS epidemic is yet another obstacle on the road to development. The difficulty of measuring the impact of the AIDS epidemic does not mean that there is less cause for alarm. Indeed, the real likelihood is that the full impact has yet to occur.