

Assessing the Macroeconomic Impact of HIV/AIDS in Uganda

Phase 1 Report
Literature Review: the Macroeconomic Impact
of HIV/AIDS

Final Draft

Keith Jefferis (Team Leader)

Justine Nannyonjo (Macroeconomist)

Jimrex Byamugisha (Statistician)

Sebastian Baine (Health Economist)

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List of Abbreviations

ABC	Abstinence, be faithful and condom use
ADPs	AIDS Development Partners
AIC	AIDS Information Centre
AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral therapy
BoU	Bank of Uganda
CDC	Centre for Disease Control
CGE	Computable General Equilibrium
DAC	District AIDS Committee
DTIS	Diagnostic Trade Integration Study
ESWAPI	Educational Sector Workplace AIDS Implementation
GDP	Gross Domestic Product
GFATM	Global Fund for AIDS, Tuberculosis and Malaria
GOU	Government of Uganda
HIPC	Heavily Indebted Poor Countries
HIV	Human Immunodeficiency Virus
IEC	Information, Education and Communication
IMF	International Monetary Fund
LTEF	Long-Term Expenditure Framework
MDGs	Millennium Development Goals
MoFPED	Ministry of Finance, Planning and Economic Development
MOH	Ministry of Health
MTCS	Medium Term Competitiveness Strategy
MTEF	Medium Term Expenditure Framework
NACP	National AIDS Control Programme
NACWOLA	National Community of Women Living with HIV/AIDS
NGOs	Non Governmental Organisations
NSF	National Strategic Framework
NSP	National Strategic Plan
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
PEAP	Poverty Eradication Action Plan
PEPFAR	President's Emergency Plan for AIDS Relief
PLWHA	People Living with HIV/AIDS
PMTCT	Prevention of Mother-To-Child Transmission of HIV
PRGFs	Poverty Reduction Growth Facilities
PRSPs	Poverty Reduction Strategy Papers
REER	Real Effective Exchange Rate
STD	Sexual Transmitted Diseases
TASO	The AIDS Support Organisation
UAC	Uganda AIDS Commission
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNASO	Uganda Network of AIDS Service Organisations
UNDP	United Nations Development Programme
UNFPA	United Nations Family Planning Association
UNGASS	United Nations General Assembly Special Session on HIV/AIDS

UNICEF	United Nations Children's Fund
UNMDGs	United Nations Millennium Development Goals
USAID	United States Aid for International Development
USD	United States Dollar
UTTA	Uganda Think Tank on AIDS
VCT	Voluntary Counselling and Testing
WHO	World Health Organisation

Introduction

Background

Over the past few years, dealing with HIV/AIDS and its effects has become one of the major public policy issues in many countries in Southern and Eastern Africa. While it is fundamentally a health issue, the impact of HIV/AIDS goes far beyond health because of its widespread human, social and economic effects. Southern and Eastern Africa have the highest HIV prevalence rates in the world, and in many countries in the region HIV and AIDS have spread throughout the general population, rather than being concentrated in specific sub-groups of the population as tends to be the case elsewhere in the world. As a result, it is estimated that nearly two-thirds of all HIV positive people in the world live in sub-Saharan Africa, while South Africa, along with India, has the highest number of HIV positive people of any country in the world.

Uganda was one of the first countries in Africa to experience a widespread HIV and AIDS epidemic, and has also been one of the most successful in dealing with the problem and bringing down HIV prevalence and incidence rates. Although HIV prevalence rates are not as high as in some Southern African countries, where prevalence rates of over 15% of the adult population are typical, it nonetheless has a large number – estimated at around 1 million – of HIV positive people, with associated problems of ill-health, death and orphanhood (see Table 1).

The economic impact of HIV and AIDS operates through a number of channels. These include direct impacts on GDP growth through labour supply, productivity and savings/investment channels. To a certain degree, these impacts can be offset through the provision of treatment programmes which ameliorate the health, social and economic impacts of HIV and AIDS. Such programmes are, however, expensive, which raises questions regarding competing demands on resources, both public and private, and potential fiscal impacts. Increasingly, poor countries have access to donor financing to meet a substantial portion of these costs, which changes the potential fiscal impact but raises additional issues regarding monetary and exchange rate implications that can have indirect effects on competitiveness, inflation and economic growth. Concerns regarding these indirect impacts of HIV and AIDS, and spending on treatment, have in some countries, including Uganda, raised issues regarding the optimal rate at which donor funds should be utilised.

Rationale for the Study

Although there is awareness of the general economic impacts of HIV and AIDS in Uganda, little work has been done on quantifying these impacts, and particularly on quantifying the impact of alternative approaches. This has hindered macroeconomic planning and the formulation of an appropriate HIV/AIDS response. While there is awareness that there is a need for a scaling up of the response to HIV and AIDS, and that donor funds to do so are largely available, there is concern that macroeconomic instability could potentially result, and that this could undermine the great strides that Uganda has made in achieving macroeconomic stability over the past 15 years. Hence there has been uncertainty over the level of investment that should be made in responding to HIV and AIDS in Uganda.

The need for a study to assess the macroeconomic impact of HIV and AIDS in Uganda has been under discussion since early 2005, when it was raised in meetings between UNAIDS and the Ministry of Finance, Planning and Economic Development (MoFPED). The need was further discussed by the Uganda Think Tank on AIDS (UTTA) and the AIDS Partnership Forum, and the UN system was requested to spearhead the process. As a result, Terms of Reference for a study on the Macro-Economic Assessment of HIV/AIDS in Uganda were drawn up by a Technical Working Group comprising UNDP, MoFPED and other stakeholders.

Table 1: HIV/AIDS Data for Selected African Countries

	Estimated number of people living with HIV				AIDS Deaths	Orphans due to AIDS
	HIV+ Adults and children 2005	HIV+ Adults (15+) 2005	Adult (15-49) HIV rate (%) 2005	Adult (15-49) HIV rate (%) 2003	Deaths in adults and children 2005	Orphans (0-17) currently living 2005
Sub-Saharan Africa	24 500 000	22 400 000	6.1	6.2	2 000 000	12 000 000
Angola	320 000	280 000	3.7	3.7	30 000	160 000
Botswana	270 000	260 000	24.1	24.0	18 000	120 000
Congo DR	1 000 000	890 000	3.2	3.2	90 000	680 000
Lesotho	270 000	250 000	23.2	23.7	23 000	97 000
Kenya	1 300 000	1 200 000	6.1	6.8	140 000	1 100 000
Madagascar	49 000	47 000	0.5	0.5	2 900	13 000
Malawi	940 000	850 000	14.1	14.2	78 000	550 000
Mauritius	4100	4100	0.6	0.2	<100	...
Mozambique	1 800 000	1 600 000	16.1	16.0	140 000	510 000
Namibia	230 000	210 000	19.6	19.5	17 000	85 000
Rwanda	190 000	160 000	3.1	3.8	21 000	210 000
South Africa	5 500 000	5 300 000	18.8	18.6	320 000	1 200 000
Swaziland	220 000	210 000	33.4	32.4	16 000	63 000
Tanzania	1 400 000	1 300 000	6.5	6.6	140 000	1 100 000
Uganda	1 000 000	900 000	6.7	6.8	91 000	1 000 000
Zambia	1 100 000	1 000 000	17.0	16.9	98 000	710 000
Zimbabwe	1 700 000	1 500 000	20.1	22.1	180 000	1 100 000
Global	38 600 000	36 300 000	1.0	1.0	2 800 000	15 200 000

Source: UNAIDS (2006)

Terms of Reference and Action Plan

The Terms of Reference indicate that the study should be conducted in three phases, as follows:

Phase 1: conduct a literature review from Uganda and the region on existing micro economic and macroeconomic studies and models, detailed methodology and scope of work for phase two;

Phase 2: carry out a selected number of micro-economic studies/surveys;

Phase 3: carry out an aggregated macro-economic analysis, production and validation of report.

This structure is commensurate with the deliverables specified in the Terms of Reference, which are:

- a) an inception report detailing the consultant's understanding of the TOR, the methodology, process and work plan to be presented to the Technical working group including analysis/study tools ;
- b) a report on the literature review of existing micro-economic/sector impact studies in Uganda or in the region;
- c) a report on selected sector assessments/surveys;
- d) a detailed report on the macroeconomic impact of AIDS in Uganda including suggestions of policy reforms/ advice as set out in the study objectives, and models for future HIV/AIDS modelling the macro-economic impact;
- e) progress reports/presentations to the Technical Working Group and Technical Advisory Panel

The Inception Report was delivered to the Technical Working Group in June 2007.

This report comprises the primary deliverable for Phase I of the Study on the Macroeconomic Impact of HIV/AIDS in Uganda. It comprises two main components:

- (i) an overview of the evolution of HIV/AIDS, policies and interventions in Uganda;
- (ii) a review of relevant literature that has been identified to date, covering (a) sector studies, (b) overall macroeconomic impact, (c) methodological approaches, and (d) the fiscal impact, role of external assistance and macroeconomic policies;

The team has identified a large quantity of relevant literature in this phase of the study, and as far as possible this literature has been reviewed and relevant points summarised in this document.

Recommendations for the scope of work for Phase II of the study will be presented at the workshop where the report is to be discussed.

The Evolution of HIV/AIDS, Policies and Interventions in Uganda

Introduction

Uganda's response to the HIV/AIDS has been aggressive and productive in terms of controlling and preventing the epidemic. Uganda has played an exemplary role in the HIV/AIDS prevention and control interventions, research and training to the rest of the world. In 1982, the first cases of HIV/AIDS were identified in fishermen at the Kasensero landing site on the shores of Lake Victoria in Rakai District in Uganda (Serwadda et al, 1985). It was first called 'SLIM' because it was a mysterious disease that made its victims thin and thinner before dying. HIV infection suppresses the immune system and the victims die due to opportunistic infections. The disease initially spread in major urban areas and along the highways. The disease then spread throughout the country and by 1988 an estimated one million Ugandans were thought to be HIV infected (Dyer, 2003). To date, it is estimated that two million people have been with infected by HIV, of whom one million have died and another one million is still living with the infection (MOH, March 2006)

During the period 1981-1985, Uganda was in the midst of a civil war and political turmoil that caused a shattered economy and stagnation. There was abuse of human rights, violence and military intimidation that facilitated the spread of HIV/AIDS through unprotected sexual intercourse. This period 1982-1985 was also characterised by denial about the HIV/AIDS epidemic. The situation at that time provided a favourable environment for the spread of the HIV infection.

The President of Uganda (His Excellence Yoweri Kaguta Museveni) recognised HIV/AIDS as a problem affecting Ugandans in all the sectors socially and economically, and spearheaded the fight against it in 1986. "President Museveni's social mobilisation and empowerment allowed everyone to participate in the fight against AIDS within their own mandate" (Dyer, 2003: pp 8). The President's openness and involvement was perceived to ease the bureaucracy and access to financial support by the many players. The policy of openness about the epidemic is a cornerstone of the national response to the HIV/AIDS epidemic, and especially in the fight against stigmatisation and discrimination of HIV infected persons.

In May 1986, the Minister of Health revealed the problem of AIDS in Uganda at the World Health Assembly in Geneva and requested the support of the international community in the fight against it, a move that was perceived as demeaning by some participants from Africa (Kaleeba, Kadowe, Kalinaki, and Williams, 2000).

Response to the HIV/AIDS Epidemic in Uganda

The government has always been at the forefront as illustrated by the strong political commitment and involvement in the control and prevention of the HIV/AIDS epidemic. The government of Uganda in collaboration with the World Health Organisation (WHO) established the National AIDS Control Programme (NACP) in the Ministry of Health (MOH) in 1986. The NACP is at the forefront in tackling HIV/AIDS challenges and has been responsible for conducting HIV epidemiologic surveillance, ensuring safe blood supply, providing HIV/AIDS information, education and communication, providing patient care and counselling, and prevention and control of sexually transmitted infections (MOH, 2002 and UAC, 2003). Evaluation of the NACP revealed a need to

address HIV/AIDS in a broader context and recommended involvement of multiple actors in the control and prevention of the HIV/AIDS epidemic. Following the recommendations of the NACP evaluation, the government adopted a multisectoral approach that saw the coming in of different sectors of government, non-governmental organisations (NGOs)/civil society organisations, health development partners, and community groups to sustain HIV/AIDS interventions. This demanded a body to coordinate the multiple players responding to the HIV/AIDS epidemic, hence, the establishment of the Uganda AIDS Commission (UAC) in 1992 (UAC, 2000).

The UAC has a range of responsibilities: to coordinate the different organisations involved in HIV/AIDS activities; to formulate HIV/AIDS policies; and to establish programme priorities for the control and management of the impact of the HIV/AIDS epidemic. UAC brings together the different partners to share views about HIV/AIDS epidemic and interventions being implemented to control it. The adoption of a multi-sectoral policy and strategy yielded a commendable response and good results as regards containment of the HIV/AIDS pandemic (UAC, 2004a). A multisectoral approach formed another cornerstone, in addition to the open policy, of the national response to the HIV/AIDS epidemic. A multisectoral approach called for collective effort by all stakeholders according to their authorisation, and areas of comparative advantages and capacities

The public health response in the prevention and control of the HIV/AIDS epidemic has aimed at:

- prevention of sexual transmission of HIV through promotion of safer sexual behaviour, provision of condoms, promotion of sexual transmission disease (STD) care seeking behaviour and provision of effective STD care;
- mitigation of the impact of AIDS through provision of support for community and home-based care and social support for people living with HIV/AIDS (PLWHA), training in clinical management of HIV/AIDS and tuberculosis, provision of drugs for opportunistic infections and protective supplies for district health facilities (government and non-government), and provision of TB diagnosis and case management; and
- supporting institutional development to manage HIV prevention and AIDS care by strengthening the district's capacity to plan, coordinate, implement, monitor and evaluate integrated AIDS related activities, and strengthening the national capacity to provide adequate technical support on health issues related to HIV/AIDS.

National Policies and Guidelines Related to HIV/AIDS

The development of policies and guidelines involved a highly consultative process and followed the principles of consensus building. The process was also highly informed by evidence-based information from teaching and research institutions such as the Mulago and Mbarara National Teaching and Referral hospitals, Uganda Virus Research Institute, Joint Clinical Research Centre, and other highly credible organisations such as The AIDS Support Organisation (TASO), AIDS Information Centre (AIC), Mildmay, AIDS/HIV Integrated model Programme and Center for Disease Control (CDC) Uganda. There was a lot of support from multi-lateral and bi-lateral agencies such as Joint United Nations AIDS/WHO, Department for International Development (DFID), and United States Agency for International Development (USAID).

HIV/AIDS is given due considerations in key policies and documents such as the national population policy (Ministry of Finance, Planning and Economic Development, 1995), National Health Policy (MOH, 1999), Health Sector Strategic Plans 2000/01-2004/05 (MOH 2000/01-2004/05) and Health Sector Strategic Plans 2005/06-2009/10 (MOH 2005/06-2009/10). Other relevant documents include:

- National AIDS Policy (draft form)
- Policy for the Reduction of the Mother-to-Child HIV Transmission in Uganda, May 2003;
- Uganda National Policy on HIV Counselling and Testing, September 2005;
- The Revised National Strategic Framework for HIV Activities in Uganda 2003/04-2005/06;
- The National Monitoring and Evaluation Framework, for HIV/AIDS activities in Uganda – 2003/04-2005/06;
- Policy Guidelines for Prevention of Mother-to-Child Transmission of HIV; Revised edition August 2006;
- HIV/AIDS Monitoring and Evaluation A guide For Districts; Revised January 2007;
- National Antiretroviral Treatment and Care Guidelines for Adults and Children, November 2003;
- Voluntary Counselling & Testing (VCT). A Guide for Mobilisation of Communities (AIC, MOH and UNFPA);
- National Policy Guidelines and Service Standards for Reproductive Health, MOH, May 2001;
- Poverty Eradication Action Plan (PEAP) 2004/05-2007/08
- Uganda Demographic and Health Survey 2000/01;
- Uganda Demographic and Health Survey 2006;
- Baseline Survey of the Trends and Impact of HIV/AIDS on the Public Service in Uganda, Ministry of Public Service, 2000;
- Implications of HIV/AIDS on Public Service Capacity and Performance, Ministry of Public Service, 2003;
- Knowledge Attitude Behaviour and Practice studies;
- Sero-survey on HIV/AIDS and STDs among the commercial sex workers in Kampala City, Uganda, June 2003;
- Uganda HIV/AIDS Sero-Behavioural Survey 2004/05
- HIV Surveillance Reports on HIV/AIDS, STD/AIDS Control Programme, Ministry of Health;
- TASO, Strategic plan for the period 2003-2007;
- Straight Talk Foundation Strategic Plan 2005-2010;
- Research reports; and
- Local and international journals.

The goals of the National Strategic Framework (NSF) for HIV/AIDS activities in Uganda for the period of 2003/04-2005/06 (UAC, 2004b) are explicitly detailed as follows:

- reduction of HIV prevalence by 25%;
- mitigation of the health effects of HIV/AIDS and improve the quality of life of PLWHA; and
- strengthening the national capacity to coordinate and manage the multi-sectoral response to HIV/AIDS.

The National AIDS Policy (draft) points out clearly the main AIDS concerns in the development agenda of Uganda and provides:

- a framework to address the multidimensional challenges of the epidemic in a coordinated manner;
- for protection of the rights of vulnerable individuals and populations, and mitigation of the impact of the epidemic at the individual and community levels, and micro- and macro-economic development;
- a framework for strengthening the capacity of institutions and communities to respond to the social and economic challenges of the epidemic; and
- a framework for strengthening monitoring and evaluation of HIV/AIDS programmes, conducting research, and for resource mobilisation (MOH, March 2006).

HIV/AIDS policy guidelines and service standards for HIV/AIDS services provide minimum standards for HIV/AIDS service delivery and logistics management at different levels of care. The monitoring and evaluation framework provides information useful for guiding, tracking progress and decision making in the implementation of interventions against HIV/AIDS.

The National Strategic Plan (NSP), 2007/8 – 2011/12, is in the process of being drawn up, and is likely to focus on seven thematic areas: Prevention, Care & Treatment, Social Support, Research & Development, Resource Mobilization and Management, Institutional Arrangements and Human Resource Requirements, and Infrastructure Requirements (Youri, 2007).

Interventions Against HIV/AIDS

The primary transmission of HIV/AIDS in Uganda is through heterosexual contact, followed by perinatal transmission, infected blood, and unsafe injections. Therefore, the strategy to contain the spread of the epidemic sought to address sexual behaviour risk factors. Most health interventions against HIV/AIDS were focused initially towards equipping the Ugandan population with knowledge to delay sexual debut, reduce non-marital sexual partners; and use condoms (Abstinence, Being faithful and Condom use, or ABC).

Uganda implemented promotive and preventive interventions with the objectives of preventing sexual transmission of HIV, mitigating the personal and community impact of AIDS, and developing institutional capacity to respond to the HIV/AIDS epidemic. The key interventions include community mobilisation, voluntary counselling and testing (VCT), prevention of mother-to-children transmission (PMTCT), blood safety, and abstinence, be faithful and condom use. More detail on these interventions is provided in the sections that now follow:

Community mobilisation

In addition to government's effort to educate people on how to avoid HIV/AIDS, local and international NGOs joined in to address the need for information and support. For example, faith-based NGOs under the umbrella organisations (Uganda Catholic Medical Bureau, Uganda Protestant Medical Bureau, and Uganda Moslem Medical Bureau) have played a key role in educating and mobilising the communities to respond to the epidemic (UNAIDS, 1998).

In addition, the government loosened its control on the mass media during the 1990s. This gave an opportunity to the mass media to contribute to the fight against HIV/AIDS epidemic through publishing cartoons, articles, photographs, discussions in news papers, documentaries, feature films, and other health and social issues related to HIV/AIDS were broadcast on radio and television (Kaleeba, Kadowe, Kalinaki, and Williams, 2000). Radio played a key role as a source of information on HIV/AIDS in both the urban and rural areas.

PLWHA spoke out and put a human face on HIV/AIDS. They gave testimonies in public to encourage positive living and to reduce stigmatisation of persons infected with HIV/AIDS. This approach contributed to helping people understand and accept that HIV/AIDS is no longer a mysterious disease and was among them, ways through which it is spread, and reduced risky behaviours that could lead them to contract the infection. Many audiences became receptive to campaigns for safer sex. Currently, in most families, either a relative or friend or colleague was infected or affected by HIV/AIDS. Initially, there was a state of disparity and resignation. Public testimonies by infected persons helped people to develop coping mechanisms to confront the HIV/AIDS epidemic and to create a supportive community after hearing from them.

The majority of the Ugandan population are aware about HIV/AIDS, preventive measures they can take to avoid HIV/AIDS and HIV/AIDS related services such as HIV testing and counselling. For instance, 8% of women and 12% of men interviewed in the Uganda Demographic Survey (UDHS) done in 2000/01 reported having been tested for HIV/AIDS (Uganda Bureau of Statistics and ORC Macro, 2001 *bid*).

AIDS Health Promotion and education

A health promotion and education strategy was implemented to stop the transmission of HIV infection. The objectives were to give the population information on how HIV is transmitted and to promote safe sexual behaviour. Programmes were aired on radios and televisions, brochures and posters were provided, target groups were addressed in special anti-HIV/AIDS campaigns, and training seminars were held for parents, teachers, religious and political leaders, modern and traditional health workers. Messages like love carefully, zero grazing or be faithful to one sexual partner and condom use were sent across the country through mass media, drama, pamphlets and posters. In addition, there were multiple other channels through which messages related to HIV/AIDS were transmitted to the population e.g. formal talks, peer educators, comic books and films (UAC, Measure Evaluation and MOH, 2003). The target audience for the different anti-HIV/AIDS campaigns were people in the sexually active age group, especially the adolescents.

The Ministry of Education and Sports, in collaboration with United Nations Children's Fund (UNICEF), established the school-based health educational programme in 1987. Its ultimate goal was to increase the age for the first sexual debut or delaying sexual intercourse.

Further, in collaboration with UNICEF, the government through UAC and Ministry of Health implemented a Safeguard Youth From HIV/AIDS initiative. Safeguard Youth From HIV/AIDS initiative works with the government agencies and NGOs to reduce sexually transmitted infections (including HIV) among the sexually active youth and promotes postponement of sex among the young population.

Straight Talk Newspaper was launched in 1993 to educate the youth about sexual and reproductive health, to promote adoption of safer sex (Straight Talk Foundation, 2004). This was followed by campaigns promoting safer sexual behaviour, including abstinence, partner reduction and condom use. HIV prevention messages were in the form of songs, rap music contests, drama, a newsletter, essay competitions and posters.

Abstinence, Being faithful to one partner and Condom use (ABC)

Sexual abstinence, mutual faithfulness among the married and cohabiting partners, and condom use especially in higher risk sexual encounters were promoted. This has continued to be the cornerstone of the HIV prevention strategy to date.

Implementation of the ABC strategy contributed to the decline of the HIV/AIDS prevalence and incidence. Religious groups advocated abstinence or delayed sexual debut among the unmarried and being faithful to one partner among the married couples. Other partners in the fight against HIV/AIDS advocated abstinence, being faithful to one partner and in addition to use of condom where one has to change sexual partners. Given that the majority of Ugandan population are children, abstinence and being faithful alone prevented a significant number of infections as the age at sexual debut for women rose from 15.9 years in 1988 to 16.6 years in 2000 while in men age at sexual debut rose from 17.3 years in 1995 to 18.5 years in 2000 (Uganda Bureau of Statistics and ORC Macro. 2001).

The abstinence, be faithful and condom use (ABC) strategy has been expanded to ABC plus. The ABC plus strategy includes: voluntary counselling and testing (VCT), prevention of mother-to-child transmission of HIV (PMTCT), antiretroviral therapy (ART), and HIV/AIDS care and support services (MOH, March 2006).

Condom promotion

The MOH, among other things, promoted the use of condoms. However, social marketing for change went beyond the health sector. "Condoms were distributed through government, NGOs, social marketing organisations, and the private sector" (Dyer, 2003 pp. 23). The public distributed free of price to the recipients while social marketing organisations provided them at affordable prices at accessible outlets. Condom use was promoted through advertisements, and health promotion and education activities. Condom promotion has been part of the HIV prevention efforts since 1986.

HIV Counselling and Testing

The AIDS Information Centre (AIC) was formed in 1993 to address the increasing demand by individual who wanted to know their HIV/AIDS status. AIC begun with one centre in Kampala and offered counselling and testing services but now has opened up satellite sites in rural and other urban areas. The satellite sites are located in public health facilities with a few of them located in NGO and private-for-profit sector. VCT is now available district hospitals, health centre IVs and stand-alone testing sites.

Counsellors are well trained and HCT service standards monitored and regulated with the support of supervisors and managers. HIV testing quality control is ensured at all HCT sites and is also a responsibility of all members of the health team.

Confidentiality is assured through keeping HIV test results and patient records in locked files and limiting access to HCT personnel only except the client or when client requests release in writing or a court order requires it.

All HIV testing is done with the consent of the client or patient. The individual is informed about the HIV testing and is free to accept or not. The consent is documented and confirmed by the client's signature or thumbprint for those unable to write (MOH, September 2005).

Anti-retroviral therapy (ART)

Despite the fact that Anti-retroviral drugs were known to be effective in improving the quality and quantity of life, Uganda did not use them initially as a standard treatment because the costs involved were very high. However, with the steady decline in prices for Anti-retroviral drugs, the MOH in collaboration with WHO/UNAIDS and other health development partners established a comprehensive care programme for the HIV infected persons. There is now increased access to anti-retroviral drugs. National antiretroviral treatment and care guidelines for adults and children were developed largely to lead the health workers in management of HIV patients and to use anti-retroviral drugs correctly (MOH, November 2003).

Some studies done after the introduction of ART revealed a decreased viral load among those consuming antiretroviral drugs. They also showed that providing ART, prevention counselling and partner VCT was associated with reduced sexual risk behaviour and estimated risk of HIV-infected adults (Bunnell *et al*, 2006).

Prevention of Mother-to-Child Transmission of HIV (PMTCT)

In 1994, a clinical trial showed that a regimen of Zidovudine administered to non breast-feeding HIV-positive pregnant women reduced the risk of vertical transmission and pre-natal HIV infection (CDC, 1994; Sperling *et al*, 1996; Simonds *et al*, 1998). However, most developing countries (including Uganda) could not afford the cost of the drugs and breast milk substitutes needed so as to make the use of zidovudine a standard cure.

Uganda piloted a project for the PMTCT in 2000. It involved provision of a comprehensive package of care including administration of prophylactic antiretroviral drugs to pregnant mother living with HIV during pregnancy, labour and immediate post partum period.

Basing on the good performance of the project, Uganda in collaboration with UNAIDS/WHO, UNICEF, and other health development partners scaled up to all districts by 2004. Unfortunately, only about 10% of pregnant women living with HIV/AIDS accessed prophylactic antiretroviral drugs for PMTCT by December 2005 (MOH 2005).

The PMTCT policy (MOH, May 2003) was reviewed and updated to align it to the global and local developments in the era of HIV/AIDS epidemic. This provided a basis for the design of the PMTCT guidelines (MOH, August 2006). The PMTCT is consistent with the Minimum Health Care Package, National Health Policy and the Poverty Eradication Action Plan (PEAP 2004/05-2007/08). It also take into account the UNAIDS policy position (UNAIDS, June 2005), UNAIDS/WHO's "3 by 5" initiative (WHO/UNAIDS, 2003) and health Millennium Development Goals (UNMDGs, 1995).

Blood Safety

Infected blood transfusion contributed significantly to the spread of HIV/AIDS. Guidelines limiting to blood transfusion to only when absolutely necessary were circulated. Uganda blood transfusion services were rehabilitated and strengthened in the second half of the 1980s so as to be able to screen all blood received at the blood banks (one central and five regional blood banks) created to supply safe blood. These recruited donors and screened blood for distribution to hospitals and now to health centres where surgical operations and deliveries are conducted.

The overall goal was to prevent spread the spread of HIV through blood and its products. Screening procedures for potential blood donors were introduced to help reduce the prevalence of HIV among donors (UNAIDS 1999).

Monitoring and Evaluation of HIV/AIDS Related Activities

Monitoring and evaluation are conducted to ensure interventions are implemented according to plan, register/record progress and guide support supervision to improve on the achievements. The activities done include: surveillance for sexual transmission/HIV/AIDS, operational research and special studies, and data collection on monitoring indicators. At the national level, monitoring and evaluation generate data on national level indicators that are consistent with international reporting requirements of bodies such as WHO, UNAIDS, USAID and Centre for Disease Control (CDC), and United Nations General Assembly Special Session on HIV/AIDS (UNGASS) requirements. At the district level, monitoring activities focus on examining the implementation of district HIV/AIDS work plans. The indicators at the district level include inputs, process and outputs. The main focus is on the implementation status of activities rather than the impact (MOH, 2007).

Other Actors in the Prevention and Control of HIV/AIDS

At the beginning of the epidemic, Uganda lacked resources to meet the demands of overwhelming numbers of HIV/AIDS affected persons, control the HIV/AIDS epidemic; to allay the personal impacts of the HIV/AIDS; and to develop capacity to sustain an effective fight against HIV/AIDS.

The presence of political commitment, leadership and the open policy on HIV/AIDS were essential and attracted both local and international development partners and civil society organisations to actively participate in the fight against HIV/AIDS (Dyer, 2003). NGOs and community-based organisations were encouraged, given freedom and proliferated. Registration of NGOs was easy and they received support from government. It was estimated that more than 1,000 NGOs were involved in HIV/AIDS control activities in Uganda by 1992. The number of NGOs involved in HIV/AIDS activities increased to about 1,300 in 2002 and significant proportion of the NGOs have operated at the district level since the second half of the 90s to date (UNDP, 2002).

Some of the large local NGOs that sprung up and intensified the fight against HIV/AIDS largely through VCT, treatment of opportunistic infections, and social support to the HIV/AIDS patients and their immediate family include:

The AIDS Support Organisation (TASO)

TASO is the largest homegrown NGO providing HIV/AIDS services in Uganda. 16 colleagues most of whom have died due to AIDS formed TASO in 1987. The founders were either directly infected with HIV or indirectly affected because their relative(s) or close family friends were infected or both. They had an experience of encountering HIV/AIDS at a time when stigmatisation and discrimination of PLWHA and ignorance about HIV/AIDS were at their peaks. In the early 1980s HIV/AIDS was associated with immorality or reckless behaviour. Persons known to be infected with HIV or those who lost spouses to HIV/AIDS were stigmatised and discriminated against. TASO was founded to contribute to a process of restoring hope improving the quality of life of persons infected and communities affected by HIV infection and disease respectively. The philosophy of TASO is care for PLWHA. TASO's vision is "Living Positively with HIV/AIDS" (TASO 2003-07, pp 1). Compassionate care facilitates early diagnosis and treatment of opportunistic infections and improves the quality of life of infected individuals. TASO still provides the following services:

- *Counselling*

Counselling services are provided at personal, family and community levels. The sole aim is to empower the infected and affected persons: to make informed decisions, improve their quality of life, and to dispel fears of contracting the disease through casual contact; to facilitate care of the infected and affected persons; to prepare families to provide home nursing care; to empower the community to respond to the problems generated by HIV/AIDS; and to enhance community participation especially in evaluation of their responses and mobilisation of community resources.

- *Treatment of opportunistic infections*

Medical services are focused on treatment of opportunistic infections to improve the quality of life of the HIV infected persons.

- *Provides nutrition materials*

TASO provided food and food supplements to persons infected or affected by HIV/AIDS to improve their nutrition status, quality of life and longevity.

TASO collaborates with the MOH, AIC, Medical Research Council, Mildmay Centres, Uganda Hospice, Mission hospitals, offices of the District Directors of Health Services and Local government structures.

TASO has also played a key role in the formation and strengthening of other organisations such as: traditional and modern health practitioners together against AIDS; Uganda network of AIDS service organisations; and the national community of women living with HIV/AIDS (NACWOLA).

AIDS Information Centre (AIC)

AIC was set in Kampala in 1990 purposely to provide VCT services and information on HIV. This was perceived to be an entry point intervention for effective prevention and control of HIV, care for the infected and affected persons, and treatment of opportunistic infections.

AIC contributed to the national priority and strategic framework through providing HIV counselling and testing at its regional centres and support to health facilities and other organisations engaged in

providing HIV counselling and testing. AIC built capacity for health facilities to provide HIV counselling and testing, and also supplied them with testing kits free of cost. It was responsible for ensuring quality of HIV testing done at these health facilities. AIC provides information on HIV/AIDS to individual clients and through mass media and outreaches to the public. AIC empowers individuals and communities to adopt safer sexual behaviour and practices in order to reduce the rate of HIV transmission.

AIC uses an integrated HIV counselling model i.e. along with HIV counselling and testing, AIC provides family planning services, treatment of sexually transmitted infections and post test services (including continued counselling and psychological support). It also provides other services such as treatment of opportunistic infections, and prevention and treatment of tuberculosis in PLWHA.

In the first year, AIC provided VCT for over 9,000 clients, which was beyond the AIC target of 5,000. It served over 800,000 clients by 2003 (AIC, 2004). Those who test sero-positive for HIV/AIDS are given information to improve their quality of life and those who test sero-negative are given information to ensure they remain safe and how they can support those people intending to take the test and others already living with HIV/AIDS.

Other local NGOs responding to HIV/AIDS in Uganda

Other NGOs that were formed in response to the HIV/AIDS epidemic include Uganda Network of AIDS Service Organisations (UNASO) an umbrella organisation that coordinates NGOs involved in HIV/AIDS activities and NACWOLA, which gives a voice to women who are HIV infected and helps them to identify practicable options to cope with the HIV infection and disease in a wider context of the family and societal environment (TASO 2003-07).

International NGOs responding to HIV/AIDS in Uganda

International NGOs that formed to contribute to the struggle against the HIV/AIDS epidemic included: AIDS Integrated Model and Uganda Program for Holistic Development.

The involvement of NGOs/civil society organisations in addition to government efforts created synergism and a force aiming at ensuring that HIV/AIDS infected individuals and affected families are reached.

Financing of HIV/AIDS Related Activities

The domestic resources available for HIV/AIDS-related activities have not been adequate to implement the national HIV/AIDS Strategic Framework, and the government has had no alternative but to seek and receive support in form of funds and technical assistance from different international organisations and donor agencies. Uganda has received unparalleled support and involvement of Development Partners at all level of governance and civil society. Some donors and agencies directly funded government activities and others contributed their support through NGOs involved in HIV/AIDS activities.

The World Bank

The World Bank has historically been the largest donor, providing budget and project support to Uganda. Early on, it funded the Sexual Transmitted Infections Project whose objectives were: (a) to

prevent the sexual transmission of HIV; (b) to mitigate the personal impact of AIDS; and (c) to support institutional development to manage HIV prevention and AIDS care (The World Bank, 1994). The World Bank also funded a multi-country AIDS Project that included Uganda. This largely aimed at empowering the community to manage their own HIV/AIDS activities (Mukaire, Kaweesa Kisu, Ssekamatte-Ssebuliba and Valadez, 2004).

WHO, UNAIDS, UNICEF, UNFPA

Multilateral donors to Uganda include the United Nations Development Program (UNDP), UNAIDS, WHO, and UNICEF. WHO has been supporting the national efforts to strengthen the HIV surveillance, blood safety and expansion of services for management of sexual transmitted infections. WHO in collaboration with UNICEF and UNFPA supports the Ministry of Health and other partners to boost Information, Education and Communication activities and health service for the young people. At the end of WHO/Global Programme for AIDS, United Nations created UNAIDS that has helped to promote the integration of HIV/AIDS in national development issues in Uganda.

European Union

European Union funded an Improving Sexual and Reproductive Health Project in Northern Uganda. The project was aimed at addressing, among others, the need to reduce the transmission of HIV/AIDS and to expand care, counselling and social support to PLWHA. The main beneficiaries of the project were: adolescents and teenagers who benefited from educational and promotional activities; and PLWHA in the conflict area in Northern Uganda. Special focus was on youth, sexually active adults, and persons living with HIV/AIDS. The project contributed towards the improvement of access to comprehensive sexual and reproductive health services, including promotional and preventive services, and improved care for HIV/AIDS related diseases (European Commission-Uganda, 2006). The project increased awareness, facilitated training of peer educators, provided VCT services, facilitated the establishment of Post Test Clubs, Information, education and communication (IEC) services were provided through young talk newsletter, radio shows and sensitisation workshops. Social support to PLWHA and treatment of opportunistic infections were given. The project positively affected the girls and the rate of teenage pregnancy and the desire to get married young declined. Awareness about HIV/AIDS increased among adolescent girls and most adolescents became aware of where to find adolescent friendly services.

Global Fund

Uganda was a beneficiary of the Global Fund to curb HIV/AIDS, Tuberculosis and Malaria (GFATM). However, it was mismanagement and this caused the Global Fund to temporarily suspended all of its five grants to Uganda and asked the Ugandan Ministry of Finance, Planning and Economic Development to put in place a new structure that would ensure effective management of the grants. The Global Fund remains committed to the support of efforts to combat the three diseases in Uganda and has resumed funding activities in Uganda (Global Fund Uganda, 2004).

United States Aid for International Development (USAID)

USAID has been assisting Uganda to reduce mass poverty, and in health promotion, and supports the implementation of interventions to ensure delivery of prevention, treatment, care and support services to those living with HIV/AIDS. HIV/AIDS activities are being integrated into the President's

Emergency Plan for AIDS Relief (PEPFAR) and are subject to the approval of the U.S. Global AIDS Coordinator. USAID also works in conjunction with the PEPFAR and Global Fund to Fight AIDS, TB and Malaria (USAID-Uganda, 2007).

President's Emergency Plan for AIDS Relief (PEPFAR)

In January 2003, President G. W. Bush made a commitment to substantially increase US support to addressing HIV/AIDS worldwide. The President's Emergency Plan for AIDS Relief (PEPFAR) is a five-year, \$15 billion US Government initiative to combat the global HIV/AIDS epidemic. PEPFAR now accounts for up to 80 percent of the money spent on HIV/AIDS in Uganda (PEPFAR, 2007).

PEPFAR's emphasis is on provision of treatment and care for people with AIDS, with only a fifth of the money being for HIV prevention work. A breakdown of the budget proposed by US congress is shown in the section that now follows:

- 55% for the treatment of individuals with HIV/AIDS (and in FYs 2006 through 2008, 75% of this is to be spent on the purchase and distribution of antiretroviral drugs);
- 15% for the palliative care of individuals with HIV/AIDS;
- 20% for HIV/AIDS prevention (of which at least 33% is to be spent on abstinence until marriage programs); and
- 10% for helping orphans and vulnerable children (and in FYs 2006 through 2008, at least 50% (of the 10%) is to be provided through non-profit, non-governmental organisations, including faith-based organisations, that implement programs at the community level).

In the financial years 2006 to 2008, 41% of the total money was planned to be spent on the purchase and distribution of antiretroviral drugs. The five-year plan set out in 2003 ends in October 2008 but US is committed to continue funding international AIDS programs for many more years to come (PEPFAR, 2006; Daily Reports, 2006).

Department for International Development (DFID)

The United Kingdom has traditionally been the leading bilateral donor to Uganda. The Department for International Development (DFID) is among those partners that have sustained the country's HIV/AIDS response through financial and technical support for coordination, management and implementation of the responses (DFID, 2007).

DFID supports the fight against poverty generally and HIV/AIDS in particular, in Uganda. DFID supports the sector-wide funding mechanisms for the health sector. DFID has supported other HIV/AIDS stakeholders directly through government agencies (e.g. UAC) and indirectly through civil society organizations, the private sector and other development partners to develop and implement priority actions guided by the National Strategic Framework of HIV/AIDS Activities.

DFID has provided technical and financial support directly through the Partnership Fund and indirectly, for example, through provision of technical assistance to various components of the management and coordination of the national responses.

DFID spearheaded the involvement of AIDS Development Partners (ADPs) in the conceptualization, establishment and implementation of the Uganda HIV/AIDS Partnership since 2001, and has since then played a key role in bringing them together to dialogue on

the country's priorities and harmonizing HIV/AIDS funding mechanisms to ensure effective utilization of resources for the national response. Currently DFID is involved in an exercise of reviewing support to National AIDS Commissions and civil society responses by a number of ADPs including Development Cooperation of Ireland (DCI), SIDA and the Norwegian Government. The outcomes of this exercise will go a long way in informing approaches for harmonizing HIV/AIDS funding to national and civil society responses.

DFID has played many other roles such as: capacity building for UAC, mainstreaming HIV/AIDS in development programmes, strategic information management, support to various information-sharing events (e.g. funding conferences), and funds coordination activities at UAC and for SCEs (Kindyomunda, 2007).

Danish International Development Agency (DANIDA)

Denmark supports the health sector in Uganda. Danish support to the HIV/AIDS prevention has been through TASO. The support is earmarked for running general information campaigns, offering counselling and advice to persons infected with HIV and providing preventive treatment (DANIDA, 2004)

Progress in the Prevention and Control of the HIV/AIDS Epidemic

Uganda has played a lead role and has been at the forefront in the fight against HIV/AIDS epidemic at both international and regional levels, reflecting the country's remarkable achievements in the fight against HIV/AIDS. Since the outbreak of HIV/AIDS epidemic was recognised, the Uganda government has implemented a comprehensive multi-sectoral approach in the prevention and control of HIV/AIDS epidemic. Government ministries (e.g. Ministry of Health, Ministry of Education and Sports, and Ministry of Defence) incorporated HIV/AIDS programmes in their sector plans. Ministry of Health decentralised HIV/AIDS activities using the existing district health structures. District AIDS Committees (DAC) were formed consisting of the representatives of various sectors, to coordinate the activities of the different government departments and NGOs. Involvement of many players created synergism and vital force to fight HIV/AIDS.

Prevalence and incidence of HIV/AIDS time trends

In Uganda, national HIV prevalence estimates have derived from sentinel surveillance among pregnant women since 1989. The rate of HIV infection in pregnant women has been shown to be a reasonable proxy for the level in the combined male and female adult population in a number of settings. However, the major limitation is that it does not include men and non pregnant women. Therefore it is difficult to make assumptions about infection rate in general adult populations basing on data generated by the sentinel surveillance of pregnant women at selected sites.

The prevalence of HIV among pregnant women attending antenatal clinic in Jinja (1989) and Mbarara (1992) was as high as 24% and 30% respectively (MOH, 2002). The prevalence of HIV/AIDS among women attending antenatal services exceeded 20% at two urban sites in 1990 (MOH, 2001). HIV prevalence reached a peak in 1992 and since then has steadily declined in the urban areas. The prevalence of HIV/AIDS in pregnant women under surveillance was observed to decrease in the early

1990s suggesting that possibly the spread and incidence of HIV/AIDS reached a peak in the late 1980s (Lower-Beer, 2002).

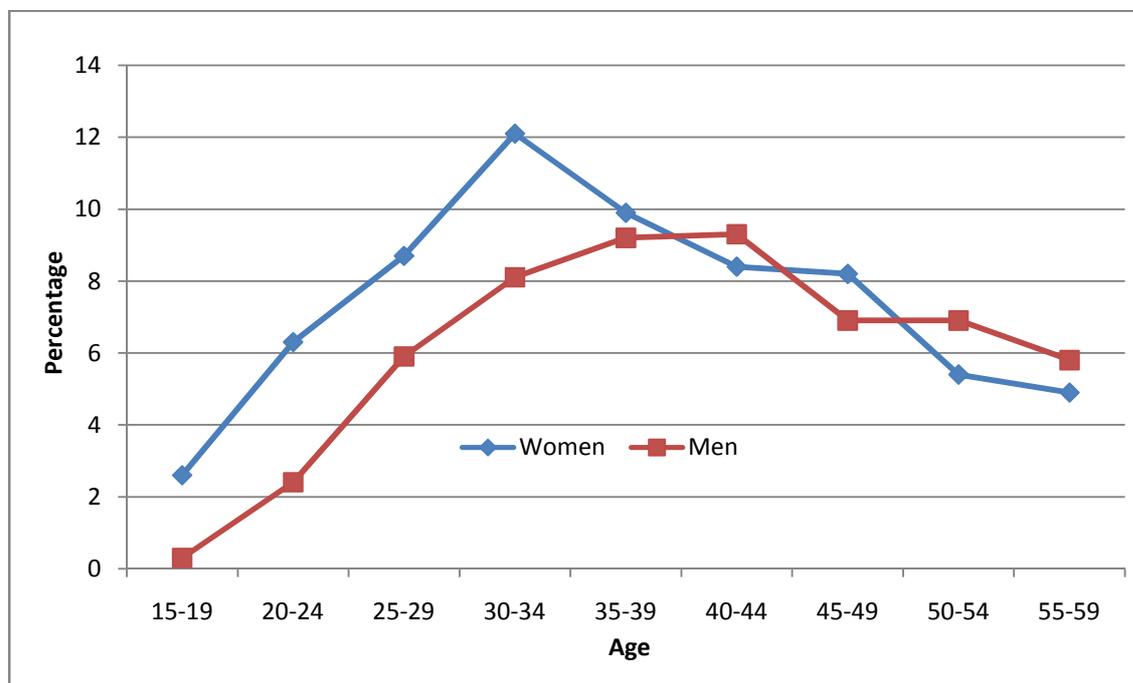
Data on prevalence and incidence of HIV from two population based cohort studies in Masaka revealed that overall sero-prevalence rates in the population declined from 8.2% to 6.9% between 1989 and 1996. The most marked decline was among females aged 13-19 and 20-24 and males aged 20-34 years. It either remained stable or increased in the older age groups (Kamali et al, 2000). Analysis of data through 1999 also revealed a similar overall decline in the in the HIV prevalence and incidence (Mbulaiteye et al, 2002). Infection rates were reported to be twice or more higher in females than males in the same age groups e.g. women in the 20-24 years age-group were four times likely to be infected than males in the same age group. Also sero-prevalence was highest in women aged 25-34 while in males the highest was in the 35-44 years age group. This was attributed to an earlier of age of sexual debut and tendency for women to have older sexual partners (Kamali et al, 2000 *bid*).

The most recent National HIV/AIDS Sero-Behavioural Survey of 2004/05 (MOH, March 2006) had important revelations regarding the prevalence of HIV in relation to different factors. Some the factors are detailed follow.

HIV/AIDS by Sex and Age

Sex and age-specific prevalence of HIV as at 2004/05 is shown in Figure 1 below.

Figure 1: HIV Prevalence by Sex and Age, 2004/05



Source: Uganda HIV Sero-Behavioural Survey 2004/05 (MOH, March 2006)

Prevalence increases and reaches a peak about 30-34 years for women and 35-44 years for men. Prevalence is generally higher for women than men at ages 15-49 years, but men are slightly higher in the 40-44 years and ages 50-59 years age ranges. The higher HIV prevalence in women could be

attributed to lack of economic empowerment, compromised rights by gender inequities and also by nature of the female anatomy.

Table 2: HIV Prevalence by Age, 2004/05

	Women 15-49		Men 15-49		Total	
	Percentage HIV positive	Number tested	Percentage HIV positive	Number tested	Percentage HIV positive	Number tested
15-19	2.6	2,062	0.3	1,932	1.5	3,994
20-24	6.3	1,803	2.4	1,184	4.7	2,987
25-29	8.7	1,679	5.9	1,123	7.6	2,802
30-34	12.1	1,374	8.1	1,139	10.3	2,513
35-39	9.9	1,029	9.2	868	9.6	1,897
40-44	8.4	823	9.3	745	8.8	1,568
45-49	8.2	621	6.9	524	7.6	1,145
50-54	5.4	513	6.9	452	6.1	965
55-59	4.9	322	5.8	332	5.4	654
Total 15-49	7.5	9,391	5.0	7,515	6.4	16,906
Total 15-59	7.3	10,227	5.2	8,298	6.3	18,525

Source: HIV/AIDS Sero-Behavioural Survey 2004, MOH March 2006

HIV Prevalence by Rural and Urban residence

Urban residents have a significantly higher risk of infection (10%) than rural residents. Urban rural difference is much stronger for women than men. Prevalence among women is 13% and 7% living in the urban and rural areas respectively. It was 7% and 5% for men living in the urban and rural areas respectively (MOH, March 2006).

The prevalence of HIV/AIDS varied by regions with the highest rates in central and western regions (UAC, Measure Evaluation and MOH, 2003) between those living in rural and urban settings even within the same locality (Kipp et al, 1995; Fabiani et al, 2001) and occupations (Wawer et al, 1997). These regional trends have not changed much. Central (including Kampala) and North Central regions have higher prevalence (above 8%) than other regions. West Nile and North East Regions have HIV prevalence of 2% and 4% respectively. West and South west Regions have prevalence rates of 6.9 and 5.9% respectively. In all regions, women have a higher prevalence of HIV infection than men (MOH, March 2006).

HIV Prevalence by Wealth Quintile

HIV prevalence is higher in the working (7%) than non working class (5%) without sex differences. The national HIV/AIDS Sero-Behavioural Survey 2004/05 also revealed a gradual increase in HIV infection with wealth quintiles. The rates rose from 4% to 9% among those in the lowest and wealthiest quintiles respectively (MOH, March 2006).

The prevalence of HIV infection declined from about 18% in the first half of the 1990s to 6.5% in 2002 (Ministry of Health, 2003). This was attributed to the open policy, critical political involvement and multi-sectoral approach, increased awareness about HIV/AIDS and positive changes especially in people's sexual behaviour. The decline in HIV prevalence was also attributed to the introduction of screening procedures for potential blood donors, which helped to reduce the transmission of HIV through infected blood. As a result the rate of HIV infection through blood donations was reported to have dropped from 14% in 1989 to 2% in 1995 (UNAIDS, 1999).

The decline in HIV prevalence was also attributed to the massive inputs to combat the spread of HIV. Later the decline of HIV prevalence stagnated since about 2001 partly because resource inputs into interventions were not keeping pace with the evolution of HIV/AIDS epidemic (MOH, September 2005), for instance, the demand for VCT is enormous i.e. by 2005 only about 15% of the adult population had accessed access to HIV counselling and treatment and knew their HIV sero-status; yet, 70% of the population wanted to be tested (MOH, September 2005 *tid*).

Despite the success made in the fight against HIV/AIDS, the adult prevalence rate of about 6%, is still a catastrophe in epidemiological terms. Observations show that as the prevalence decreased in the urban areas it increased in the rural areas. The observed successes may therefore be temporary or the decrease in the prevalence could be due to about equal number of those dying to those getting infected. The pressure exerted on the HIV/AIDS epidemic by the different actors should be maintained.

Table 3: HIV Prevalence by Background Characteristics, 2004/05

	Women 15-49		Men 15-49		Total	
	Percentage HIV positive	Number tested	Percentage HIV positive	Number tested	Percentage HIV positive	Number tested
Residence						
Urban	12.8	1,435	6.7	1,096	10.1	2,531
Rural	6.5	7,956	4.7	6,419	5.7	14,375
Education						
No education	5.8	2,129	7.5	624	6.2	2,753
Primary incomplete	7.7	4,355	4.5	3,515	6.3	7,870
Primary complete	9.8	1,064	6.5	1,058	8.2	2,122
Secondary+	7.6	1,826	4.4	2,310	5.8	4,136
Employment						
Currently working	8.4	5,758	6.1	5,195	7.3	10,953
Not working	6.1	3,560	2.5	2,238	4.7	5,798
Wealth quintile						
Lowest	4.8	1,532	4.0	1,147	4.4	2,679
Second	6.6	1,911	4.2	1,541	5.5	3,453
Middle	6.7	1,760	5.1	1,418	6.0	3,177
Fourth	7.0	1,895	5.9	1,552	6.5	3,446
Highest	11.0	2,294	5.5	1,857	8.6	4,151
Religion						
Catholic	7.1	3,922	5.4	3,145	6.3	7,067
Anglican/Protestant	8.4	3,178	5.5	2,754	7.1	5,933
Other Christian	7.4	820	4.5	507	6.3	1,327
Muslim	6.5	1,294	3.0	974	5.0	2,268
Other	7.8	103	2.4	76	5.5	180
Total 15-49	7.5	9,391	5.0	7,515	6.4	16,906
Total 15-59	7.3	10,227	5.2	8,298	6.3	18,525

Source: HIV/AIDS Sero-Behavioural Survey 2004, MOH March 2006

Declining HIV Prevalence and HIV Awareness

The overall decline in the prevalence of HIV/AIDS could be attributed to many factors playing a role either individually or in various combinations. The empowerment of the Ugandan population to fight against HIV/AIDS, hence, the declining prevalence is based on: population awareness and knowledge about HIV/AIDS; rejection of misconceptions with respect to HIV/AIDS; and change in attitude towards to negotiate sex. A detailed account on these factors is provided below.

Awareness of HIV/AIDS

A good proportion of the Ugandan population is aware of HIV/AIDS. The Sero-Behavioural Survey of 2004-2005 revealed that 98.6% and 99.1% of women and men aged 15-49 years and 98.8% of both sexes had ever heard about AIDS. The information sources vary from area to area, and by education levels, occupation, and age groups (Uganda Bureau of Statistics and Macro International Inc. 2007.). The key sources of information about HIV/AIDS were as shown in below.

Table 4: Source of information about HIV/AIDS in Uganda 2004-05

Main source of information (% distribution)	Women 15-49	Men 15-49	Both sexes
Radio	52.6	59.4	55.7
Television	0.6	0.9	0.7
Film/drama	0.6	1.4	0.9
Newspapers/magazines	1.0	3.3	2.0
Brochures/community notices	1.0	0.7	0.8
Family	7.0	1.5	4.5
Friends/peers	13.0	8.9	11.1
Health workers	13.3	11.3	12.4
Teachers	4.6	5.9	5.2
Political/traditional leaders	0.4	0.4	0.4
Religious leaders	1.5	0.8	1.2
Seminars/meetings/workshops	0.5	0.9	0.7
Direct experience with AIDS patient	1.2	2.4	1.7
Other/never heard of AIDS	2.7	2.4	2.6
Total	100.0	100.0	100.0
Number of respondents	9941.0	8010.0	17950.0

Source: HIV/AIDS Sero-Behavioural Survey 2004, MOH March 2006

The main source of information was radio followed by health workers, friends, teachers and political/traditional leaders formed the least source.

The different messages about HIV/AIDS are shown below.

Table 5: Most important HIV/AIDS message learned from main source in Uganda

Message	Women 15-49	Men 15-49	Both sexes
Abstain from sex	21.6	20.3	21.1
Use condoms	20.7	36.6	27.8
Limit sex to 1 partner/stay faithful	28.2	21	25
Limit number of partners	3	3.1	3.1
Follow the ABCs	1.4	1.2	1.3
Avoid sex with prostitutes/those who have many partners	0.9	0.7	0.8
Avoid injections/blood transfusions	0.4	0.3	0.4
Antiretroviral drugs available	0.3	0.1	0.2
PMTCT	0.5	0.1	0.3
Avoid discrimination against those with HIV/AIDS	0.7	0.2	0.5
Anyone can get AIDS	1	0.5	0.8
Get tested for AIDS	5.5	3.2	4.5
AIDS is a killer	10.3	9.8	10.1
Don't take chances	1.2	0.6	0.9
Other	4.3	2.3	3.4
Total	100	100	100
Number of respondents	9,941	8,010	17,950

Source: HIV/AIDS Sero-Behavioural Survey 2004, MOH March 2006

Most messages were in support of the ABC strategy. Abstinence from sex, being faithful and condom use were perceived to be essential in the reduction of HIV/AIDS spread. Knowledge about HIV/AIDS prevention is widespread and the population knows about the different approaches to limit the chances of getting HIV/AIDS, as shown below.

Table 6: Knowledge of the ways to reduce the chances of getting the AIDS virus, 2004-2005

	<u>Women</u> <u>15-49</u>				No. of women	<u>Men</u> <u>15-49</u>				Number of men
	Using condoms	Limit sex to one uninfected, faithful partner	Using condoms and limiting sex	Abstaining from sex		Using condoms	Limit sex to one uninfected, faithful partner	Using condoms and limiting sex	Abstaining from sex	
Age										
15-19	70.9	86.8	64.2	86.2	2,186	79.3	86.3	71.5	85.1	2,070
20-24	71.4	90.6	67.3	87	1,933	83.4	90.5	77.8	86.8	1,262
25-29	69.6	88.6	64.7	85.8	1,764	80	91	75.5	83.2	1,220
30-39	66.7	87.9	61.3	86.8	2,542	76.5	90.3	71.9	84.7	2,116
40-49	60.3	88.4	56.2	87.1	1,516	68	90.9	64.6	82.7	1,342
Residence										
Urban	80.9	92.8	76.4	92.8	1,508	85.4	93.4	80.9	90.4	1,200
Rural	65.8	87.6	60.5	85.5	8,433	76	88.8	70.5	83.6	6,809
Education										
No education	47.6	80.2	41.8	77.9	2,255	57.3	76.9	51.7	71	668
Prim. Incomplete	70.1	88.7	64.5	86.8	4,596	76.5	88.5	70.3	83.9	3,723
Primary complete	77.2	92.4	72.3	90.8	1,115	78.7	91.2	73.9	84.6	1,133
Secondary+	81.8	94.9	78.4	93.8	1,957	83.6	93.5	79.3	89.3	2,477
Wealth quintile										
Lowest	53	80.5	47	77.3	1,610	68.8	82.9	62.9	77.9	1,209
Second	61.9	85.2	56.1	83.5	2,038	74.2	87.8	68.5	81.1	1,628
Middle	67.2	88.5	61.7	87.9	1,849	76.6	90.7	71.5	83.8	1,506
Fourth	71.6	91.6	66.8	88.9	2,000	78.8	89.8	72.9	86.7	1,669
Highest	81	93.5	76.9	92.4	2,443	84.7	93.5	80.2	90.2	1,998
Total 15-49	68.1	88.4	62.9	86.6	9,941	77.4	89.5	72	84.6	8,010
Total 15-59	66.7	88.2	61.7	86.6	10,826	76	89.4	70.8	84.4	8,830

Source: HIV/AIDS Sero-Behavioural Survey 2004, MOH March 2006

Table 7: Comprehensive knowledge about HIV/AIDS, 2004-05

Background characteristics	<u>Women 15-49</u>		<u>Men 15-49</u>	
	Comprehensive knowledge	Number of Women	Comprehensive Knowledge	Number of men
Age				
15-19	29.0	2186	32.5	2070
20-24	30.1	1933	39.9	1262
25-29	30.7	1764	41.6	1220
30-39	27.0	2542	35.4	2116
40-49	24.2	1516	32.6	1342
Residence				
Urban	46.3	1508	52.1	1200
Rural	25.0	8433	33.0	6809
Education				
No education	12.4	2255	16.5	668
Primary incomplete	24.0	4596	26.3	3723
Primary complete	37.6	1115	39.5	1133
Secondary+	51.1	1957	53.7	2477
Wealth quintile				
Lowest	17.3	1610	26.4	1209
Second	21.3	2038	31.5	1628
Middle	23.9	1849	31.9	1506
Fourth	28.5	2000	34.9	1669
Highest	44.4	2443	48.8	1998
Total 15-49	28.3	9941	35.8	8010
Total 15-59	27.3	10826	35.0	8830

Source: HIV/AIDS Sero-Behavioural Survey 2004, MOH March 2006

Rejection of the misconceptions about HIV/AIDS transmission

Knowledge of the effective ways to avoid contracting HIV/AIDS played a key role in the identification of incorrect beliefs and elimination of misconceptions (e.g. all infected people appear ill and that the virus is transmitted by witchcraft) among the Ugandan population as shown below.

Attitude towards Safe Sex

The Ugandan population has been empowered to negotiate safer sex as shown below:

Table 8: Attitudes towards negotiating safer sex, 2004-05

Percentage of respondents aged 15-49 who say that when a wife knows her husband has a sexually transmitted infection, she is justified in:								
Background characteristics	Women			Number of women	Men			Number of men
	Refusing to have sex	Asking that they use a condom	Refusing sex or asking to use a condom		Refusing to have sex	Asking that they use a condom	Refusing sex or asking to use a condom	
Age								
15-19	70.8	71.2	83.6	2186	82.2	83.5	90.2	2070
20-24	73.5	74.5	86.7	1933	83.1	85.5	92.3	1262
25-29	72.7	72.8	86.2	1764	82.5	85.2	91.5	1220
30-39	72.0	69.1	83.7	2542	82.0	83.1	90.9	2116
40-49	71.3	64.1	83.0	1516	82.5	79.9	88.9	1342
Residence								
Urban	83.6	85.0	94.7	1508	85.7	86.1	94.6	1200
Rural	70.0	67.9	82.8	8433	81.8	82.9	90.0	6809
Education								
No education	63.8	57.6	75.1	2255	65.7	66.0	72.4	668
Primary incomplete	70.7	69.9	84.8	4596	80.4	82.3	90.0	3723
Primary complete	78.3	78.7	89.7	1115	85.1	86.0	92.8	1133
Wealth quintile								
Lowest	64.5	58.2	76.0	1610	75.3	76.5	84.1	1209
Second	68.0	65.6	81.3	2038	80.5	79.1	88.1	1628
Middle	71.0	68.3	84.2	1849	83.5	84.4	92.0	1506
Fourth	72.2	72.8	85.3	2000	83.7	86.4	91.7	1669
Highest	81.2	82.5	92.7	2443	86.2	87.7	94.9	1998
Total 15-49	72.1	70.5	84.6	9941	82.4	83.4	90.7	8010
Total 15-59	71.3	69.2	83.8	10826	82.3	82.7	90.4	8830

Source: HIV/AIDS Sero-Behavioural Survey 2004, MOH March 2006

The complex interaction between being aware about the HIV/AIDS presence; possessing comprehensive knowledge about HIV/AIDS; possession of knowledge of the means of avoiding contracting the HIV infection; rejection of the misconceptions about HIV/AIDS transmission; and a positive attitude towards negotiating safer sex means the Ugandan population empowered to fight against HIV/AIDS. This partly explains the observed declining trend in the HIV/AIDS prevalence. Abstinence, being faithful, and condom use have also contributed to the decline in the prevalence of HIV/AIDS in Uganda.

Research related to HIV/AIDS

Antenatal sentinel surveillance of HIV/AIDS

Antenatal sentinel surveillance sites were first established according to the WHO/Global Programme for AIDS surveillance guidelines in the 1989 and their numbers in the country have increased since then. These provided information on HIV prevalence from data collected on pregnant women attending antenatal clinics at these sentinel surveillance sites. Data from these sentinel surveillance sites were robust and represented the HIV prevalence situation in both urban and rural areas (ACP/MOH, 2003).

Uganda plays a key role in the HIV/AIDS research, which has benefited the world at large. It has played a major role in prevalence and incidence studies, and drug and vaccine trials providing information to enrich the body or mass of knowledge. It has been involved in the development of vaccines, treatment of PLWHA and PMTCT. Uganda was one of the two African countries to pilot anti-retro viral drugs in 1998. In 1999, Uganda tested an AIDS vaccine candidate and the second vaccine trial started in 2003 (Emilie Dyer, 2003).

Other studies done in the field of HIV/AIDS include changes in sexual behaviour and risk of HIV transmission after antiretroviral therapy and prevention interventions in rural Uganda (Bunnell et al, 2006 *bid*). This study focused on sexual risk behaviour and risk of HIV transmission among HIV-infected adult during the first six months of treatment with antiretroviral drugs revealed that there was an associated reduction in the HIV load.

The Economic Impact of HIV/AIDS

The widespread occurrence of HIV and AIDS in Southern and Eastern Africa has raised concerns about the potential adverse economic impact, both at an overall macroeconomic level as well as possibly more concentrated effects in different economic sectors. There are also concerns about socio-economic effects, through the impact of HIV and AIDS on poverty and inequality.

In general, four different aspects of the macroeconomic impact of AIDS can be considered:

- (i) the impact on key macroeconomic variables (GDP, average incomes, savings and investment, employment and wages);
- (ii) the household level impact, focusing on household incomes (rather than average incomes), poverty, and income distribution;
- (iii) the micro-level impact on firms and other enterprises, focusing on output, productivity, investment and measures taken to counter HIV/AIDS;
- (iv) the fiscal impact on government revenues, spending (and specifically spending related to HIV/AIDS) and the budget balance.

The potential channels through which each of these economic impacts may operate are as follows¹.

Impact on GDP and Average Incomes

The potential macroeconomic impact of AIDS operates through various different channels. These effects can helpfully be divided into those that arise from rising morbidity (greater sickness) and those that arise from rising mortality (higher death rates).

Rising morbidity may have the following impacts:

- **reduced productivity** due to workers' time off for sick leave or to look after sick family members, lower productivity while at work due to illness or worry;
- **increased expenditure** on:
 - health care (by individuals, firms and government);
 - training (by firms and government, to replace sick workers);
 - sick pay (by firms and government);
- **reduced savings**, as at least part of the additional expenditure will be taken from income that would otherwise be saved;
- **reduced investment** in fixed capital (both public and private), due to:
 - lower expected profits, or increased economic uncertainty;
 - diminished ability to finance investment due to lower savings;
 - diversion of public spending towards HIV-related programmes;

Rising mortality has a demographic impact, through:

- smaller population and labour force;

¹ These channels are discussed in many of the articles referred to in this section. Haacker (2002, 2004) provides a particularly thorough overview.

-
- changed age structure of population and labour force (which affects the experience and productivity of the labour force);
 - availability of skills;
 - labour force participation rates;
 - reduced investment in human capital, as incentives (due to lower life expectancy) are diminished.

HIV/AIDS can therefore affect output (GDP) relative to the level that would have prevailed without AIDS, by affecting the size, skill structure, experience and productivity of the labour force, and by reducing the rate of investment (gross fixed capital formation) and hence the available capital stock. Because all of the key inputs to production are likely to be negatively affected (labour, capital and productivity growth), it is highly likely that the rate of GDP growth will be reduced. However, the impact on average incomes is not clear, a priori, because both GDP growth and population growth are reduced, and the net impact on GDP per capita depends on which one falls further².

In addition, there are a number of indirect effects that may accumulate over time. In particular, HIV/AIDS may undermine the effectiveness of institutions and the cohesiveness of communities. Bonnel (2000:3) notes that “at the national level, AIDS is undermining the capacity of governments to provide basic social services and efficient economic management, regulation and legal framework. The main economic effect is to reduce the efficiency of production and to lower output”.

There are also a number of potential indirect macroeconomic effects. In most countries, efforts to counter the impact of HIV and AIDS are donor funded to a greater or lesser extent; the associated inflows of donor funds can potentially impact on the exchange rate and hence on international competitiveness, the relative attractiveness of investment in tradeable and non-tradeable activities, and on efforts to pursue export-led growth and diversification. Additions to aggregate demand resulting from donor-funded expenditure can also impact on inflation, especially if there are binding absorptive capacity constraints. In countries where HIV/AIDS costs are domestically funded, the increase in spending can lead to deteriorating fiscal deficits and less effective macroeconomic management. All of these issues will be more acute if there is a rapid scaling up of donor funding and of interventions more generally.

Household Impacts

The above discussion refers to broad macroeconomic impacts at a high level of aggregation. However, this does not necessarily tell us much about the effects at a disaggregated level, that of individual households (or groups of households). This is important, as there are likely to be quite different effects across households; not all households will be affected by AIDS in the same way, most obviously depending on whether or not a household has a member who is HIV positive. The impact on household consumption spending (which determines living standards) might be quite different to the impact on average national incomes (GDP). Working at a household level, we can consider the potential impact of HIV/AIDS on poverty and income distribution.

² Several analyses note that in medieval Europe, plagues typically led to higher real wages due to reduced labour supply.

Households may be affected by HIV/AIDS in the following ways:

- loss of income, if a breadwinner stops work due to sickness or death (this is a permanent impact);
- loss of income, if a breadwinner has to stop work to look after a sick family member (this is a temporary or transient impact);
- increased dependency ratios (the number of non-working members supported by income-earning household members);
- additional expenditure, on health care and, eventually, funeral costs (again, a transient impact).

The above effects apply to households with a member who is HIV positive. All of them tend to decrease income and increase spending, so that the disposable income of the households will be reduced. Some of these households will find that their disposable income is no longer sufficient to keep them above the poverty line, or households in poverty may find that the depth of their poverty has worsened. Overall, the direct effect of HIV/AIDS will be to worsen poverty, although it should be noted that the short term impact on poverty is likely to be worse than the long-term impact (because of the impact of the transient factors noted above).

However, there are also a number of indirect effects that stem from the macroeconomic impacts described above, which will affect all households, not just those with an AIDS patient. It is likely that the levels of employment and wages will be affected. Whether these effects will be positive or negative cannot be determined *a priori*, but households will find that their incomes will be affected by increased or reduced chances of finding work, and, for those in work, increased or reduced wages. This will also have an effect on poverty (which may be positive or negative).

Distributional effects could also be important, given that some households will become poorer, while others (depending on the degree and direction of change of wages and employment) may become better off. Again, *a priori*, it is not possible to predict the direction or magnitude of the distributional impact of AIDS.

Enterprise- and sector-level impact

HIV/AIDS has extensive effects on enterprises, through the impacts on the workforce, investment and markets.

The workforce is affected in several ways. As workers become sick, their productivity falls, due to time taken off for sick leave and reduced ability to perform while at work. Absenteeism is increased, making it more difficult to plan maintain production levels. If the disease is not treated, the eventual death of workers or retirement on medical grounds results in the loss of experience and investment in skills. Extra expenditure is required, whether on sick pay, medical insurance, supplementing the cost of the medication that is required to mitigate the impact of the disease, and additional training and/or recruitment is required to maintain desired skill levels and workforce complement.

Investment is affected in a number of ways. First, the higher costs of doing business reduce profitability, as well as the availability of funds, both of which are likely to reduce overall investment

levels. Second, the additional uncertainty that results – for instance, over the future availability of skilled labour – will also tend to reduce investment.

These channels apply mainly to formal sector enterprises (firms), but similar channels will impact on informal sector enterprises and agricultural activities. However, there will be some differences, as informal enterprises and subsistence agriculture tend to be more closely intertwined with household activities, and make less use of employed labour. Hence the impact channels that affect labour supply are more likely to have a direct impact on production and incomes, with less impact on labour market demand.

The impact of HIV and AIDS is likely to vary across sectors, which have differing characteristics with regard to labour requirements (both skilled and unskilled) and capital intensity. These characteristics, combined with the pattern of HIV and AIDS prevalence across income groups and skill levels, will lead to a differentiated impact. The impact will also depend on the nature of firms' markets; for instance, firms in certain industries will also find their business growing more slowly, especially those that are dependent upon consumer spending, which will feel the effects of slower population growth and the diversion of consumer spending to HIV/AIDS-related needs.

Fiscal Impact

AIDS is a development of such proportions that it will inevitably have an impact on government revenues and spending, and therefore on the budget balance and government saving or borrowing. AIDS will have direct effects on some key areas of government spending, most obviously the health budget, but there will also be a range of indirect effects as the ability to raise tax revenues is affected. The main impacts can be identified as follows:

Expenditure

Health spending: will rise due to the additional clinical costs of AIDS treatment and care, as well as the costs of awareness campaigns and other HIV/AIDS prevention measures (although not all of the latter will necessarily fall under the health budget). The degree of impact on the health budget depends on five key factors:

- decisions taken about making drug therapies generally available, and the nature of the treatment protocols utilised;
- the (unknown) future availability of new treatments;
- the degree to which care for AIDS patients is split between hospital-based and home-based care;
- the ability of the public health service to manage its functions and spend the budgets that are provided
- the extent to which additional expenditure is donor-funded.

Although the impact of AIDS will inevitably to increase health spending, it should be noted that in most countries health expenditure makes up a relatively small proportion of the overall government budget.

Education spending: will be affected by AIDS, but the direction of this impact will be difficult to predict. The increased death rate means that more people will have to be educated/trained to meet

targets for the provision of skilled workers; this also applies specifically to the training of teachers. However, the reduction in the rate of population growth means that the population will be smaller as a result of AIDS, and hence the demand for general education (particularly primary and junior secondary) will be reduced, and this will tend to have a negative effect on the education budget.

Social Welfare spending: larger expenditure on support for orphans and vulnerable children.

Other types of spending: lower population will also lead to reduced needs for other types of government spending, such as on urban and village infrastructure, water supplies etc. Depending on the outcome for the government budget balance, it may also be necessary to cut back on certain areas of spending that are not directly affected by AIDS or lower population growth.

More generally, the additional demands imposed by dealing with HIV and AIDS will tend to squeeze other government activities by imposing additional burdens on available resources, both in the health sector and in general administration. This will be exacerbated by increased scarcity of such resources due to illness, death and slower population growth.

Revenues

The impact of AIDS on government revenues will not be as direct as on expenditures. In general, however, government revenues will grow more slowly due to slower GDP and population growth (which will potentially impact on a whole range of government revenues, including direct and indirect taxes, and import duties). However, if HIV and AIDS-related spending is extensively funded by donors, then overall government receipts could rise.

The Economic Impact of HIV/AIDS – Sectoral Studies

Impact on the Business Sector

Research on the sectoral or micro-economic impact of HIV/AIDS is in many respects more difficult than that at the macroeconomic level. While macroeconomic analysis works mainly through simulation exercises using models calibrated to individual economies, micro-level work requires data from the experiences of a variety of companies in order that quantitative conclusions can be drawn. This is resource intensive, and will often require data that individual companies do not collect.

Nevertheless, there is a small but growing body of work on the impact of HIV/AIDS on businesses in sub-Saharan Africa, mostly focused on Southern Africa where prevalence rates are highest and the potential impact on businesses accordingly substantial. In addition, at the firm level, some companies have begun to monitor the loss of staff and quantify impacts of HIV/AIDS on the associated healthcare costs, absenteeism, benefits and compensation, labour turnover, training, and recruitment.

One of the most comprehensive research efforts in place is that carried out by the Bureau for Economic Research and the South African Business Coalition on HIV/AIDS (SABCOHA). In 2005 they carried out a survey of 1032 businesses, building upon earlier surveys in 2003 & 2004. The survey revealed that the most badly affected sectors in South Africa are mining, followed by manufacturing and transport. The impact depends on company size, skill levels and location: small and medium enterprises (SMEs) note fewer impacts than medium and large companies, while companies with predominantly unskilled & semi-skilled workers note a much greater impact than those employing mainly highly skilled workers.

A range of actual and potential impacts on business are identified. These include:

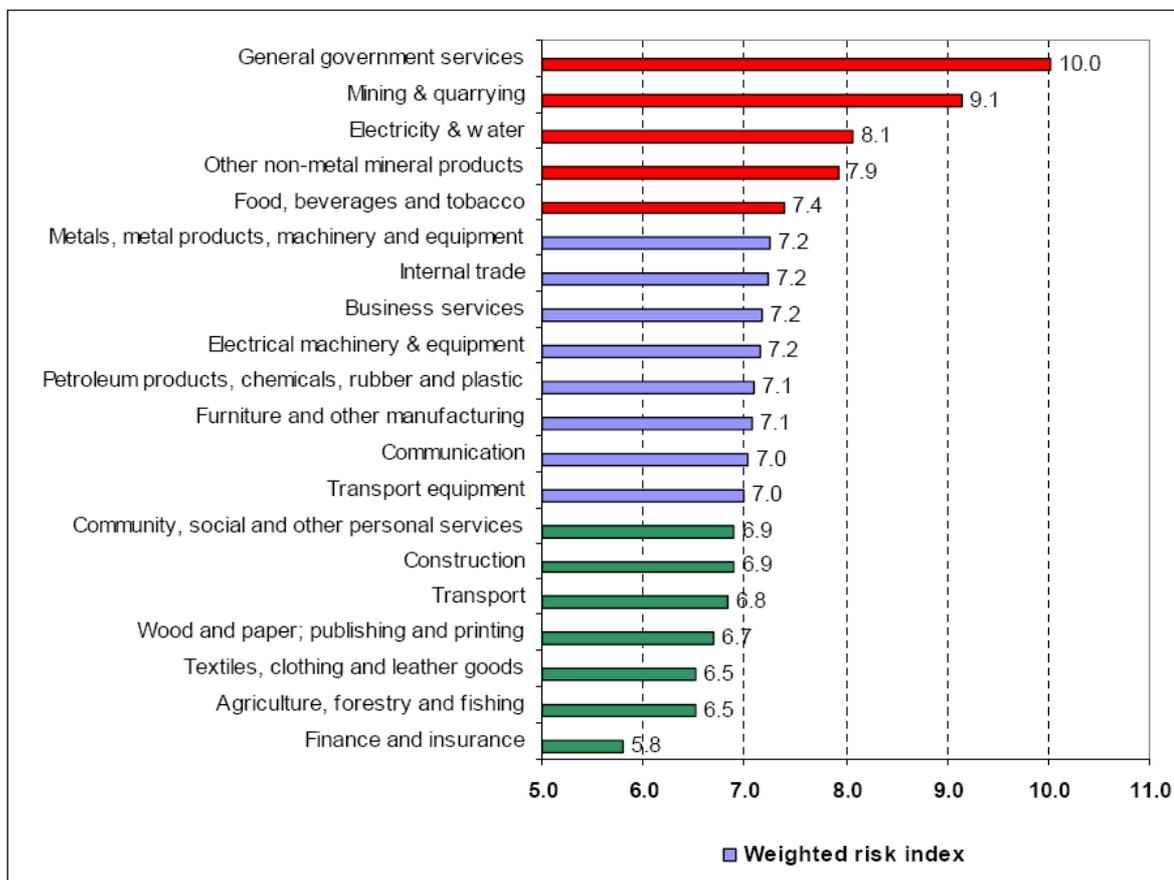
- reduced labour productivity and/or increased absenteeism (especially in mining, manufacturing, transport, financial services);
- higher turnover, recruitment and training costs, and loss of experience and skills of workforce (mining, manufacturing and transport);
- a smaller impact in retail, wholesale, construction;
- increased labour demand, including over-staffing in key positions to avoid disruption to production;
- some movement towards more capital intensive production techniques (mining, manufacturing)
- a negative impact on foreign investment in SA
- reduced profitability, but little impact on prices.

It was noted that in the construction sector, firms had changed their employment patterns so that core workforces – with permanent employment - are small, but many casual or temporary staff are employed as and when businesses need them. In this way, firms do not have to bear the long term costs of health-related spending, and such workers are easy to replace from the pool of unemployed workers. Finally, the survey noted that larger companies are more proactive in adopting preventative measures to curb impact through awareness and treatment programmes.

A second assessment of the sectoral impact of HIV/AIDS in South Africa was carried out as part of a larger study by USAID South Africa and the Bureau for Economic Research (2006). This focused on the macroeconomic impact of HIV/AIDS and included an analysis of the impact of ART interventions, and combined macroeconomic analysis with sectoral impact analysis. The latter included an assessment of sectoral risk, through both the supply side and demand side impact of HIV/AIDS. The supply side analysis essentially looked at the demographic profile / characteristics of workforces – age, gender etc., combined with skill structure – to encompass HIV infection risk as well as HIV/AIDS-related company costs (a given level of prevalence in higher-skilled workforces has a greater cost impact). This was used to generate a sectoral HIV risk index. On the demand side, the study looked at market risk, using demand projections from the macroeconomic model. While sectoral HIV infection rates are not directly measured, company surveys are illustrative, e.g. the prevalence rate in two large mining companies was 30%, but in four large financial services institutions was only 3.4%.

The study concluded that high-risk (high prevalence) sectors were mining, government, manufacturing and construction, while low risk sectors were transport, communications, business services, finance, and trade (retail & wholesale). It was noted that although industries with high use of skilled workers tend to have lower prevalence rates, the cost of infection is higher, given that skilled workers are more costly to replace and their absence has more impact on production, and vice versa with semi/unskilled. The study produced a ranking of HIV/AIDS risk by sector, based on supply side impacts, as shown below.

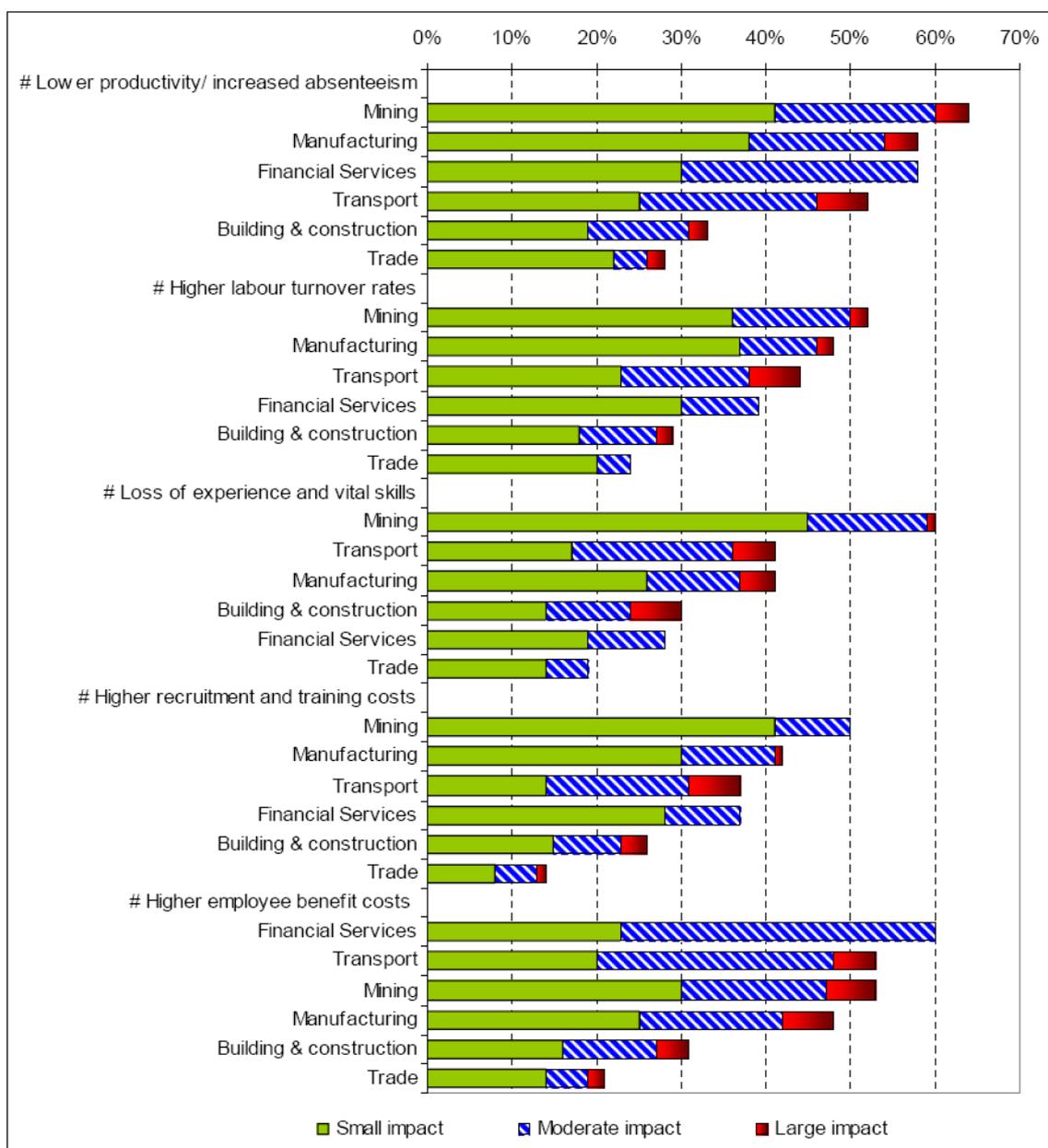
Figure 2: HIV/AIDS Risk Index by Sector (South Africa)



Source: BER/ Quantec research

The study also surveyed the extent to which HIV/AIDS had affected the demand side of companies' businesses. In general, the ranking is consistent across different aspects of production.

Figure 3: Companies indicating that HIV/AIDS has affected production activities (South Africa)



Source: BER/ Sabcoha

The paper also models the channels through which HIV/AIDS affects domestic final demand (household and government consumption, investment), exports, and intermediate demand (demand for one industry’s output by another industry). Overall, real GDP growth is lower as a result of HIV/AIDS, but the effect is not uniform across the economy. Analysis shows that fixed investment is the component of demand most affected, which feeds through to industries such as construction. While there is no clear pattern of sectors that are affected on the demand side by HIV/AIDS, it is primarily those where investment (rather than consumption) demand is important, and where their output comprises predominantly intermediate demand that is very dependent upon the output of

other sectors. Despite the impact of HIV/AIDS on the population, sectors that are mainly dependent upon household consumption (community & social services, food & beverages, clothing etc.) do not seem to be particularly badly affected.

The overall ranking taking into account both demand and supply side impacts is fairly complex, reflecting a wide range of factors including HIV infection rates, skills dependence, and exposure to investment and intermediate demand. The sectoral impact of these effects is summarised in the table below.

Figure 4: Ranking overall HIV/AIDS risk from the supply and demand sides

Market risk: demand-side impact		
	Medium to high	Low to medium
Supply-side risk	<ul style="list-style-type: none"> • General government • Water & electricity • Metals & machinery • Mining • Electrical machinery 	<ul style="list-style-type: none"> • Food & beverages • Non-metal minerals • Business services • Internal trade
	<ul style="list-style-type: none"> • Furniture & other manufacturing • Communication • Petroleum, chem, rubber & plastic • Finance & insurance • Wood, paper & printing • Transport equipment 	<ul style="list-style-type: none"> • CSP services • Clothing & textiles • Transport • Agriculture • Construction
	High to medium	Medium to low

Source: BER

The impact of HIV/AIDS on business was also examined in the 2006 study of the macroeconomic impact of HIV/AIDS in Botswana (Jefferis *et al*, 2006). The study included a small survey of 25 firms in Botswana, across a range of industries. The key results were that the majority of firms reported that HIV/AIDS had had an impact on output and productivity, with at least half of firms reporting that the impact was “significant”, but less than half of firms reported an impact on investment; the general picture was that other factors are more important in determining investment levels.

By sector, the pattern of impact was similar to that in South Africa, except for construction:

Figure 5: Severity of HIV/AIDS Impact, by Sector, Botswana and South Africa

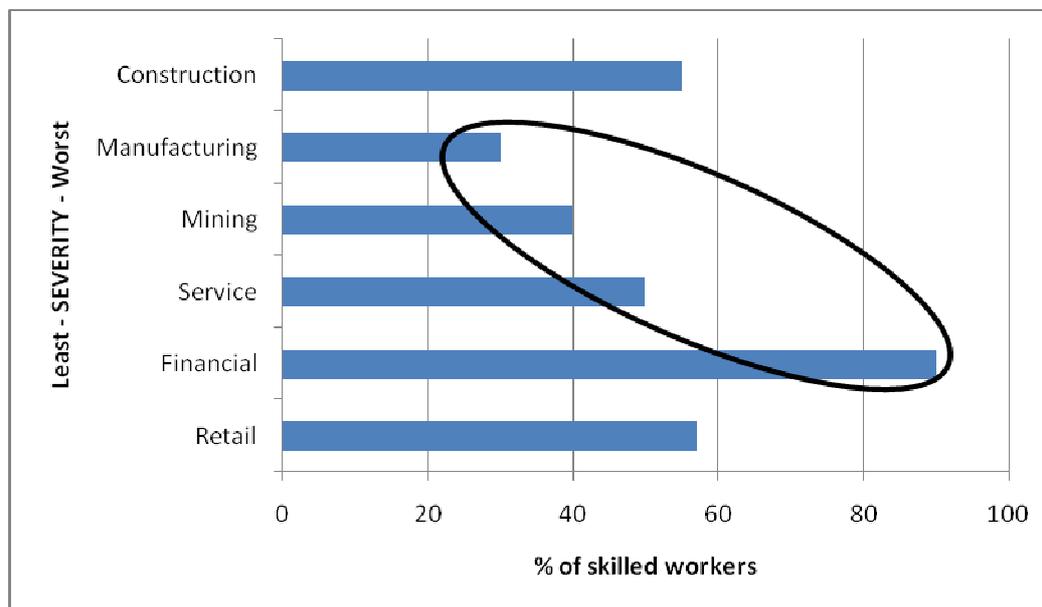
		Botswana	South Africa
Rank		Sector	
Least	1	Retail trade	Trade
	2	Financial	Construction
	3	Services	Financial
	4	Mining	Transport
	5	Manufacturing	Manufacturing
Most	6	Construction	Mining

Sources: Botswana survey; BER (2006)

As in South Africa, the impact was greatest in those sectors that were most reliant on unskilled labour, and the greatest response from firms in terms of dealing with the adverse impact had come from firms with a low proportion of skilled workers in their workforce. In general, firms had been quite proactive in dealing with the output and productivity losses through hiring more workers, multi-skilling, overtraining, etc. However, and contrary to initial expectations, firms with higher skill needs tended to do least in terms of training and hiring responses – this essentially reflected the smaller impact of HIV/AIDS on skilled workers than on less skilled workers, through lower HIV prevalence rates and earlier access to ART through private medical aid schemes. Firms also reported a reduced effect of the disease due to the availability of ART since 2001/2002.

As the chart below shows, there was in general a negative relationship between the severity of the impact of HIV/AIDS and the proportion of skilled workers in the sector, although the most and least affected sectors were exceptions to the general trend.

Figure 6: Botswana – Severity of HIV/AIDS Impact by Economic Sector



The sectoral impact of HIV/AIDS in South Africa was examined by Arndt & Lewis (2001), using a Computable General Equilibrium (CGE) model. They focused on the impact on unemployment in South Africa, and noted that AIDS will depress both labour supply and labour demand. They found that the impact of HIV/AIDS on investment at the macroeconomic level had a particular sectoral impact via the supply of investment goods, so that the construction and capital equipment sectors were particularly affected. More generally, sectors that employ semi-skilled and unskilled labour are more heavily affected (due to productivity effects and the structural characteristics of these sectors). Overall, the impact of HIV/AIDS is forecast to increase unemployment slightly, although not markedly. Arndt & Lewis conclude that a policy of (real) wage moderation would be instrumental in increasing demand in sectors employing semi-skilled and unskilled labour, and in raising economic growth and unemployment. Essentially, the moderation or reduction of real wage growth is needed to offset the greater costs of employing labour (due to reduced productivity and life expectancy and increased training costs) in an HIV environment.

The above studies utilise either widespread surveys or modelling approaches to assess industry or sector impact of HIV/AIDS. In a different approach, Rosen *et al* (2004) aimed to estimate the cost of HIV/AIDS to businesses in southern Africa using company-specific data on employees, costs, and HIV prevalence. The motivation for the study was that information on the potential costs of HIV/AIDS to the private sector is needed if companies are to be given a financial incentive to invest in prevention and treatment interventions. Data was collected from six formal sector enterprises in South Africa and Botswana, which provided detailed human resource, financial, and medical data and carried out voluntary, anonymous HIV sero-prevalence surveys. The companies were mostly quite large, with workforces of over 500 employees, and covered a range of industries including mining, retail, utilities, agribusiness and media. The present value of incident HIV infections with a 9-year median survival and 7% real discount rate was estimated. Costs included were sick leave; productivity loss;

supervisory time; retirement, death, disability, and medical benefits; and recruitment and training of replacement workers.

The study found that HIV prevalence in the workforces studied ranged from 7.9 to 25.0%. HIV/AIDS among employees added 0.4-5.9% to the companies' annual salary and wage bills. The present value of an incident HIV infection ranged from 0.5 to 3.6 times the annual salary of the affected worker. Costs varied widely across firms and among job levels within firms. The key reasons for the differences included HIV prevalence, levels and stability of employee benefits, and the contractual status of unskilled workers. Some costs were omitted from the analysis because of lack of data, and results should be regarded as quite conservative.

It concluded that AIDS is causing labour costs for businesses in southern Africa to rise and therefore threatens the competitiveness of African industry, and that research on the effectiveness of workplace interventions is urgently needed.

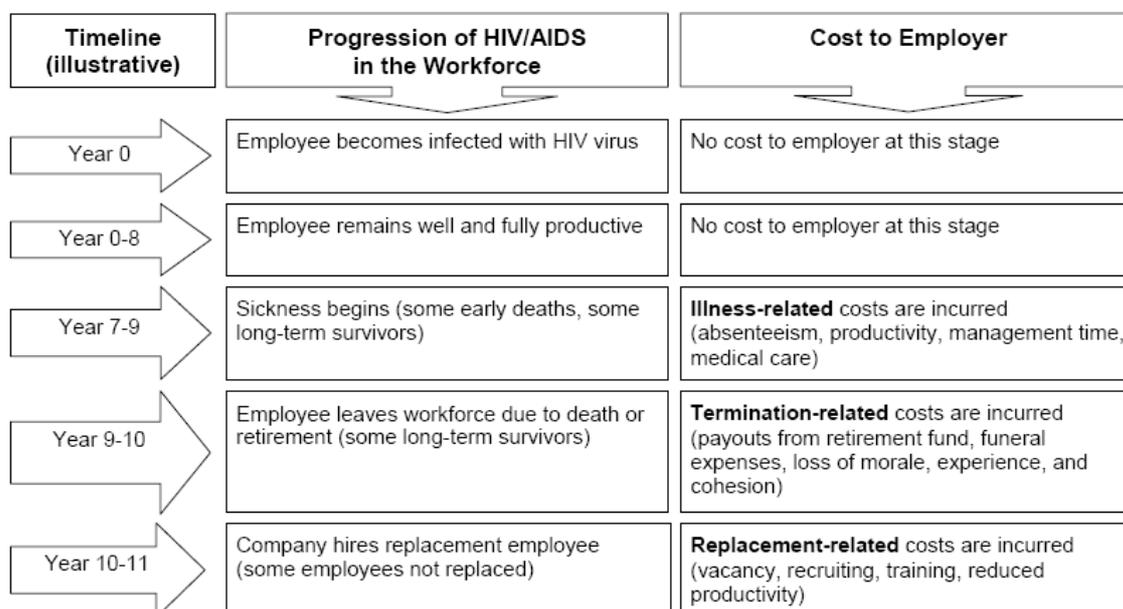
A study by Rosen *et al* (2006) provides an overview of research on the impact of HIV/AIDS on the private sector, collating and summarising the results of a wide range of company or industry level research. The study provides a useful typology of the possible cost impact of HIV/AIDS on the private sector, divided into individual costs, organisational costs, and market or economy-wide external costs. It concentrates mostly on individual and organisational costs (Levels I and II), leaving broader societal-economic costs to macro-level studies.

Figure 7: Typology of Cost Impact of HIV/AIDS on Private Sector

	a. Increased expenses (Direct costs)	b. Lost productivity (Indirect costs)
I. From one employee with HIV/AIDS (individual costs)	<ul style="list-style-type: none"> • Benefits payments • Medical care • Recruitment of a replacement worker • Training of a replacement worker 	<ul style="list-style-type: none"> • Increased leave and absenteeism • Reduced on-the-job productivity • Supervisor's time • Vacancy until replacement is hired • Poorer performance due to replacement's inexperience
II. From many employees with HIV/AIDS (organizational costs)	<ul style="list-style-type: none"> • Benefits premiums • Accidents due to sick or inexperienced employees • Litigation over benefits, dismissals, etc. 	<ul style="list-style-type: none"> • Production disruptions due to missing skills, accidents, vacant positions, etc. • Loss of institutional memory and experience • Breakdown of workforce morale and cohesion • Diversion of senior managers' time • Deteriorating labor relations
III. From high HIV prevalence in society (market or external costs)	<ul style="list-style-type: none"> • Higher cost of material inputs • More security needed due to breakdown in civil society • Higher wages due to shortage of skilled workers 	<ul style="list-style-type: none"> • Reduced demand for products • Higher risk premium on investment • Higher cost of capital • Higher cost of transactions with government and labor
Total Costs of HIV/AIDS		

It also provides a useful timeline of the way in which costs progress over time, in relation to HIV infection (assuming that effective treatment is absent).

Figure 8: Timeline of HIV/AIDS Impact and Costs for Private Company



The study reviewed the results of other research projects and included studies on 16 individual large companies and 7 surveys of companies South Africa, Botswana, Ethiopia, Uganda, Zambia, Rwanda and Kenya. It drew ten conclusions about HIV/AIDS and the private sector in Africa.

1. *The impact of HIV/AIDS on firms' labour costs has so far been real but moderate.* In most of the companies studied, HIV/AIDS was found to increase labour costs by less than 3 percent. The largest impacts were in companies that employed large numbers of unskilled or semi-skilled workers. Companies that rely primarily on skilled staff will face larger costs per HIV positive employee, but the number of employees with HIV/AIDS is likely to be small, and the share of labour costs in overall operating expenses may also be relatively low. The magnitude and nature of the impact of AIDS on business is also liable to change over time, as local epidemics mature, access to treatment expands, and companies adapt in other ways.

2. *A few variables explain most of the differences in costs among firms.* While there was a good deal of variation in costs across and within countries and sectors, but there is also some consistency in the drivers of costs, which are mainly HIV prevalence in the workforce population; the job level of affected employees (as morbidity and mortality among more skilled (and higher paid) employees impose higher costs on employers than they do among less skilled employees); the structure of employment (permanent vs contract and casual workers); company ownership; and industrial sector (mining and manufacturing firms face higher costs than service and agricultural firms, probably as a result of differences in capital intensity, labour productivity, and workforce demographics).

3. *Responses to AIDS are also associated with consistent company characteristics.* Large firms with professional human resource departments, occupational health departments, and/or on-site medical expertise are more likely to establish a workplace AIDS policy, secure access to medical care,

including ART, for HIV-positive employees, and provide other HIV-related services and benefits. Multinational and parastatal companies are also more likely to take action.

4. *Treatment is a good investment for many employers.* Chronic illness in the workforce is expensive for most employers, particularly when it ends with the payment of large death benefits and replacement costs. As the price of effective treatment has fallen, the estimated net financial benefits to employers of making ART available (paying for and, in some cases, directly providing) to employees have turned positive for increasing numbers of companies.

5. *Businesses have other ways to respond to the cost of HIV/AIDS.* Common practices that shift the AIDS burden from businesses to others include pre-employment screening, reduced employee benefits, restructured employment contracts, outsourcing of less skilled jobs, selective retrenchments, and changes in production technologies. Contracting out of previously permanent jobs (“casualization”), for example, shields firms from benefits and turnover costs, effectively shifting to households, NGOs, the government the responsibility to care for affected workers and their families. Many of these changes are primarily responses to globalization and would have occurred in the absence of AIDS. The opportunity to minimize the costs of AIDS-related illness and death, however, may hasten or intensify trends outsourcing and benefits caps.

6. *Employer provision of treatment can make sense even when public sector treatment is available.* Even where public sector provision of ART is available, the time taken to access it, and lack of in-house monitoring of adherence, may reduce its benefits. As a result, many large companies in South Africa and elsewhere have concluded that continuing to pay for private disease management services is a worthwhile investment, despite rapidly expanding public sector programs.

7. *For most small and medium-sized companies, HIV/AIDS is not a pressing issue.* The surveys of SMEs in South Africa, Zambia, Kenya, and Uganda consistently found that HIV/AIDS ranked well below several other business issues as a concern for senior managers.

8. *Small and medium sized companies do not have the resources to develop HIV/AIDS programs.* Small and medium-sized companies typically do not have human resources staff, and other managers do not see enough impact to justify the investment of their own time to understand the epidemic, research the response options, and put them in place. Other deterrents to investing in HIV/AIDS programs include relatively high employee turnover, lack of redundancy in the workforce that would allow individual workers to take time out to participate in HIV-related activities, individual rather than policy-driven relationships with employees, high discount rates, and a dearth of available cash. Smaller companies, moreover, cannot benefit from the economies of scale available to large companies, and face higher costs of bringing in the relevant expertise..

9. *Almost nothing is known about the effectiveness of workplace HIV/AIDS interventions.* Many companies throughout sub-Saharan Africa have implemented active HIV prevention programs, but despite more than a decade of experience, there is virtually no quantitative research to indicate whether these interventions have reduced HIV transmission substantially, marginally, or not at all..

10. *Little is known about the effect of ART on worker productivity or labour costs.* Highly active antiretroviral therapy has been shown to extend survival and reduce HIV/AIDS-related morbidity in the vast majority of patients. What is less clear is the extent to which ART will restore the

productivity of workers and diminish the costs of untreated AIDS. While preliminary findings are promising, further research to evaluate the effectiveness of ART in reducing the impact of AIDS on labour productivity and costs is needed.

Looking at studies in East Africa, Feeley et al (2004) measured costs linked to HIV/AIDS in two Ugandan companies in the manufacturing sector and found that the two companies studied were losing 1.6% (Company A) and 0.6% (Company B) of the current work force to AIDS-like illness. The measured costs associated with the loss of a worker were 17,167,056 shillings (US\$ 8,804) at Company A and 40,796,086 shillings (US\$ 20,921) at Company B. These observed costs are equal to 120% of the average annual cost (salary and fringe benefits) of a worker at Company A and 185% at Company B. The estimated AIDS related costs are 1.9% of the annual total for compensation and fringe benefits of all employees at Company A and 1.2% at Company B (Table 2) .

Total employment in the Ugandan operations of the two companies in 2003 was just under 1,000. Looking back over five years at Company A and three years at Company B, they identified 35 workers who died or took medical retirement due to a chronic illness that was probably AIDS. At each company, a case-comparison methodology was used to estimate the difference between absenteeism and medical care costs for cases (those who died or retired due to chronic AIDS-like illness) and comparisons (employees of similar age, sex and job grade who remained in the work force). To these costs were added various benefits (funeral benefit, gratuity, family relocation) paid at the time of the worker's death or retirement. These termination costs were net of any payouts from contributory retirement plans funded by previous worker and employer contributions.

To these individual worker related costs, were added several categories of costs incurred by the employer. The corporate Human Resource (HR) departments estimated costs of recruiting and retraining a replacement worker. Supervisors were interviewed to estimate the percentage of normal productivity lost when an AIDS-sick worker was present at work. Supervisors also estimated the percent of their time spent handling the problems created by the worker's illness and the resulting vacancy and transition to a replacement worker. The costs measured, on a per worker basis, are summarized in the table below.

Table 9: The costs associated with the death or retirement of an HIV/AIDS sick worker

	Company A		Company B	
	Shillings (000)	USD	Shillings (000)	USD
Incremental absenteeism	2,118	1,086	522	268
Additional medical care	241	124	745	382
Gratuity, funeral and related death retirement benefits	452	232	1,706	875
Recruitment/training of replacement	2,601	1,334	21,664	11,110
Supervisor time	2,445	1,256	2,001	1,026
Lost productivity while present but sick	9,306	4,772	14,159	7,261
Total cost per worker lost	17,167	8,804	40,796	20,921
% of annual pay/benefits to average worker	120%		185%	

The authors noted that the provision of ART at company expense would be a good investment, especially given the declining costs of treatment (now available in the private sector in Kampala for around Shs 825, 000 per year (just under \$500), or 4.8% and 2% of the cost of losing a worker to AIDS at Company A and B, respectively), which can effectively keep an HIV positive worker productively employed.

Other studies have shown that the absence of workers in the company may also have an impact on the morale of the remaining workers, which could lead to declining productivity.

In a study to examine the impact of AIDS-related costs on human resources carried out among four Kenyan firms, the most significant factor in increased labour costs was absenteeism due to HIV or AIDS, which accounted for 52 percent of total AIDS-related costs (Roberts and Rau 1994). In terms of cost per employee, the companies spent an average of US\$ 30 per capita in 1994. Although this figure may seem insignificant, the impact may be profound as time goes on, increasing labour costs and reducing company profits, providing a motivation for the implementation of appropriate prevention measures at the workplace.

In commercial farms studied in Kenya, illness and death had already replaced old-age retirement as the leading reason why employees leave service. Retirement accounted for only 2 percent of all employee drop-out by 1997. A quarter of the workforce was infected with HIV on one sugar estate in this study. Direct cash costs related to HIV rose dramatically, company spending on funerals increased five-fold between 1989 and 1997, and direct health expenditure increased ten-fold. The estate's managers reported greatly increased absenteeism, lower productivity (a 50 percent drop in the ratio of processed sugar to raw cane between 1993 and 1997), and higher overtime costs as workers were paid to work extra hours to fill in for sick colleagues. A flower farm in another part of the country experienced a similar tenfold rise in spending on employee health costs from 1985 to 1995. This expenditure, which was estimated at over one million U.S. dollars for a company with 7,000 employees, diminished profits so heavily that the owners sold the company.

According to a one Government of Uganda (GoU) (2000) study, the HIV/AIDS epidemic has more than doubled the expected number of deaths among the workforce of some enterprises. Thus, workplace prevention programs may be a cost-effective response.

Private sector employers are starting to reconsider the benefits they are able to pay if employees sicken or die in service. This has led to a dilemma of benefit packages and insurance payments. Many organizations are increasingly hiring staff on casual or rolling short-term contracts, thus escaping the need to pay disability, death, or other benefits. A significant number of companies are working together with the insurance industry to work out policies and benefit packages that meet the needs of terminally ill people and their families without bankrupting the companies themselves.

HIV-infected workers also are likely to become less productive as infection progresses to AIDS. In Namibia, NamWater, the largest water purification company, announced in 2000 that HIV/AIDS was "crippling" its operations (Angula, 2000). They reported a high staff turnover due to HIV-related deaths, increasing absenteeism and a general loss of productive hours. A study in Kenya (Fox et al., 2003) showed that tea pluckers who died of AIDS-related causes produced a quantity of tea roughly one-third less in their last two years of life than other healthy workers. The AIDS patients who died had also suffered an earning loss of 18 % in the year before their death.

Firms that have a health programme to help workers who become sick may find themselves responsible for substantial medical costs. The insurance scheme of the firm may become more expensive as insurance companies increase the costs of coverage as a response to high HIV prevalence rates in firms. This could impede any saving for investment by the firms. A study on Lonrho companies in Malawi found that deaths-in-service benefits increased by more than 100% between 1991 and 1996 (Ntirunda and Zinda, 1998). The study also found that AIDS-related costs were 1.1 % of the total costs and 3.4 % of gross profits of these companies in 1992. Another study of five firms in Botswana found that the impact of HIV/AIDS depended on the type of business, the skill level of employees, the type of benefits provided, and the amount of savings (Stover and Bollinger, 1999).

The impact of HIV/AIDS on firms depends partly on the age structure of the workers in the firm. For example, a study conducted in Zambia in Barclays Bank showed that mortality peaked in the 30-39-year age group. The death rate rose from 0.4 % to 2.2 % between 1987 and 1991, and the bank paid more than ZK 10 million (US\$ 58,140) in the form of ex-gratia payments to the families of employees who died from HIV/AIDS (Smith and Whiteside, 1995). The study also showed that medical expenses and training costs were on the increase whereas man-hours were reduced.

Not only does the absence of infected workers contribute to revenue losses at the firm level, but absence of healthy workers taking care of infected family members or attending funerals of co-workers can also be detrimental for companies. It has been estimated that extension workers in north central Namibia spent at least 10 % of their time attending funerals (Eng and others, 2000).

Impact on the Agriculture Sector

Evidence suggests that the HIV epidemic is disproportionately affecting agriculture relative to other sectors (IFAD 2001). This is not because rates of HIV are higher among workers in the agricultural sector than elsewhere (indeed they are usually lower), but because the structure of the agricultural

sector, especially the smallholder subsector, is such that it is much less able to absorb the impacts of the human resource losses associated with the pandemic. In Uganda, the impact on agriculture is likely to be far reaching, as over 70% of the population depend on the sector for livelihood³. In agrarian societies, the HIV/AIDS epidemic is intensifying existing labour bottlenecks, increasing widespread malnutrition; proving a barrier to traditional mechanisms of support during calamities, massively adding to the problems of rural women, especially female-headed farm households arising from gender division of labour and land rights/resources, and deepening macroeconomic crises by reducing agricultural exports. In extremis, it is creating the 'new variant famine.' (de Waal & Tumashabe, 2003, p.2). If sustained, this impact will be far-reaching and in the long run threatens the food security of areas or entire countries.

A number of studies have been conducted to assess the impact of HIV/AIDS on agriculture on African countries. Some of the relatively early studies on the impact of HIV/AIDS on subsistence agriculture focused on Uganda, Tanzania and Zambia (Barnett & Blaikie, 1990 and Barnett et al, 1995). These found that HIV/AIDS had a major impact on the sector, through the interface between domestic and farm labour supply and demand. When adults became sick, this typically ended up with less time being spent on farming activities, with the result that the pattern of food production changed; most affected households focused more on basic crops, with less variety in what they grew. This had implications for diet and nutrition as well as potential cash earnings. ; in Uganda, for instance, where farming conditions are good (with respect to rainfall, soil fertility etc.), high levels of HIV infection were leading to a deteriorating quality of life and income levels in many rural households. While HIV/AIDS was also found to be having an impact in Zambia and Tanzania, the impact was smaller (due to the earlier stage of the epidemic), and more generally the impact was uneven within and between countries, making generalisation difficult. It was noted that household level studies are resource intensive and expensive, especially if the objective is to obtain broadly-based information that is of use to policymakers.

Using participatory approaches Glellier, Tanzam Lamberts and Howard (2004) find that HIV/AIDS has impacted on the Ugandan fishing sector (which is estimated to contribute 6% of GDP, but is highly vulnerable to HIV/AIDS infection)⁴ in a number of ways: loss of skills, reduced time spent fishing due to ill health, and subsequently a reduction in the quantity of fish caught; and reduced fisher's ability to invest in gear. Consequently the cumulative impact of HIV/AIDS is affecting incomes and possibly food security, as households are dependent on fish for both their staple diet but also to generate income to buy in other foods. In addition, HIV/AIDS resulted in sale of assets households for survival, time taken from work to attend funerals, increased costs of health care and caring for the sick etc. and increasing engagement in illegal activities including using unauthorised fishing gear, illegal numbers of nets, fishing in unlicensed boats or failing to declare all the fish caught. Though this

³ In the case of Uganda the agriculture sector (including crops, livestock, forestry and fishing) employs about 69% of the active labour force. Though its contribution to Gross Domestic Product (GDP) has been declining (i.e. from 25 percent of monetary GDP in 1981/82 to 16.8 percent in 2006/07), it accounts for the highest share of GDP. Agricultural products also account for around 55% of exports.

⁴ Given the nature of the fishing activity which involves seasonal migration and a lot of mobility, it enhances the possibilities of HIV infection.

study would not accurately assess the long term impact of these issues at macro-economic level, it provides an indication that without a reduction in HIV/AIDS prevalence rates, a cumulative effect may well be felt through loss of export earnings and a reduction in fish stocks if fishing near shore and/or use of inappropriate gear increases.

A study on 313 households was conducted by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) in Uganda (2002). Empirical data on the impact of HIV/AIDS on agricultural production was analysed in four districts Rakai, Lira, Iganga and Mbarara where farmers were small landholders, majority owning less than 8 acres of land, and using labour intensive techniques in their cultivation, and most of the households were growing crops on small portions of land. Most of the crops both for food and sale were labour intensive crops, most susceptible to HIV/AIDS. The study found that all households have been affected by the epidemic through time loss, labour depletion, increased burden dependency, sale of precious household property such as land and animals, all of which translate into decreased agricultural and fish production. This is suggestive of increased poverty among rural households, for HIV/AIDS threatens their basic source of survival. It is as a result of this that mainstreaming HIV/AIDS messages into agricultural extension in Uganda becomes inevitable and timely.

A majority of the household respondents (76.9%) revealed that their respective households had experienced decreased agricultural production in the last 10 years. Declining agricultural production and consequently food insecurity were more prevalent in grandparent- and child-headed households than in other households. A number of factors, all related to HIV/AIDS, explain the general pattern/trend of decreased agricultural production such as depletion of labour force and increased workload due to increased dependency burden, loss of skills and knowledge, and income disruption. Of the studied households, 66.9% mentioned shortages of labour to be behind decreased agricultural production in their households. In almost a fifth of the sampled households, labour shortages were directly linked to HIV/AIDS related deaths.

The same study established that HIV/AIDS was a cause of a range of problems faced by livestock farmers. In households that had been afflicted and affected by HIV/AIDS, the impact was severe as 17 households (32%) reported it involved uncontrollable selling of animals in order to meet the emerging needs such as medical care. In over a quarter of the households (26.4%) reported death of livestock was attributed to lack of care and poor management practices that arise as a result of members' sickness and death. The situation was reported to be more severe in a household where the breadwinner is having HIV/AIDS or died of related illness.

Similar findings are derived by an in-depth assessment of the impacts of HIV/AIDS on individuals, households and communities in the mixed agriculture, fisheries and pastoral subsector (National Agricultural Advisory Services (NAADS), 2003)⁵. Agricultural and fisheries production were reported to decrease due to AIDS. The main household impacts included sale of assets, reduced food

⁵ A cross-sectional survey was done on 631 smallholder agricultural rural households at six sites in the Lake Victoria Crescent agro-ecological zone. Both qualitative and quantitative data including five-year recalls were collected.

consumption, in terms of both quantity and quality; reductions in herd size or in the area of land cropped; use of fewer crop varieties; abandonment of specific activities and crops; and removal or stripping of assets by relatives from outside the household. HIV/AIDS-affected households find it difficult to adopt recommended agronomic practices that boost production and the quality of produce, and have less money to invest in farm inputs and implements. The dissemination of new techniques is also being hampered by affected households' difficulties in attending extension seminars, by their short-term planning horizons and by the death of knowledgeable extension staff. As a result of the pandemic, several institutions have emerged (HIV/AIDS counselling, nutrition education etc), while others have collapsed (previously established mutual assistance networks, such as those between fish traders and fishmongers). Coping strategies were found to be erosive.

A study by Bukusuba et al (2007) on 144 randomly recruited households of people living with HIV/AIDS in Eastern Uganda showed that the HIV/AIDS pandemic has increased the inability of affected households in the study area to put enough food on the table, possibly because of the continued decreased productivity in these households and the high expenditure on medical costs. Similarly, HIV/AIDS epidemic has led to shifting work patterns and an overall reduction in food production in Burkina Faso. Revenues from agricultural production had decreased by 25% to 50% % in HIV/AIDS affected households (FAO, 1997).

Outside of Uganda, many other studies have been conducted on the impact of HIV/AIDS on rural societies and agricultural production, of under the auspices of FAO. A study conducted in Burkina Faso in 1997 found that the HIV/AIDS epidemic has led to shifting work patterns and an overall reduction in food production. Revenues from agricultural production had decreased by 25% to 50% % in HIV/AIDS affected households (FAO, 1997).

Findings from a study among agricultural workers in the Tanzania showed that a woman whose husband was sick was likely to spend 45% less time working than if her husband was healthy. In Kagera, a survey showed that, HIV/AIDS had a considerable impact due to labour reallocation (away from farming, towards care for the sick and mourning the dead), declining farm productivity as assets and working capital are sold to pay medical bills, and rising dependency ratios (Tibaijuka, 1997). Another study in the same region found that on average, adults in households that experienced a death spent five hours less in farming during the previous week than those without a death (Mutangadura, 2000).

Rugalema (1999) finds that the commercial agricultural sector in Kenya is facing a severe social and economic crisis due to the impact of HIV/AIDS. The loss of skilled and experienced labour to the epidemic is a serious concern. But it is difficult to quantify the impact of the epidemic in terms of increasing costs.

Similarly, the Ministry of Agriculture and Cooperatives (MACO) Zambia (2007) finds that HIV/AIDS reduces food sufficiency of households in Zambia; the worst affected are female-headed households, especially those caring for people living with HIV/AIDS (PLWHA) and/or orphans. These households are food-insufficient for an average of 3.4 months a year, compared with 1.9 months for non-affected households. Female-headed households reduce the area under cultivation, have little access to improved technologies and are increasingly unable to cultivate under chitemene – all of which has reduced their agricultural production. In addition, these households have few income

opportunities, and thus have limited disposable income for purchasing food to cover the months of food insufficiency. This makes them more likely to adopt risky survival strategies such as sex work, thus exposing them further to HIV/AIDS.

Accordingly, AIDS undermines agricultural systems, affects the nutritional situation and food security of rural families. Families face declining productivity as well as loss of knowledge about indigenous farming methods and loss of assets (FAO, 2001a). Labour intensive farming systems with a low level of mechanisation and agricultural input are particularly vulnerable to AIDS. Given the fact that AIDS is concentrated among the 15 - 45 years old, who are most able bodied, then agriculture suffers most in terms of production and market for the accruing products.

Women who are the main producers⁶ generally shoulder the burden of caring for the sick. This diverts their energies from agricultural production and general work that would provide income. The result is household food insecurity, declining nutrition and health. Thus, the decline in women's contributions to agriculture, as a result of their own illness or that of family members, reduces agricultural productivity and household food security. This is especially devastating given women's key role in the agricultural work force and in the production of most subsistence food crops.

Using both quantitative and qualitative techniques to collect data on business firms, Muwanga (2002) attempts to determine the impact of HIV/AIDS on agriculture and the private sector in Swaziland and finds that within the subsistence sector there has been a decline of family incomes because of higher adult morbidity and mortality, and additional expenditures on health. This has led to decreased food security. However, HIV/AIDS has not affected the profitability and productivity of Swazi businesses as the costs have been passed onto households and the public sector. The response by Swazi business to the epidemic has focused mainly on avoidance of costs associated with the epidemic - absence of community investment by business and provision of limited benefits to employees; leaving it to the households and public services to cater for their sick and those orphaned by the epidemic. The paper recommends that through the Ministry of Agriculture and Co-operatives, government should establish a multi-sectoral approach that goes beyond the health-based response to obtain vital information on vulnerability of agriculture and the private sector to HIV/AIDS related morbidity and mortality; and identify strategies that can be implemented to prevent and control the epidemic.

However, although much has been written on HIV/AIDS interactions with food security and rural livelihoods, the impact of the epidemic is particularly difficult to measure at the household level (Curry et al., 2006). White and Robinson state that HIV/AIDS exacerbates existing problems of poverty and argue that most research does not have a clear theoretical framework for isolating the particular impact of HIV/AIDS in the context of the range of different factors that affect households and communities (White and Robinson, 2000, p. 36-37). HIV/AIDS impacts can initiate a slow process of decline of smallholder agriculture, rural livelihoods and household resilience, with each season producing a new negative change to the farming system or requiring another asset to be sold (Barnett and Whiteside, 2002). The extent and severity of the impact is also influenced by gender roles (as Curry et al., 2006 among others find), relative wealth, whether periods of sickness or death

⁶ In Uganda, women contribute about 60 percent of the labour force in the agriculture sector.

coincide with peak agricultural seasons, marriage and inheritance systems and the level of institutional support for HIV/AIDS affected households at the community level (Shah *et al.*, 2002, p. 41, table 7). Other factors that play a role include which person in the household is sick or has died (e.g., the breadwinner), whether the household has experienced multiple cases, and/or the simultaneous occurrence of other shocks that affect people's livelihoods, (e.g. drought). In the case of households taking in orphans, the impacts depend on the existing household composition and the net contribution made by the orphan to the household—a contribution that depends on the orphan's age, gender and skills (O'Donnell, 2004, p. 14-15). In addition, household livelihoods are further influenced by the cumulative effects of chronic poverty, liberalisation failures, and weak institutional capacity, all of which are hard to disentangle from HIV/AIDS impacts (Wieggers *et al.*, in press).

The impact of HIV/AIDS on agriculture may also depend on the level of prevalence in the country or area. For example, production loss in AIDS-affected households was reflected in a survey conducted in Zimbabwe, a country with an adult HIV prevalence of more than 25%. According to this survey, conducted in 1997 by the Zimbabwe farmers' union, agricultural output in communal areas declined by nearly 50% among households affected by HIV/AIDS (Kwaramba, 1997). Maize production by smallholder farmers and commercial firms declined by 61% because of illness and death from AIDS. These production losses could result from a number of factors including shifting production patterns, though according to the same author, there is no indication so far in the Zimbabwe data of a dramatic switch from cash to subsistence crops.

The impact of AIDS is expected to increase in the future due to labour force decreases. FAO estimates labour force decreases ranging from 11 to 26% are anticipated (Table 10) in the ten most affected African countries, following an estimated 7 million more death are likely to occur in the next two decades.

However, the future impact will depend partly on the possibility of mechanising agricultural production and reducing reliance labour intensive means of production. It is therefore important to review periodically the impact on this sector (Gaigbe-Togbe and Weinberger, n.d. pg 37).

Table 10: Estimated and Projected Loss of Labour Force (percentage) in 2000 and 2020, Various Countries in Sub-Saharan Africa

Country	2000	2020
Namibia	3.0	26.0
Botswana	6.6	23.2
Zimbabwe	9.6	22.7
Mozambique	2.3	20.0
South Africa	3.9	19.9
Kenya	3.9	16.8
Malawi	5.8	13.8
Uganda	12.8	13.7
United Rep. of Tanzania	5.8	12.7
Central African Republic	6.3	12.6
Cote d'Ivoire	5.6	11.4
Cameroon	2.9	10.7

Source: FAO, 2001b.

The Household & Poverty Impact of AIDS

A few studies have examined the impact of HIV/AIDS on households and poverty. These comprise a mixture of case study approaches, typically focusing on a particular community, and national studies, typically using simulation approaches to model the impact of HIV/AIDS on household incomes and expenditure. The former can provide rich data, both qualitative and quantitative, that enable a detailed understanding of the processes at work, but may be of limited representativeness in enabling an assessment of the national impact. The latter can provide national data, but being simulations, they provide an estimate rather than a measurement of the poverty impact. In this section, we review the latter type of analysis.

As many macroeconomic studies show, HIV/AIDS has a negative effect on overall GDP growth, but can have an ambiguous effect on (average) per capita incomes. If the reduction in GDP growth is smaller than the reduction in population growth, then average incomes may rise. However, more recent studies have tended to reach the conclusion that average incomes will fall, as the negative GDP impact outweighs the lower rate of population growth. If so, HIV/AIDS would be expected to increase overall poverty rates (not necessarily in absolute terms, but relative to what would have prevailed without HIV/AIDS).

More detailed analysis of household and poverty impacts takes into account the various different channels through which HIV/AIDS can affect household incomes and expenditure, as well as the characteristics of actual households. The various channels through which HIV/AIDS can affect households include:

Morbidity (sickness) effects: if a household member's income depends on his or her productivity, then loss of income can result during illness. This is especially likely in subsistence agriculture, although as Greener (2005) points out, for employees in the formal sector, the impact is likely to be ameliorated, at least initially, by provisions for sick leave and/or disability benefits. Household income may also be reduced indirectly, as (healthy) income-earning members have to take time off

work to care for sick members of the household. Morbidity may also cause an increase in household expenses, due to additional medical costs or associated expenses such as food and transport.

Mortality affects household income and expenditure through the loss of an income earner, and funeral costs, which can be high.

There are also a range of indirect effects. Mortality also affects dependency ratios within households (the ratio of children to adults, or the ratio of income-earning members to non-earning members). On a practical level, the deaths of adults will create orphans, who may be cared for by other households (whether relatives or otherwise). HIV/AIDS also affects the labour market. Wages for certain categories of labour may rise, due to shortages, especially of skilled labour. Unemployment may rise or fall, also creating wage pressures.

The impact of these effects on households also depend on the nature of social welfare or private insurance mechanisms in place, through such mechanisms as the extent of public health provision (are antiretrovirals provided?) the cost of private health care, the extent of government social programmes (e.g. orphan support or more general poverty alleviation programmes), and informal provision (social networks and extended families).

Analysis of the impact of HIV/AIDS on household income, poverty and inequality has been carried out for only a few countries in sub-Saharan Africa: Botswana (Greener et al, 2000 and Jefferis et al, 2007), and Ghana, Kenya, Swaziland and Zambia (Salinas & Haacker, 2006). The basic methodology, as described in Salinas & Haacker (2006), is similar in all of these cases. First, using household level survey data on individuals, an HIV status is randomly assigned to all individuals, based on the individual's socio-economic and demographic characteristics and information on HIV prevalence by category⁷. Second, using certain assumptions about the costs of HIV/AIDS to the affected households, the income effects, and the existing (formal or informal) social insurance mechanisms, and changes in employment, the simulation exercise models the impact of HIV/AIDS on income per capita, income distribution and poverty rates⁸. This reflects changes in income and expenditure as a result of HIV/AIDS. The analysis can be dynamic (modelling the impact each year over a chosen time period) or a one-time shock (say after ten years, when HIV positive individuals would be expected to have died).

The results of these studies are fairly consistent across countries. The first of these, for Botswana, found that the household poverty count (using a Botswana-specific poverty datum line) would increase by 5 percentage points over ten years as a result of HIV/AIDS, taking into account direct income and expenditure effects, and indirect macroeconomic and employment effects. The Salinas and Haacker study found that the impact depended crucially on assumptions regarding labour market efficiency and how quickly workers were replaced, the nature of the distribution of HIV

⁷ The method therefore requires source data from a household income and expenditure survey or living standards measurement survey, as well as detailed HIV prevalence data, preferably from a nationwide household survey or alternatively from an ANC sentinel survey.

⁸ Given that the outcome is stochastic (it will depend upon the way in which HIV status is randomly assigned to individuals), it is preferable to conduct the analysis using Monte Carlo methods, so that multiple runs will minimise random error

prevalence across the population (and income scale), and which poverty line was used. The results showed a maximum impact on the poverty headcount of 10 percentage points, for Swaziland (which has the highest HIV prevalence rate), under the assumption of slow replacement of workers who die, and based on the \$1 a day poverty line. Improving labour market efficiency has a significant impact: if workers are replaced immediately, the impact on poverty headcount falls to around five percentage points in the case of Swaziland, and there are commensurate reductions in other countries. The same study found that the impact of a social insurance mechanism is also beneficial, although the effect is small and much less than the impact of efficient labour markets. This is partly because the mechanism considered is a social welfare contribution meeting some of the costs of HIV/AIDS financed by other households in the same income bracket – so while some households benefited from higher incomes as a result of the transfer, others had lower (post-tax/transfer) incomes.

The second Botswana study (Jefferis *et al*, 2007) considers the same issue using the above technique but also using a CGE model combined with micro-simulation. The results suggest that the poverty impact, while negative, is somewhat smaller than the other studies. The poverty impact simulations indicate a negative impact of up to 3 percentage points on poverty (i.e., with AIDS, the poverty headcount ratio would be up to 3 percentage points higher than in the absence of AIDS). This negative impact arises because of slower income growth and slower employment growth, and also because part of household expenditure has to be diverted towards HIV/AIDS-related spending. In general, household consumption expenditure rises more slowly than overall GDP, reinforcing the negative poverty impact.

Simulations also show that the negative impact of HIV/AIDS on poverty is reduced by approximately one-third to one-half if ART is provided, and that the government's policy of providing welfare support through grants to assist in the upbringing of orphans can substantially alleviate the negative poverty impacts.

With regard to income inequality (as measured by the Gini coefficient), the impact of HIV/AIDS can be complex. Certainly households with HIV positive members will suffer an effective reduction in (disposable) income (through lower income or increased forced spending). Others, however, may benefit from higher incomes, especially if labour market pressures and supply constraints push up wages and reduced unemployment. The net balance of the effects depends very much on the distribution of HIV prevalence across the income scale – if HIV prevalence is higher amongst the upper income groups than amongst lower income groups, then HIV could quite easily lead to a reduction in income inequality. The first Botswana study (Greener *et al*, 2000) finds that income inequality is unaffected by HIV/AIDS, with the Gini coefficient at 0.51 in both the with-HIV and no-HIV scenarios⁹. However, Salinas & Haacker (2006) find a significant increase in inequality, with the Gini coefficient rising from 0.51 to 0.56 in Swaziland and 0.48 to 0.53 in Zambia. Improved labour market efficiency cuts this by about one-third.

At the micro level, quantifying the impact of HIV/AIDS is difficult. As one study notes, "The estimation of impact of HIV/AIDS of the economy of individual households and populations presents

⁹ The second Botswana study did not calculate the impact on income inequality.

severe technical challenges. It is difficult to establish adequate control groups; longitudinal studies are difficult and expensive to organise; and there is the additional problem that, as HIV/AIDS is only one of many changes affecting the economy, it is difficult to ascribe observed changes to HIV/AIDS” (Seaman & Petty, 2005, p.11). Nevertheless the study reports on such an analysis carried out in Swaziland, and concludes that HIV/AIDS had reduced average household income by around 8% over a five year period, and had raised the household poverty rate from 20% to 22% (interestingly, both figures are in line with the modelling results described above) (Seaman, Petty & Narangui, 2004).

The Impact of HIV/AIDS on Government Finance and Public Services

General Impacts

Haacker (2004) notes that HIV/AIDS poses a huge challenge to governments facing severe epidemics. He observed that HIV/AIDS increases substantially the demand for certain categories of public services (most importantly, health services), and also that the capacities of governments to cope with the epidemic are eroded, in part because of increased mortality and morbidity among government employees. Indeed, the impact of HIV/AIDS on government employees goes far beyond the disruptions and increased costs associated with increased attrition owing to HIV/AIDS. In fact as the mortality among young adults (15-49 years) increases, the age composition of the civil service changes. Fewer public servants survive to an age when they might normally be candidates for higher managerial positions; as a result, some of these positions must be filled with less qualified or less experienced people, and the quality of decision making is likely to deteriorate.

Fiscal Impacts

The most visible impact of HIV/AIDS on governments’ operations has been on health services and expenditures. Because of high costs of antiretroviral treatment, only a few AIDS victims accessed it, hence the health sector emphasized palliative care and the treatment of opportunistic infections which trend reversed due to reduction in the prices of antiretroviral treatment and increased financial support from the international community. This made much of the emphasis to be shifted toward Impact of HIV/AIDS on Government Finance and Public Services by improving access to that treatment. Indeed, UNAIDS estimated that in 2003, more than 75% of public expenditure on HIV/AIDS in developing countries was to be financed by external grants. However, such grants typically finance only those expenditures that directly relate to HIV/AIDS ignoring the indirect costs of HIV/AIDS which are substantial—increasing personnel costs, rising social expenditure, and a decline in domestic revenue as the tax base is eroded—which are left to the governments to cover from their own resources

Considering the impact of and the response to HIV/AIDS from a fiscal policy perspective is important because:

- HIV/AIDS affects all areas of public services and the domestic tax base, and it forces substantial increases in spending in some services. Hence to conduct responsible fiscal policy one has to take into account the broad impact of HIV/AIDS on government employees and the budget.
- The efforts to fight the epidemic and mitigate its impact have important consequences for the budget and the management of public services, in the form of increased expenditure,

increases in required personnel, and the need to coordinate the activities of international donors. Also

- For a successful HIV/AIDS policy, (one that reduces the number of new infections and improving the health status of people living with HIV), can mitigate the impact of HIV/AIDS on the economy as a whole, and thus soften the impact on public services and the government budget.

Johansson (2006) modelled the fiscal impact of HIV/AIDS in South Africa. He considers a number of scenarios, including interventions such as Prevention of Mother to Child Transmission (PMTCT) anti-retroviral therapy (ART)¹⁰. He concludes that these interventions will largely pay for themselves (relative to the no-intervention scenario), through two key channels. First, there will be healthcare cost savings, as the level of illness will be lower in the case of interventions. Second, there will be a larger population and increased economic growth, both of which will add to fiscal receipts. In Johansson's analysis, the health care cost saving is relatively modest, as in his base case he assumes that only 26% of HIV/AIDS-related health care needs are actually met in the no-intervention scenario, so that the main benefits come from indirect demographic and growth effects.

Jefferis *et al* (2007) analysed the fiscal impact of HIV/AIDS in Botswana, including the cost of providing ART nationally. In contrast to the Johansson study on South Africa, they considered only the direct costs and benefits of HIV/AIDS to government, and also assumed that in the no-ART case, all of the health costs related to illness of HIV-positive people would be met. They concluded that HIV/AIDS will have a substantial impact on the government budget under the scenario of nationwide provision of free ART. The total cost in 2006 is estimated at P1 billion (at 2004/05 prices; approx US\$200m), which is equivalent to approximately 6% of government spending. These costs include health care costs relating to in-patients, ambulatory patients and the ART programme, as well as related costs such as home-based care, prevention activities, other HIV/AIDS programmes, care of orphans and vulnerable children, and additional old aged pensions. The cost of ART drugs is the largest single component of overall costs. It is projected that total costs will increase in real terms by some 60% by 2021, although as the economy will also be growing, the share of government spending will only rise slowly, to 8% in 2011, before falling back to just over 7% by 2021.

In the AIDS-without-ART scenario, the cost to government would be lower, as the high cost of ART treatment (which accounts for up to 40% of total programme costs) would be avoided. However, these savings would be counteracted to a large extent by higher health service costs for in-patient and ambulatory care, and higher social spending on home-based care and orphan care, if policy and capacity allow for estimated increases in spending in these areas. Hence total government spending on HIV/AIDS related costs would be 15%-25% lower over 2006 – 2021. At the same time, GDP growth would be lower (due to a greater HIV/AIDS impact without ART), and general government revenues and spending lower as a result. Hence HIV/AIDS-related costs to government would be only some 2% lower, as a percentage of total spending, in the no-ART scenario.

In order to maintain fiscal balance, the costs of HIV/AIDS spending would have to be met by cutting back spending in other areas, possibly including lower priority areas of HIV/AIDS response. This

¹⁰ The annual cost per patient of ART is given as R4838 in 2000 prices.

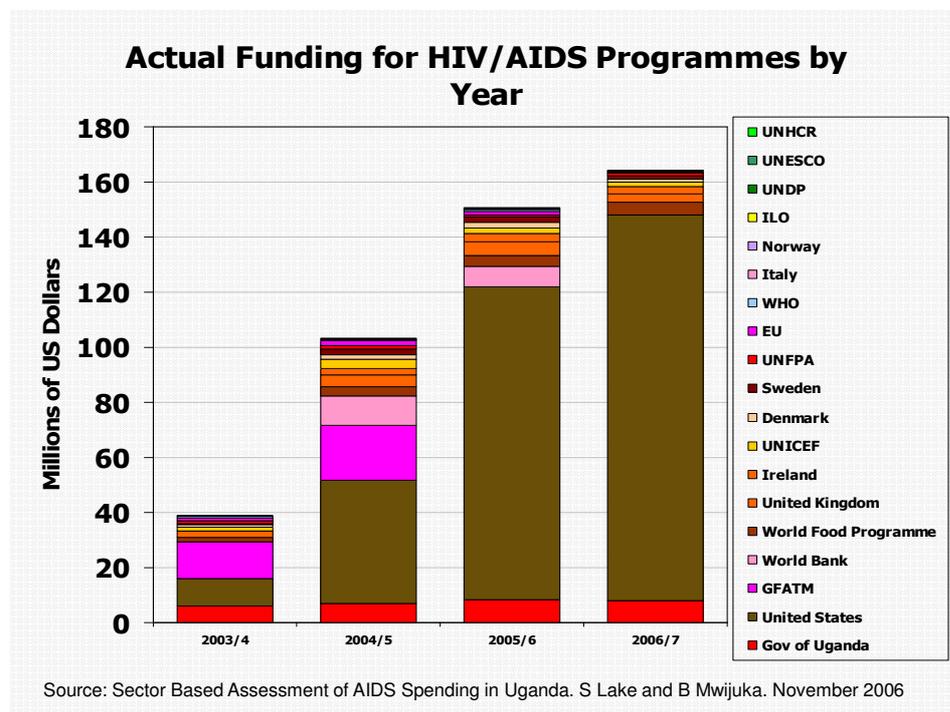
would require prioritising of expenditures and strict budgetary controls. Alternatively, if HIV/AIDS-related spending is financed through budget deficits, there will be upward pressure on interest rates and a crowding out of private sector activity. Fully funding HIV/AIDS related spending out of budget deficits is not feasible or sustainable, and hence some tough spending trade-offs will be necessary, and those trade-offs will be more severe if ART is provided.

However, it is important to note that the bulk of HIV/AIDS-related public spending will be required *whether or not ART is provided*; the additional cost of ART provision is relatively small (only 30% of spending would be saved if ART is not provided). Furthermore, part of the additional ART costs are met by donors, so that the impact on the overall government budget is reduced further. In addition, this incremental spending on ART will help to unlock additional GDP. The macroeconomic projections in the study suggest that the additional spending on ART rising to P360m a year would lead to additional GDP amounting P7.5 billion a year. The incremental government revenues on this additional GDP (net of other costs associated with there being a higher population) would also help to cover part of the costs of ART.

Spending on HIV/AIDS in Uganda

The quality of information relating to the costs of HIV/AIDS and associated interventions is gradually improving. In Uganda, a sector-based spending study has recently been carried out (Lake & Mwijuka, 2006), and it is understood that a costing study is also in progress. The amount of resources available for HIV/AIDS-related initiatives has increased sharply in recent years – from US\$40m in 2003/04 to nearly US\$170m in 2006/07 – due especially to the US's PEPFAR initiative. Of this, the Government of Uganda contributes some 5 percent. Availability of resources is not a major constraint; however there are many issues related to sustainability (of committed programmes should donor funds be reduced), absorptive capacity (can such a rapid scale up be efficiently implemented), and macroeconomic (Dutch Disease) effects.

Figure 9: Funding of HIV/AIDS Programmes, Uganda



Impact of HIV/AIDS on the Public Sector in Uganda

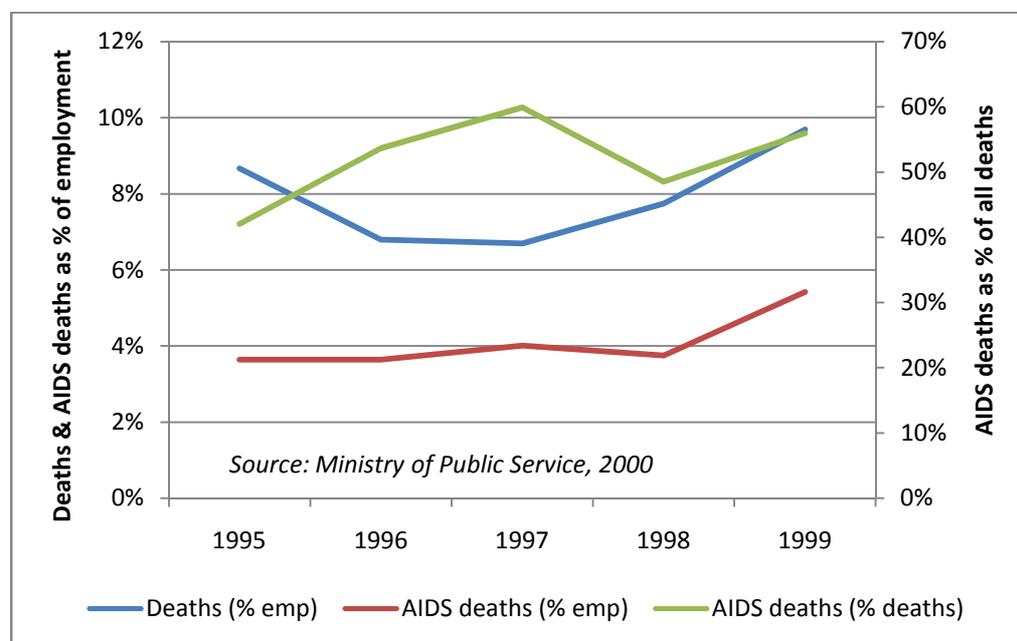
HIV/AIDS has had a substantial impact on the public service in Uganda. It affects the public service in four main ways: on the capacity of the public service to deliver, and resulting performance; on the availability of human resources; the need to develop sustainable strategies to mitigate the effects of HIV/AIDS in the workplace; and the development of an appropriate management information framework to handle HIV/AIDS.

Two studies have been carried on the impact of HIV/AIDS on the Uganda public service (Ministry of Public Service 2000 & 2003). A number of negative impacts were identified as systemic costs, which include lack of workplace cohesion manifesting in as a reduction in morale, motivation and concentration, disruption of schedules and teamwork and breakdown of workforce discipline such as unauthorised absenteeism. There is reduction in workforce performance due to reduction in average skill, performance, institutional memory and experience of work force (Ministry of Public Service, 2003).

The 2000 study was based on survey questionnaires administered to a number of serving public officers and heads of department, as well as focus group discussions. The study illustrated that AIDS was having a major impact on the public service. During the period 1995-99, an average of 8% of the workforce in the selected departments died each year, and of this, just over half of deaths were thought to be due to AIDS – meaning that the public service (or at least in the selected departments) was losing 4% of its employees to AIDS each year. The figures showed a major contrast between males and females – while an average of 84% of males deaths were thought to be due to AIDS, only 22% of female deaths were (although this may illustrate problems with the data collection or

analysis as much as underlying real differences). The trend of AIDS deaths over this period was deteriorating (it was 5.4% of employees in 1999, compared to only 3.6% in 1995), illustrating a mounting problem.

Figure 10: Deaths in the Public Service (Selected Departments), Uganda



Unfortunately many of the data in the study were presented as absolute numbers rather than as percentages of relevant totals – for instance, while the majority of those thought to have died from AIDS were married, the study did not report whether the *rate* of death was higher for married officers; the result may simply reflect that most public officers are married, rather than being more or less vulnerable to AIDS. However, one conclusion that can be drawn relates to AIDS and the level of education. While 22% of officers thought to have died from AIDS had a university education, the overall proportion of public officers with university education is thought to be much lower than this, indicating that the death rate for university education public officers was higher than the average.

The study also showed that many of those who die are in the prime of their careers, depriving government of key personnel with a resulting loss of crucial experience and expertise.

Table 11: Mean age at death in selected sectors of the Public Service

Sector	HIV/AIDS- related		Non-AIDS-related	
	Number	Mean	Number	Mean
Agriculture	12	39.6	6	48.5
Justice, Law and Order	11	40.7	5	46.4
Accountability	7	42.0	7	43.3
Economic Functions and social Services	13	39.8	2	52.5
Total	43	40.3	20	46.6

Source: Ministry of Public Service, 2003

Possession and maintenance of an effective and efficient workforce is crucial in both the public and private sectors. This has become increasingly difficult in the era of HIV/AIDS. The capacity of the

Public Service has been affected by the rate at which the officers are dying and/or leaving the service either because of retirement or to engage in activities outside public service. HIV/AIDS is recorded as the second most important cause of employees leaving the public service.

Table 12: Reasons for officers leaving the public service in 1999

Reasons for leaving	Number of officers	Percentage
Greener pastures	174	32.6
HIV/AIDS-related	76	14.2
Voluntary	68	12.1
Abscondment	61	11.4
Dismissal	58	10.9
Deaths other than AIDS	36	6.7
Others (mandatory retirement, resignation)	33	6.1
Retrenchment	28	5.2
Total	534	100

Source: Ministry of Public Service, 2000

As noted above, HIV/AIDS has a number of impacts. The concerns cited by other workers about the impact of HIV/AIDS on their work and working environment were recorded as follows:

Table 13: Respondents concerns about the impact of HIV/AIDS in the workplace

Concern	% citing as a concern
Less experienced staff	18.4
Endless absenteeism	15.1
Reduced output	15.4
Failure to meet target	3.3
Overloaded	18.0
Slow down of projects	1.6
Expensive medical support	15.1
Psychological stress	3.0
Stigmatisation	11.8
Rudeness at work	2.3
Loss of teamwork	9.5
Lack of counselling services	0.6
Others	2.6

Note: contains multiple responses. Source: Ministry of Public Service, 2003

Table 14: Percentage of respondents by coping mechanism

Response	Response (%)
Hire labour	12.1
Re-deploy	42.6
Re-assigning duties	56.4
Coaching/grooming	9.2
Replacement	21.3
Counselling	18.4
Multi-skilling	20.3
Nothing	8.2
Others	1.3

Note: contains multiple responses. Source: Ministry of Public Service, 2003

The Impact of HIV/AIDS on the Education and Health Sectors

At a GTZ international symposium held in Dar-es-salaam in 2004, it was noted that public sector response to HIV/AIDS at the work place in Africa has been lagging behind yet HIV/AIDS remains a significant threat. It was noted that the epidemic on the performance of the public service including education sector include:-

- Loss of skilled human resource
- Increased recruitment and training costs
- Distortion of human resource planning
- Wanton absenteeism due to ill health and care for the sick
- Erosion of personal disposable incomes due to increased health care expenditure; and
- Decline in performance and productivity

People's most productive time is spent at the work place and as much there are fears that the work place can easily provide an entry point to HIV/AIDS through work place affairs or even sexual harassment. All these issues, have therefore undermined the education sector's ability to deliver national services for development, hence the need for a policy and programme to respond to the problem of HIV/AIDS in the education workplace.

In 2002 under the directive of the President of Uganda, the educational sector embarked on the development and implementation of the Presidential Initiative on AIDS Strategy for Communication to Youth (PIASCY) programme in schools. The initial focus targeting primary schools has now been expended by the Ministry of Education and Sports to the post-primary education and training levels. School administration and teachers are central in schools-based programmes such as this one and for sustained success, it imperative that there needs as persons either affected or infected by HIV/AIDS be addressed too.

Through its Agency for International Development (USAID), the US government and World Vision are jointly funding the piloting of the Educational Sector Workplace AIDS Implementation (ESWAPI) project. The project is intended to empower persons in all workplaces with in the educational sector, most importantly the teachers, with requisite information about HIV/AIDS and the existing networks of services and service providers within the country. Indeed, it is uncommon for people to suffer silently when there actually exists services within the immediate vicinity to mitigate their suffering.

ESWAPI supports the MoES to implement and operationalise its HIV/AIDS policy in the workplace. ESWAPI's goal is to reduce the spread and mitigate the impact of HIV/AIDS among Ugandan teachers and MoES employees. This project is pursuing three objectives:

- Increasing adoption of behaviour change practices for the prevention of HIV/AIDS.
- Increasing access to quality HIV/AIDS prevention care and support services.
- Empowering education workplaces to sustainable implement the HIV/AIDS policy, which policy seeks to address challenges such as; stigma and discrimination; who is eligible for support; risk management; responsibilities for employees and employers and effective policy implementation. The policy is based on the principles of non-discrimination and confidentiality, that is, that no employee should be denied appointment, training, transfer, or promotion on the basis of him/her being HIV positive. In the same vein, that no one

should disclose another person's status. Despite this, cases of people being persecuted and stigmatized because they are HIV positive have been reported.

On the whole, HIV/AIDS has been a major socio-economic and health challenge in Uganda since the first case was reported in the country in 1982. It has continuously threatened human resource development all sectors including educational sector. According to a report by Action Aid Uganda; entitled *HIV/AIDS and Teachers' Absenteeism*, dynamics in the school environment, implication of HIV/AIDS on the quality of education were found to be extensive.

Teachers' workload increases in the short-term as available teachers have to take up lessons for those who are absent, and as a result they are overloaded and not able to teach effectively. In the medium term, schools have to employ part-time teachers; hence the school has to find its own ways of financing this gap. Reduction of the budget which the school uses to cater for teachers' welfare and allowances was also observed. Additionally, when the workload of the sick teacher is given to another teacher there is no extra pay for it. This situation can go on for a long time or for as long as the sick teacher remains unwell does not return to school. During this period the sick teacher remains on the payroll if they are in a government school. Also, AIDS increase attrition and absenteeism among teachers, threatening education goals. HIV/AIDS erodes the teachers' workforce, making retention of teachers a challenge. Other observations made were: HIV positive teachers are also not able to mark and release students' marks in time; inability to complete the school syllabus towards the end of the school term, the teachers in a bid to fully cover the syllabus, begin to overload the learner with material. However, given the little time to left to examinations, the learners are not able to internalize what is being taught to them; the rampant absenteeism of teachers in schools means that children have no leadership in co-curricular activities and; teacher absenteeism strains the relationship between the absentee and other teachers within the school. Strained relation and animosity between teachers foster an environment that is not conducive for effective delivery of the quality education. Besides their own illness, teachers may also be absent due to the need to care for family members or to attend funerals. Overall, HIV/AIDS drains the teacher supply, impacts the quality of teaching and increases costs within an already struggling sector. As all actors continue to address the impact of HIV/AIDS, the need to meaningfully involve teachers the chief custodians of education cannot be underestimated

With regard to health, the sector is particularly badly affected by the HIV/AIDS epidemic. The demands on the sector increase dramatically, due to the impact of HIV-related illnesses and deaths, which may compromise the ability of the health service to provide adequate levels of care for the sick. The prominence of HIV/AIDS may mean that resources are diverted to the disease, leaving other health care needs under-resourced. In addition, health workers themselves suffer from HIV/AIDS, and the associated illness and death. HIV infection amongst health workers, combined with deteriorating working conditions and the diminishing attractiveness of working in the sector, combine to reduce the supply of health workers. Health skills are internationally marketable, and many doctors and nurses workers from Africa have left for better pay and conditions in the health systems of developed countries. The poor state of health systems in many African countries, due in

part to the burden of HIV/AIDS, has in some cases led to a special focus by donors in order to keep health systems functioning¹¹.

¹¹ For further information see: Tawfik & Kinoti, 2003; Abt Associates (2000)

The Macroeconomic Impact of AIDS: Country Studies

Introduction

There has been an increasing amount of work carried out on quantifying the economic impact of AIDS. Much of this has focused on sub-Saharan Africa, where HIV prevalence rates are high by global standards, and when combined with often poor and vulnerable economies, the economic impact of HIV/AIDS is potentially quite serious. The various studies use a range of different methodologies, which will be discussed in more detail below, and provide a wide range of estimates or forecasts of the economic impact. Early expectations were that the economic impact of HIV/AIDS in sub-Saharan Africa would be substantial. For instance Bloom and Godwin (1997, p.18) note that “leaders in the global campaign against AIDS have repeatedly expressed the opinion that the AIDS epidemic is likely to have a substantial – perhaps even a catastrophic – impact on the macroeconomics of developing countries”. This implies significantly lower economic growth rates and falling average incomes. However, most of the growing body of quantitative assessments do not reach such dramatic conclusions, and suggest that the economic impact, although negative in terms of overall GDP growth rates, will actually be rather small. Indeed, Bloom and Godwin (1997, p.19) conclude that “with these findings in hand . . . the amount of attention devoted to the macroeconomic impacts of the AIDS epidemic can be reduced”.

In this section we review the various quantitative macroeconomic studies that have been conducted on the impact of HIV/AIDS. Sectoral studies are reviewed elsewhere, as are studies specifically relating to Uganda.

Modelling Approaches

The studies which attempt to evaluate the economic impact of AIDS in African countries can be classified into various categories:

- (i) econometric estimation, where HIV/AIDS is one of a range of factors hypothesised to determine economic growth rates, and the relative impact and significance of these different factors is estimated econometrically (statistically) in a conventional growth model;
- (ii) aggregate macroeconomic equilibrium growth models, where a simple simulation model is constructed and calibrated to a particular economy, and the growth path of an economy is simulated under different scenarios (e.g. “with AIDS” and no-AIDS);
- (iii) computable general equilibrium (CGE) models; these are like aggregate growth models in that they simulate the equilibrium behaviour of an economy under different scenarios, but are more disaggregated and can take into account labour, capital and commodity markets;
- (iv) large scale macroeconomic models, where an economy is represented by a number of econometrically estimated equations that can be used to forecast economic trends, and which can incorporate HIV/AIDS-related factors (e.g. impact on productivity growth) into model-based forecasts;

Modelling the Economic Impact of AIDS

Econometric Estimation Models

One of the earliest attempts to model the impact of AIDS was carried out by Mead Over, of the World Bank, in 1992. This study develops a model for African growth, based on labour force, capital accumulation and exogenous factors, estimated econometrically across a number of African countries. The estimated model is first used to project future economic growth rates without AIDS. AIDS is then modelled through its impact on independent variables in the model, particularly human capital and savings.

The results depend upon values assigned to certain key parameters (e.g. the proportion of treatment costs met from savings, and differentials in AIDS incidence across labour force categories). On the basis of the “most plausible” parameter assumptions, the results indicate a reduction in per capita GDP growth of 1/3% in the most heavily affected countries. The approach is a mixture of econometric modelling and simulation/forecasting.

Bloom and Mahal (1995) use a straightforward econometric model to estimate the impact of AIDS on economic growth. They estimate a growth function (where the dependent variable is the growth of real GDP per capita). The estimation is carried out on a sample of 51 countries for the period 1980-92 (also for 1987-92, when AIDS prevalence rates were higher). A basic regression of growth on the annual change in AIDS cases does indicate a significant negative impact for AIDS.

Once other standard growth-model elements are introduced (e.g. initial GDP per capita, schooling, openness, population growth etc.) the impact of AIDS becomes insignificant. The paper concludes that predictions that AIDS will have a major economic effect are overstated, and not borne out by empirical evidence. However, it is important to note that most of the countries in the sample had relatively low AIDS prevalence rates; if the impact of AIDS is non-linear, then this may not be a good prediction for countries with very high rates of AIDS prevalence, as in southern Africa.

A more recent econometric analysis is contained in Bonnel (2000), which models the relationship between average economic growth during 1990-97 and HIV prevalence and a range of other variables across 70-80 developing countries in a three-equation system that attempted to capture the inter-relationships between growth, HIV prevalence and institutional factors. The results showed that HIV prevalence did have a negative impact on growth over this period, through an adverse impact on the macroeconomic environment. Bonnel concludes that for a country with a 20% HIV prevalence rate¹², average real GDP growth would be 2.6 percent a year lower than without HIV – a substantial growth impact.

Aggregate Growth Models

Apart from the above three studies, econometric estimation models of the impact of HIV/AIDS have not been widely used, and attention has turned to aggregate growth models. Such models are relatively tractable with manageable data requirements, and are highly transparent. They are also much more suited to analysis for individual countries. Early models were developed for Tanzania

¹² The paper does not make it clear whether this is adult prevalence or population prevalence.

(Cuddington, 1993a,b) and Malawi (Cuddington & Hancock, 1994a,b). The simplest growth model involves an aggregate production function incorporating capital, labour and productivity growth in a single sector to produce output (GDP), combined in a way that can be calibrated to the actual performance of an economy in a suitable base year. The model can therefore reflect the impact of HIV/AIDS on labour force growth, productivity and – via savings – on investment and capital stock. The Tanzania and Malawi models noted here have been adapted from the simple case to incorporate characteristics that reflect the structure of many African economies, including dual labour markets (formal and informal sectors), and the persistence of unemployment. The Cuddington and Hancock model became known as the MacroAIDS model, and a simplified version of it is used as an add-on to some version of the Spectrum demographic model.

Cuddington's (1993a) simulation results for Tanzania show that the average real GDP growth rate over 1985-2010 is reduced from 3.9% (in the no-AIDS scenario) to a range of 2.8% to 3.3%, depending on the values chosen for key parameters. The impact on GDP per capita growth is smaller, ranging from 0.2% to 0.7% with AIDS, compared to 0.7% for no-AIDS. By the end of the 25 year period, real GDP is reduced by 15 to 25% compared to no-AIDS, and GDP per capita ranges from 0.5% larger to 11% smaller.

The results are highly sensitive to assumptions regarding the values of two key AIDS-related parameters, the annual productivity lost per AIDS patient, and the proportion of AIDS-related medical expenditures that come from reduced saving (whether public or private). The paper notes that these results will be under-estimated if AIDS prevalence rates are higher among the highly educated or urban members of the labour force, who have higher than average productivity.

Cuddington and Hancock (1994a) apply the same model to simulate the impact of AIDS on the Malawian economy. The main difference to the Tanzania exercise is that two different AIDS-prevalence scenarios are modelled, medium and extreme. Similar results are obtained. Average annual GDP growth rates will be reduced by 0.2 to 0.3% (medium case) and 1.2-1.5% (extreme case). Annual per capita GDP growth rates will be reduced by 0.1% (medium) to 0.3% (extreme). Base case values are 4.3% for GDP growth and 0.9% for GDP per capita growth.

The Tanzanian model is extended in Cuddington (1993b), where the assumption of perfectly functioning labour markets is dropped. A dual labour market is introduced, including a formal sector with a minimum wage, or wage rigidities, so that the labour market does not clear and "unemployment" exists. Labour demand is a function of the fixed real wage and productivity; labour demand falls as AIDS prevalence increases, due to reduced productivity. There is also a more labour intensive informal sector, which clears the remainder of the labour market. The sticky wage in the formal sector adjusts over time to the market clearing level.

As before, the impact of AIDS on capital accumulation is modelled through its effect on savings. It is assumed that workers in the informal sector have part of the costs of caring for AIDS patients met by a socialised medical system, hence this part of the cost falls on workers in the formal sector. Output is determined by capital accumulation, demographic and AIDS influences on the size and productivity of the labour force, and wage adjustment.

As in the earlier work the impact of AIDS in an economy with a dual labour market and sticky wages depends on the magnitude of the savings and productivity effects. The negative impact of AIDS

reduces real GDP by 11-28%, and the impact on real GDP per capita ranges from a rise of 3.6% to a decline of 16.1%. Given the sticky wage, real wages do not fall with productivity, hence output in the formal sector falls as labour demand is reduced and more workers are forced into the informal sector.

Cuddington and Hancock (1994b) apply the same methodology to Malawi. They note that in such an economy, AIDS could actually increase per capita income as workers move from the informal sector into more productive formal sector job "vacancies" caused by AIDS. This is, however, countered by the impact of AIDS on the number of formal sector jobs as capital accumulation is reduced, and by declining productivity.

Their results show that with AIDS, real output is 4.8% lower in 2010 than in the no-AIDS scenario, but as the population is 4% smaller the impact on per capita income is virtually unchanged. Taking a range of values for key parameters, the impact of AIDS on GDP after 25 years ranges from -3% to -9%, and on GDP per capita ranges from 0% to -3%. Results are similar to those in the single sector full employment case. However the impact is less than in Tanzania, because (i) the demographic projections used show a lower AIDS rate in Malawi; (ii) formal sector wages are higher in Malawi, hence can better absorb medical costs so there is a smaller effect on savings and investment.

The same (Macroaids) model was applied to Kenya (Hancock et al, 1996). The results estimate that by the year 2005 Kenya's GDP will be nearly 1/6th smaller than it otherwise would have been had AIDS never occurred. Furthermore per capita income is projected to be reduced by 10 percent as a result of AIDS. This loss was attributed to a loss in labour productivity a reduction in investment and savings and changes in the labour market supply and demand. Furthermore projections indicate that Kenya's savings rate will decline by 15 percent by the year 2005 as a result of AIDS. The present value of the indirect costs of AIDS are estimated to be KSh76 trillion through the year 2005. The model predicts that annual foreign aid would need to double (from 4% of GDP to 8% beginning in 1996) to maintain output at levels predicted in the "No AIDS" scenario. The study concluded that the AIDS epidemic had already had a significant effect on the macroeconomy of Kenya and will have an even greater impact in the near future. Furthermore, measures to improve development prospects of Kenya become significantly more important in light of AIDS, including the need to improve domestic saving incentives and attract foreign capital. In addition, it would be important for the Government of Kenya to review labour laws in such a way as to sustain growth while balancing concerns about basic human rights. Finally the potential extent of the impact of AIDS on Kenya's macroeconomy again reinforces the urgency of HIV prevention.

The next such study was carried out by BIDPA (2000). This used essentially the same dual labour market-labour surplus approach as the Tanzania and Malawi models described above, calibrated to the specific characteristics of the Botswana economy. One particular adjustment was to reflect the dominance of the mineral sector in the Botswana economy, and in particular the fact that mineral rents contribute to GDP but are not attributable to either capital or labour, and hence are removed from the equation. The model also reflected that Botswana has a substantial surplus of savings over investment (and hence current account surplus), so that a reduction in savings due to higher HIV/AIDS-related spending would not have such a dramatic and immediate impact on investment (although this might still be affected by reduced corporate profitability and increased risk and uncertainty).

The BIDPA study projected a range of macroeconomic variables at 5-yearly intervals over the period from 1996 (the base year) to 2021. Predictions were made of the following variables (in terms of levels and/or real growth rates) under “no-AIDS” and “with-AIDS” scenarios:

- real GDP (economic growth)
- real GDP (income) per capita
- average wages
- skilled labour wages
- un(der)employment

A number of scenarios were modelled, depending on key parameters relating to investment and productivity. The key results were that GDP growth would be reduced by 1-2 percent a year through to 2021 as a result of HIV/AIDS, and that GDP would be 20%-40% smaller than it would have been without HIV/AIDS. The impact on GDP per capita is less clear cut, with it rising in some scenarios as a result of HIV/AIDS and falling in others, depending on whether the reduction in GDP growth was larger or smaller than the reduction in population growth.

The BIDPA study was followed up by other work on Botswana, perhaps reflecting the country’s status as having the highest HIV prevalence rate in the world in the early 2000s, combined with reasonably good data availability and the awareness that HIV/AIDS was a major economic policy issue. A paper published by the IMF in 2001 “draws upon, updates and extends the BIDPA results, using a similar framework” (MacFarlan & Sgherri, 2001). It focuses on the same channels for the economic impact of HIV/AIDS, i.e., the demographic/labour supply impact; productivity changes; the impact on human capital/skilled labour; and the impact on investment & savings. It does, however, note that the BIDPA study may have under-estimated “intangibles”, i.e. the impact on economic growth through confidence and the investment climate. It also expressed concerns that the BIDPA study may have under-estimated the impact on health care spending, and hence on savings and investment.

The IMF analysis uses basically same model as BIDPA but varies it by incorporating different scenarios, specifically lower capital inflows from abroad; lower capital accumulation (investment); reduced productivity growth (TFP); and a greater negative labour productivity impact (via lost working time) of HIV/AIDS¹³. The analysis predicts GDP growth to fall by 3-4 percent a year over a decade. The higher impact is due partly to updated demographic projections implying a higher HIV prevalence, but also because the analysis incorporates the feedback effect of lower capital accumulation. It concludes that the “prospects of moving towards a more diversified economic structure would appear to be particularly threatened by HIV/AIDS”, because of intensifying skills shortages, a deteriorating investment climate and a weakening of the social fabric.

A subsequent IMF study (Masha, 2004) notes that “a major gap in most of the existing studies is the lack of analysis of how social and economic adjustments are likely to mitigate the future course of the epidemic, and subsequently the macroeconomic impact”. In other words, economic modelling

¹³ TFP is Total Factor Productivity, which refers to the overall productivity with which inputs to production are combined, rather than the productivity gains that result from additional labour or capital inputs. TFP growth is the main determinant of long-term economic growth.

relies on demographic projections that incorporate minimal intervention to counter HIV. The study therefore models an “AIDS with intervention” scenario in addition to “no AIDS” and “with AIDS” scenarios; the “AIDS with intervention” scenario is based on the plans outlined in NACA’s National Strategic Framework (NACA, 2003a). This was the first study to explicitly model the impact of interventions, given that ART was becoming widely available, and health policy in Botswana envisaged it being made available virtually free of charge on a universal basis through the public health system.

The study uses a simpler model than that used in the BIDPA study and the earlier IMF study, in that the economy has a single sector and two factors of production, i.e. it doesn’t model the different responses of the formal and informal sectors, nor does it distinguish skilled and unskilled labour. Nevertheless, the study provides some interesting results. First, it notes that while a large scale treatment/intervention programme is in progress, economic growth is reduced because of the impact of high HIV/AIDS treatment costs on savings and investment, hence capital accumulation is lower. In the medium term, however, economic growth rises because of the positive impact of intervention on labour force size and productivity. In addition, however, it notes that the beneficial medium term economic impact is highly dependent upon degree to which programme is financed by external donors. The analysis assumes that donors meet 50 percent of the programme costs, and notes that without this, the cost of the intervention programme would cause economic growth to fall to a much greater extent due to reduced availability of investment funds, despite the positive impact on the labour force and productivity. It also concludes that under the AIDS-with-intervention (NSF) scenario, the “indirect fiscal effects of a comprehensive prevention and treatment programme [from higher tax revenues due to higher economic growth] can significantly contribute to the financing of such a programme”.

These issues were followed up in another study commissioned by the Government of Botswana (Jefferis, Kinghorn, Siphambe & Thurlow, 2006). This updated the earlier BIDPA model by incorporating a third scenario, “AIDS with ART”, and refining the incorporation of investment and productivity effects into the model. The study concluded that HIV/AIDS was having a substantial negative impact on the economy of Botswana. The detailed projections showed that, in the absence of widespread ART provision:

- average real economic (GDP) growth would be reduced by 1.5% to 2.0% a year over the period 2001 - 2021, resulting in the economy being 25% to 35% smaller as a result of HIV/AIDS than it would have been otherwise;
- this negative impact results from reduced labour force growth, a younger labour force, reduced productivity and reduced investment;
- in terms of its effect on GDP, the impact of HIV/AIDS is approaching the impact that would result from the decline and closure of Botswana’s mining sector over 15 years;
- population growth is also reduced, from an estimated 2.2% a year without AIDS to 1.1% a year with AIDS (but without ART)
- as the reduction in economic growth is greater than the reduction in population growth, average income growth will also fall, with the estimated growth rate of GDP per capita falling by 0.5% - 1.0% a year, resulting in average real incomes being 10% to 15% lower after 20 years as a result of HIV/AIDS.

The study also ran a CGE model (discussed in more detail below) and found that these conclusions were robust to different simulation methods, with both the macroeconomic model and the CGE model giving similar estimates of the reduction in growth as a result of HIV/AIDS.

However, the widespread provision of ART to HIV positive individuals through the public health system would offset some of the negative economic impact of HIV/AIDS:

- the provision of ART would contribute to raising economic growth, adding a projected 0.4% to 0.8% to average annual growth over the 20 year period; this results from a larger and healthier labour force, and reduced negative impact on productivity, compared to the with-AIDS scenario;
- while the provision of ART would mitigate the negative economic impact of HIV/AIDS, it would not eliminate it, and HIV/AIDS would still have a significant negative economic impact even if ART is widely available; this results in part from the very high costs of widespread ART provision;
- even with this mitigated impact, HIV/AIDS in the with-AIDS scenario would cause economic growth to be reduced by 1.2% a year, compared to a no-AIDS scenario, and the economy to be 23% smaller after 20 years;
- the provision of ART can therefore offset about one quarter to one third of the negative impact of HIV/AIDS;
- growth in average incomes will also be reduced, but will be higher than in the AIDS-without-ART scenario;
- comparing the AIDS-with-ART and no-AIDS scenarios, nearly half of the reduction in GDP growth is due to reduced investment, some 20% is due to reduced TFP growth, and 30% due to reduced labour supply.

Compared with the findings of the BIDPA (2000) study, the projected negative impact of HIV/AIDS was slightly in this study. This is primarily due to a larger negative impact on investment than that assumed by BIDPA. However, the predicted negative impact of HIV/AIDS is smaller than that forecast in the IMF (2001) study of Botswana, which had an even larger investment impact. Another important contrast with the BIDPA (2000) study is that BIDPA envisaged that, under some scenarios at least, GDP per capita could be higher in 2021 with AIDS than without AIDS; this is no longer the case, and GDP per capita is lower in both of the with-AIDS scenarios than without AIDS.

Haacker (2002) models the impact of HIV/AIDS on nine Southern African countries¹⁴ using a similar simulation approach (although he focuses on steady-state outcomes rather than a dynamic analysis using projections of the demographic impact of HIV/AIDS over time). He also uses both a “closed economy model”, which is similar to those described above, and an “open economy model”. Typically in the closed economy model, the capital-labour ratio rises (as labour supply declines) and the rate of return to capital falls. In the open economy model, this leads to a further decline in investment as capital outflows increase or capital inflows decline. Hence the impact on output is greater in the open economy model, as domestic factors that may serve to reduce investment (e.g. reduced savings) are compounded. The results show that in the medium term (10-15 years), output

¹⁴ Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia & Zimbabwe

per capita would be up to 4.2% higher in the closed economy model as a result of HIV/AIDS (he does not model GDP growth directly). In the open economy model, however, output per capita would be up to 10% lower.

CGE Models

While aggregate growth models are relatively easy to produce, there is no doubt that a richer analysis of the impact of HIV/AIDS on an economy can be obtained from a modelling approach that incorporates different economic sectors. This is in contrast to the models described above, which work at the aggregate economic level and include only limited distinction between economic activities, through the model's division into formal and informal sector economic activities and skilled and unskilled labour. In practice of course, the economic impact of HIV/AIDS will vary across sectors, depending on a number of factors such as the degree of labour/capital intensity in the production structure of each sector, and its use of skilled and unskilled labour. Given that HIV/AIDS has its impact through various different channels, including investment, labour availability and productivity, and public spending, the sectoral impacts may well vary.

Such a disaggregated approach can be modelled using a computable general equilibrium model (CGE). While this is a more complex modelling exercise, the results can be richer than the aggregate growth model approach. The first CGE analysis of the economic impact of HIV/AIDS was by Kambou, Devarajan, & Over (1992), who used an 11-sector CGE for Cameroun with 3 categories of labour (rural, urban unskilled and urban skilled) to simulate the impact of AIDS via a reduction in the supply of labour in different categories. They find that AIDS reduces output, exports, investment and savings. GDP growth is reduced by nearly half to 2.4% from the base case of 4.3%. The main channel is through investment which falls sharply because of reduced government savings, due to lower trade revenues (taxes). Besides reduced output, exports are also reduced because of labour shortages and hence wage increases which cause a loss of competitiveness. Output reduction is mostly due to the shortage of skilled urban labour, as labour reductions in the other two categories have little impact on any of the variables. The paper concludes that it is the distribution of AIDS cases (across labour categories) rather than the absolute size of AIDS infection that is crucial in determining the impact of AIDS.

In their CGE model of South Africa, Arndt & Lewis (2000) pay particular attention to the impact of HIV/AIDS on productivity (TFP) growth. They conclude that HIV/AIDS will reduce growth by 2.6 percent a year (vis a vis the "no AIDS" scenario), with lower GDP per capita (reduced by 8 percent after 10 years). The contribution of various factors to lower GDP growth include lower productivity growth (34 percent of the total impact); lower government savings (leading to lower investment, to the extent that it is not replaced by FDI) (45 percent); reduced labour supply (13 percent) and reduced factor-specific productivity (8 percent).

In a second paper using the same approach, Arndt & Lewis (2001) looked at sectoral impacts, and found that while all sectors of the SA economy were adversely affected, the greatest negative impacts were in the construction and equipment sectors, while the least affected were medical services and government. The explanation for these effects was that the construction and equipment sectors were strongly affected by the reduction in investment (as investment demand accounts for the majority of output in those sectors), while government and medical services were

the least affected due to the direct impact of HIV/AIDS in increasing demand for the output of those sectors.

The CGE approach has also been used to model the impact of HIV/AIDS in Zambia (Lofgren, Thurlow & Robinson, 2004). This assessment concluded that over the period 2001-2015, HIV/AIDS would reduce average economic growth from 5 percent (without AIDS) to 4.1 percent, a reduction of almost one percent a year. It also analyses the impact of a publicly-funded treatment programme for HIV/AIDS, providing ART to half of those who would clinically benefit from such treatment. The costs of such a programme are very high, leading to a 50 percent increase in government spending. The negative impact of HIV on economic growth is reduced by half in this scenario, with growth averaging 4.6 percent. However, the additional taxes or government borrowing required to pay for this treatment imposes a burden on households, so that private consumption growth is lower, and poverty higher, than under the AIDS-without-treatment scenario. GDP per capita growth is marginally higher under the two with-AIDS scenario (with and without treatment) than under the no-AIDS scenario.

Macro-econometric Models

A fourth approach is to derive simulations from a large scale econometrically-estimated macroeconomic model, which are available in some countries for the purposes of macroeconomic forecasting. Use of such this approach for forecasting the impact of HIV/AIDS is feasible if such a model has been previously estimated and can be readily adapted to incorporate the channels through which HIV/AIDS affects the economy. This approach has been used in South Africa, particularly in the analyses carried out by the Bureau for Economic Research (BER) at the University of Stellenbosch. Like a CGE, such a model can simulate the impact of HIV/AIDS across economic sectors. The first such analysis, published by ING-Barings (Quattek, 2000), estimated that GDP growth would be on average 0.3 percentage points a year lower between 2001 and 2015 than it would be in the absence of HIV/AIDS. Although there are no explicit calculations of impact on GDP per capita, the implication is that because GDP growth declines less than population growth, GDP per capita would rise in the with-AIDS scenario. BER's 2001 exercise (Laubscher et al 2001) was somewhat broader, and projected outcomes for employment, inflation, interest rates, exchange rates and the balance of payments as well as GDP growth. The study projected that economic growth in South Africa would be reduced by (on average) 0.5 percent a year over 2001-2015, although GDP per capita growth would rise by 0.9 percent p.a..

BER's more recent exercise, carried out for USAID (BER 2006) focuses on the impact of alternative intervention scenarios, including the provision of ART. The methodology is similar, in that it uses the BER's existing medium-term macro-econometric forecasting model of the South African economy, with assumptions regarding the channels through which HIV/AIDS has a macroeconomic impact, and associated parameter values, added to the model. The main channels modelled are the lower demographic growth rates of the population and labour force; lower productivity; additional government spending on health care and welfare payments; additional direct and indirect costs to firms; and the impact on household savings and consumption expenditure.

Although the methodology is different to the other studies discussed above, the results are similar. The impact of HIV/AIDS on growth is -0.5 percent a year on average between 2000 and 2020 without

ART, and -0.4 percent a year with ART (the model assumes a 50 percent take up of ART by the relevant HIV+ cohorts). However, GDP per capita rises, growing on average by 0.4 percent a year faster with AIDS, because the slowdown in population growth is larger than the slowdown in economic growth. Also, the decline in population and labour force growth results in a sharp reduction in unemployment; in 2020, unemployment is projected to decline from 27 percent in 2004 to 21 percent in 2020 in the no-AIDS scenario, but to decline to 9 percent in the with-AIDS scenarios. Savings and investment are both adversely affected, with the latter declining by around 3 percent of GDP.

A macroeconometric model has also been used to simulate the impact of HIV/AIDS in Ethiopia (Zerfu, 2002). This only models the impact of a decline in labour supply, and simulates the impact of the labour force being 10% small as a result of HIV/AIDS over a historical period from 1980/1 to 1998/99. The results indicate that agricultural output would be on average 2.0% smaller, and non-agricultural output 1.8% smaller, as a result.

Other Approaches

Finally, a somewhat different approach was employed by Bell, Devarajan and Gersbach (2003). In contrast to the approaches described above, this employed an Overlapping Generations Model (OLG) which focuses on the impact of HIV/AIDS on long-term human capital formation. Whereas other models have generally had a time horizon of up to one generation (15-25 years), the OLG focuses on the impact of HIV-related deaths of parents on the ability of children to participate in education and accumulate human capital. The model is applied to South Africa and projections are made over an 80-year period.

The model's projections are for HIV/AIDS to have a devastating economic impact, at least if there is no remedial intervention undertaken by society. Although no figures are presented for the impact on GDP or economic growth, projections are made of real family (household) income. These suggest that under the worst-case scenario, family income would decline precipitously, and instead of quadrupling between 1990 and 2080 as in the no-AIDS counterfactual, it would fall by half. The main mechanism for this is reduced investment in education, due to both reduced family resources and diminishing expectations regarding survival.

Although this model is not intended to provide a realistic projection of what is likely to happen in South Africa as a result of AIDS in the long-term, it does illustrate the merits of considering intergenerational effects, and the importance of ensuring that access to education is sustained in the face of processes that may be working in an opposite direction. It also illustrates the need to intervene to check both the spread of the epidemic and to offset its negative impact.

Table 15: Studies Evaluating the Macroeconomic Impact of HIV/AIDS

Authors	Country	Method	Period Covered	Impact on Growth Rates	
				GDP	GDP per cap.
Over (1992)	30 sub-Saharan African countries	Econometric estimation & 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 & Over (1992)	Cameroun	CGE	1987-91	-1.9%	n/a
Bloom & Mahal (1995)	51 countries	Econometric estimation	1980-92	-ve but small	
Cuddington (1993a,b)	Tanzania	Aggregate growth model	1985-2010	-0.6% to -1.1%	0.0% to -0.5%
Cuddington & Hancock (1994a,b)	Malawi	Aggregate growth model	1985-2010	-0.1% to -1.5%	-0.1% to -0.3%
BIDPA (Jefferis, Greener & Siphambe) (2000)	Botswana	Aggregate growth model	1996-2021	-0.8% to -1.9%	+0.4% to -0.5%
Bonnel (2000)	70 developing countries	Econometric estimation	1990-97	up to -2.8%	up to -1.4%
Quatteck/Ing Barings (2000)	South Africa	Macro-econometric model	2001-2015	-0.3%	+ve
Arndt & Lewis (2000)	South Africa	CGE	2001-2010	-1.6%	-0.8%
MacFarlan & 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%
Zerfu (2002)	Ethiopia	Macro-econometric model	1981-1999	-2% total	n/a
Haacker (2002)	Nine southern African countries	Aggregate growth model	10-15 years	n/a	-10% to +4% (total, not p.a.)
Bell, Devarajan & Gersbach (2004)	South Africa	Overlapping-generations model	1990-2080	n/a	-0.2% to -2.5% (†)
Lofgren, Thurlow & Robinson (2004)	Zambia	CGE	2001-2015	-0.4% to -0.9%	+0.2%
Masha, I (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%
Jefferis, Kinghorn, Siphambe & Thurlow / Econsult (2007)	Botswana	Aggregate growth model CGE Household simulation model	2001-2021	-1.2% to -2.0%	-0.4% to -0.9%

Source: updated from Table 4 in BER (2006)

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

Conclusions

The findings of the eighteen studies discussed above cover a wide range of outcomes. In all cases HIV/AIDS has a negative effect on economic growth, although the estimated impact varies from not much different to zero to a massive -4.5% a year, although most studies conclude that the negative impact will be less than 2% a year in the relatively badly affected countries in Southern Africa. With the lower prevalence rates typical elsewhere in Africa, it is likely that the impact on overall GDP growth would be smaller. It is also important to note that even in high-prevalence countries, HIV/AIDS is unlikely to be the main determinant of economic growth. The main channel for the long-term economic growth impact of HIV/AIDS is reduced investment, and the economic impact can therefore be mitigated or offset by other measures undertaken to boost (productive) investment.

The findings for average real incomes (per capita GDP) are more mixed. It is not implausible for the negative impact of HIV/AIDS on population growth to be smaller than the impact on GDP growth, in which case the growth rate of GDP per capita may rise.

An important finding is that the long-term economic impact depends very much on what happens to investment. If the additional costs of HIV/AIDS are largely met by reducing savings rather than consumption, then the impact will fall on investment and lower long-term growth and per capita incomes. On a policy level, therefore, efforts should be made to maintain investment rates, firstly by shifting the burden of meeting HIV/AIDS costs to consumption, and second by mitigating the impact of HIV/AIDS on risk and uncertainty.

Few studies have modelled the impact of interventions in the epidemic, especially as the widespread availability of ART is relatively recent. The impact of ART is complex: it improves the health and survival of those infected with HIV, raises life expectancy, but increases HIV prevalence rates¹⁵. ART is also extremely expensive, even if generic drugs are used or substantial discounts negotiated on the cost of branded drugs; this reflects the high costs of supporting infrastructure (testing laboratories, pharmacies, security, medical personnel etc.) as well as the drugs themselves. The cost implications will affect private individuals and companies, governments and donors (depending on funding arrangements), which will in turn have potentially large economic and financial impacts, which may affect expenditure patterns, savings, investment, fiscal balance and even exchange rates. The studies that have assessed the impact of ART provision (for Botswana and South Africa) have concluded, however, that despite the expenditure implications, ART provision has a positive impact on economic growth, and can offset up to one-third of the negative impact of HIV/AIDS on growth. Overall, the conclusion of these studies is that the additional costs of ART are more than compensated by the macroeconomic benefits, in addition to the health and quality of life benefits that result.

¹⁵ Therefore, in the context of widespread ART availability, HIV prevalence rates are no longer an effective indicator of the success (or otherwise) of bringing the disease under control.

Methodological Approaches and Issues

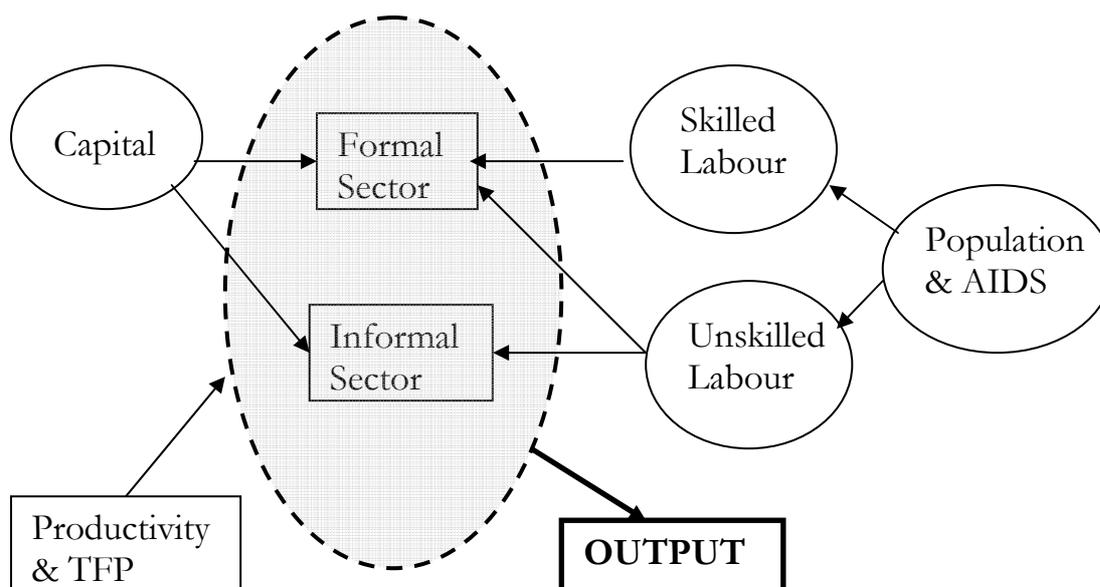
The methodological approaches to evaluating the macroeconomic impact of HIV/AIDS have been described above. Here we provide more information on the various approaches and their potential suitability for use in Uganda.

Econometric Modelling

Econometric modelling of HIV/AIDS as a factor in a more general growth model has not been widely used, for a number of reasons. First, there are a wide range of factors that can influence economic growth, in ways that often interact with each other and with different time lags, and econometrically such models are difficult to estimate in a robust manner; the general class of econometric growth models is therefore quite tricky. Second, the impact of HIV/AIDS on growth may be quite small relative to other factors, especially in countries where prevalence rates are low. In cross section models covering a number of countries the HIV/AIDS impact may be difficult to distinguish from other factors, and hence HIV/AIDS may be statistically insignificant. In single country models, it is difficult to get enough observations (given that, at best, annual data would be available for HIV prevalence) to provide sufficient degrees of freedom for a statistically sound model, especially given the long lag structures involved in the relationship between HIV and growth impact. While there is some merit in using this approach for cross-country studies, especially as the length of time during which HIV/AIDS has an economic effect increases, it is unlikely to be a productive route for single-country studies.

Aggregate Growth Models

The basic structure of the adapted Solow-type dual economy aggregate growth model is shown below:



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:

$$Yf_t = \alpha f \cdot \gamma^t Efs_t^{\beta_s} Efu_t^{\beta_u} Kf^{(1-\rho f)} \quad [1.]$$

where Efs and Efu represent effective labour supplies of skilled and unskilled labour respectively, and Kf is the capital stock. The shares of output attributable to each factor are β_s , β_u , and $\rho f = 1 - \beta_s - \beta_u$. γ^t represents an exogenous technological trend, while the constant αf is a scale factor, which is used to calibrate the model in the base year, so that it fits the actual data from that year. A separate production is calibrated for the informal/agricultural sector, although this only has two factors of production (capital and unskilled labour).

The data requirements of the model are as follows:

For base year calibration of parameters:

- Capital stock (formal and informal sectors)
- Labour (skilled and unskilled in formal sector; unskilled in informal sector)
- Output (GDP) in formal and informal sectors

For simulations:

- Projections of expenditure and savings impact of HIV/AIDS (for investment and capital stock projections)
- Productivity impact estimates/projections
- Demographic (population, labour force and HIV prevalence) projections under different scenarios (ideally no-AIDS, with AIDS, and AIDS-with-interventions)

Overall, the data requirements are modest, and can typically be met by a standard set of national accounts data supplemented by information on the informal sector and subsistence agricultural activities. Setting appropriate parameters is made easier if there are relevant econometric studies available producing estimates of, for instance, productivity growth rates, or relevant information from sector studies. In addition, demographic projections from an HIV/AIDS-focused demographic model (such as the Spectrum Model¹⁶) are required. The economic modelling can be carried out on an excel spreadsheet.

As the table above shows, this approach is the most common in the evaluation of the macroeconomic impact of HIV/AIDS in sub-Saharan Africa, at least outside of South Africa where the availability of data and models is much more extensive than in other countries.

The availability of relevant data and projections for Uganda is currently being evaluated.

CGE Models

CGE models are increasingly widely used in economic modelling. In principle they have many similarities with aggregate growth models (both have a production function at their core, both model market-equilibrium behaviour, and both produce scenario-based simulations). However,

¹⁶ Downloadable from <http://www.policyproject.com/software.cfm?page=Software&ID=Spectrum>

CGE's are typically much more detailed, with a sectoral breakdown. The authors of one study using a CGE-based analysis of the economic impact of HIV/AIDS in South Africa (Arndt & Lewis, 2000, 2001) note that:

"CGE models have a number of features that make them suitable for examining "cross-cutting" issues such as the impact of HIV/AIDS.

They simulate the functioning of a market economy, including markets for labour, capital and commodities, and provide a useful perspective on how changes in economic conditions will likely be mediated through prices and markets.

Unlike many other partial equilibrium or aggregate macro approaches, they are based on a consistent and balanced set of economy-wide accounts (called a Social Accounting Matrix, or SAM), which requires (among other things) that key behavioural and accounting constraints (such as budget constraints and balance of payments equilibrium) are maintained, which in turn serves as an important check on the "reasonability" of the outcomes.

Because they can be fairly disaggregated, CGE models can provide an economic "simulation laboratory" with which we can examine how different factors and channels of impact will affect the performance and structure of the economy, how they will interact, and which are (quantitatively) the most important" (Arndt & Lewis 2000, p.4)

CGE models therefore permit a disaggregation of the economy into various different productive sectors (14 in South Africa), each using a range of factors of production (e.g. skilled and unskilled labour, and capital), and incorporating different household types by income level and various government spending categories; they can also incorporate different HIV prevalence rates across skill categories. CGE modelling enables the consideration of distributional impacts, the impact on overall economic growth and sectoral growth, the impact on employment and wages in different segments of the labour market, as well as the impact on relative prices.

CGEs are, however, quite demanding. They require a recent SAM as a data source, and need to be constructed using specialised modelling software (such as GAMS) and typically require dedicated CGE modelling expertise.

The availability of a suitable CGE and modelling expertise for Uganda is currently being evaluated.

Large scale macroeconomic models

HIV/AIDS modelling using large-scale macroeconomic models requires an existing macroeconomic forecasting model that has been estimated and calibrated for a particular economy. Such models may exist in central banks, government ministries or research institutes. The impact of HIV/AIDS is incorporated into model forecasts by running scenarios based on different labour supply and productivity growth projections, and perhaps changes in expenditure patterns. Due to the limited availability of such models in sub-Saharan Africa, such exercises have only been undertaken for South Africa.

The availability of a suitable model for Uganda is being evaluated.

Macroeconomic Impact: Budgets, ODA, Exchange Rates and Absorptive Capacity – the Impact of Scaling Up.

General Issues

An important aspect of the macroeconomic impact of HIV/AIDS that is not captured in many of the modelling approaches but which may be important in poor, developing countries is the impact of large inflows of external development aid. At face value, the story of increased resource inflows for Uganda like many developing countries would appear to be nothing but good news. As noted by several writers (e.g. Serieux, 2007), the additional resources can be used to: (i) Provide badly needed resources for the treatment and prevention of HIV/AIDS (as well as other diseases) and for addressing some of the social consequences of the disease, such as the care of AIDS orphans and the repair and support of challenged or compromised community institutions and household structures; (ii) Provide for the rapid replacement of human resources lost to the infection and the training of additional personnel to address the urgent issues of prevention, treatment and mitigation; (iii) Make progress towards the achievement of other MDGs; and (iv) Provide relief from savings and foreign exchange constraints -thus allowing for more optimal (and ultimately more growth-enhancing) decision making with respect to production and investment-related choices.

The surge in aid inflows to address the challenges of the HIV/AIDS pandemic may not, however, be unequivocally good news, and some policy makers and donors fear its possible consequences of macroeconomic instability and/or Dutch disease effects that may undermine growth. The concern about the Dutch disease effects is that increased aid will translate into appreciation of the exchange rate and that this will damage the economy.¹⁷ And policy makers worry that a real exchange rate appreciation will reduce the international competitiveness of a country's tradable goods sectors, weakening the potential gains from international trade and the country's capacity to attract investment and grow itself out of poverty and aid dependency¹⁸.

These issues have been highly contentious, both internationally and within Uganda, with conflicting articulated by various parties. Amongst multilateral organisations, the WHO has been active in pushing for rapid scale-up, for instance through the report of the Commission on Macroeconomics and Health (WHO, 2001), and similar positions have been taken by the UN International Poverty

¹⁷ When a country receives large inflows of foreign currency, a significant part of that aid is spent on non-tradable goods, raising their prices (determined domestically) relative to tradable goods prices determined (for small open economies) on the world market. The result is a real exchange rate appreciation; which will be demonstrated mostly through a nominal appreciation in the case of a flexible exchange rate regime or a rise in domestic inflation in the case of a fixed exchange rate regime. The real appreciation reduces the competitiveness of the domestic traded goods sectors. Over the long run, production in these sectors contract and resources shift to the production of nontradables. This may lead to a less diversified and more vulnerable economy that is increasingly dependent on external resource flows. Thus, the short-run welfare benefits of the aid inflows may be superseded by the welfare losses from the increased cost of non-traded goods and the loss of production in the traded goods sector.

¹⁸ Excellent reviews of the macroeconomic challenges imposed by the scaling up of aid flows are contained in Gupta, Powell & Young (2006) and Serieux (2006).

Centre¹⁹ (see, e.g. Serieux, 2007 & Hailu, 2007). These organisations have tended to emphasise the potential benefits that can flow from a rapid scale-up of donor financing and expenditure on HIV/AIDS-related programmes. Contrasting positions have come from the IMF and the World Bank, who have tended to emphasise the potential impact of such rapid scale-up on macroeconomic stability and the need for caution in undertaking a rapid scale-up. Within Uganda, similar debates have been evident, with the MoFPED at times in conflict with other parties on the ability of the economy to efficiently absorb a rapid increase in external resources (see e.g., Rowden et al, 2004, and UTTA, 2005).

The macroeconomic issues arising from the surge in aid inflows essentially relate to the impact on fiscal, monetary and exchange rate policies, and the interrelationships between them. In essence, a country receiving large inflows of aid is in analogous position to a country receiving an export windfall or an improvement in its terms of trade. This will affect the macroeconomic equilibrium position of the country, but exactly how this is manifested will depend upon the macroeconomic policy framework in place, particularly with respect to exchange rate and monetary policy. The process can be laid out as follows.

The first round effect is increased inflows of foreign exchange. This will cause:

- exchange rate appreciation, if the exchange rate is floating;
- the accumulation of foreign exchange reserves, if the exchange rate is fixed;
- some combination of these effects, if the exchange rate is managed.

The nature of the second round effects depend on the exchange rate and monetary policies adopted.

- exchange rate appreciation may cause “Dutch Disease” effects, where the international competitiveness of tradeable commodities (such as exports and import substitutes) declines, and this may adversely affect the balance of payments and attempts at export diversification;
- if reserves are accumulated in an attempt to prevent exchange rate appreciation, this will cause the money supply to expand, and is therefore potentially inflationary;
- monetary expansion can be countered through sterilisation (through sales of additional government or central bank securities), but this will tend to push up interest rates and has a fiscal cost that may not be sustainable.

Thus there would appear to be no painless option or “free lunch”, reflecting the fact that the surge in aid inflows, especially if sustained, will cause the equilibrium real exchange rate to appreciate. This new equilibrium may be manifested in either an appreciation of the nominal exchange rate or

¹⁹ A conference on Macroeconomic Policies to Reverse the HIV/AIDS Epidemic was held in Brasilia, 20-21 November 2006, sponsored by the UN IPC and UNAIDS..

higher inflation. If attempts are made to prevent the real exchange rate from appreciating to the new equilibrium level, then various other problems could result²⁰.

Inflationary pressures can result from a number of sources. Generally, rapid increases in expenditure on domestic goods and services, in excess of the capacity of the economy to increase its supply of those goods and services will result in upward price pressures. The impact will be particularly felt on non-tradeable goods and services (those which are produced domestically and which are not subject to international trade or competition, and hence where supply cannot be increased rapidly through imports.). Indeed, the primary focus of most discussion of Dutch Disease effects is in terms of rising non-tradeables prices relative to the prices of tradeable commodities. These price pressures reflect a lack of absorptive capacity. Such pressures are more likely to arise when expenditure is externally funded (through increase donor funding) than if domestically funded, as the latter involves a corresponding reduction in expenditure elsewhere (and hence reduced demand pressures), while the former does not. The fiscal concerns relating to the breaching of expenditure ceilings as a result of rapid growth of aid-financed spending essentially relate to these additional demand pressures. In addition, if the aid flows are unlikely to be sustained over the long term, there are issues relating to expenditure commitments that may eventually have to be funded from domestic revenue sources.

The above arguments focus primarily on the demand side effects of aid inflows, and they may be offset to a degree by supply-side effects. If aid is spent on improving social and economic infrastructure (whether physical or human capital), then the resulting productivity gains may offset some or all of the negative demand-side effects. These may also be offset to the extent that additional aid inflows are spent on imported goods and services – such as ART drugs and medical equipment – which reduces the impact of foreign exchange inflows. A key issue, therefore, is the extent to which spending may reduce constraints to growth. Given that HIV/AIDS has been established as having a negative impact on growth, as discussed in the economic impact studies reviewed earlier in this study, spending at an appropriate level and with appropriate targeting, may help to relieve growth constraints. If skilled labour is a constraint to growth, then the provision of ART is likely to address this constraint directly.

Besides the macroeconomic concerns outlined above, additional concerns that may result from a rapid scaling up of aid inflows relate to:

- Aid volatility;
- Aid dependence;
- Debt sustainability.

Volatility of Aid Flows

Aid flows are volatile for several reasons (and in several ways). Firstly, the information content of aid commitments (the quantity generally used in recipient countries' budgeting), with respect to actual disbursements, is poor; i.e. actual *ex-post* disbursements may not reflect *ex-ante* commitments.

²⁰ These other problems are essentially a reflection of macroeconomic disequilibrium, and could include rising fiscal costs (interest payments on treasury bills issued for sterilisation purposes) or central bank losses (if the government attempts to pass the sterilisation costs on to the central bank).

Secondly, aid disbursements are more volatile than fiscal revenues. Thirdly, aid is generally pro-cyclical relative to revenue – meaning that it tends to exacerbate the variability in revenue streams. An implication of volatility of aid is that, in and of itself, a sharp unanticipated change in the amount of aid received by a country that is credit rationed in international capital markets (the case for most high-aid recipients) is, effectively, an exogenous shock that imposes adjustment costs on the economy. As indicated by Pallage and Robe (2001), the welfare costs of the business cycles created by these shocks are particularly high in low-income countries. Further, when the pro-cyclicality of aid is added to its own cycle-inducing effects, that cost is further magnified. In cases where a cash budget is used to manage public sector spending, the stop-start-stop effect induced by the volatility of aid further compromises the effectiveness of public sector activity, with concomitant welfare and growth costs (Buli and Hamann, 2003). In short, high aid-receiving countries face the very real prospect of greater volatility in fiscal outcomes and economic activity and reduced public sector effectiveness. Aid volatility provides an argument for using a portion of aid inflows for reserve accumulation, in order to provide a buffer against such volatility.

Aid dependence

Concerns about aid dependence reflect the fact that aid flows tend to be cyclical, reflecting the interests and priorities of donors; indeed, few donors would intend their aid commitments to particular programmes to be permanent. To the extent that aid inflows finance programmes that have permanent expenditure commitments, aid can cause long-term problems; domestic revenue generation may be insufficient to meet these long-term commitments, which are therefore permanently aid-dependent. The problem may be exacerbated by a tendency for countries to relax on domestic revenue mobilisation efforts when aid inflows are scaling up rapidly. Reserve accumulation also provides a defence against aid dependency, by reducing the build-up of expenditure commitments and providing a buffer to help finance longer-term adjustments.

Debt sustainability

Scaled-up aid inflows will have an impact on external debt sustainability. There is a direct impact if any of the aid comes in the form of loans (even if concessional) rather than grants; the need to service such debt adds to future debt service commitments. However, even if all of the additional financing is in the form of non-repayable grants, debt servicing will still be affected, through changes in exports, imports and exchange rates. For instance, the additional expenditure initially financed by aid inflows may incur long-term import commitments, which can reduce the availability of resources for future debt service. If aid leads to the appreciation of the real exchange rate, then exports may be reduced and imports increased, further constraining debt service capacity. Movements in nominal exchange rates will change the domestic currency value of external debt, although should provide an offsetting movement in the export-import balance. Overall, a long-term debt sustainability analysis needs to be conducted to evaluate the impact of aid flows on debt servicing.

Aid Flows into Uganda

Uganda is heavily dependent on budget support, which finances nearly 50% of government expenditures, the bulk of which is spent on non-traded goods and services. Being qualified for the Heavily Indebted Poor Countries (HIPC) Initiative, and because the need to contain the daunting

scale of HIV/AIDS epidemic Uganda has experienced a surge in aid inflow over the last decade including under the Global Fund for AIDS, Tuberculosis and Malaria (GFATM).²¹

As Table 16 indicates, Uganda was one of the ten top recipients of total Official Development Assistance (ODA) flows to the health sector over the period 1996-2004. Uganda has also been among the top ten recipients of aid earmarked for HIV/AIDS control (Table 2). Between 2000-2002, the country received USD 53.4 million a year and ranked the third largest recipient. In per capita terms, donor funding for HIV/AIDS control amounted to USD 2.3, ranking Uganda second among the top ten recipient countries in Africa. Several governments provide funding, mainly the United States, United Kingdom and Japan. Uganda is one of the focus countries of the President's Emergency Plan for AIDS Relief (PEPFAR), Global Fund for AIDS, Tuberculosis and Malaria (GFATM), and The World Bank. UNAIDS and other UN Agencies also provide also support a variety of HIV/AIDS activities in Uganda. Donor inflows are projected to increase rapidly (to approximately US\$160m in 2006/07, and more in subsequent years), thus exacerbating concerns about the macroeconomic impact of donor funded expenditure.

Table 16: Main Recipients of Aid to Health 1996-2004, (Annual Average USD Million)

1996-1998		1998-2001		2002-2004	
India	701	India	317	India	382
Bangladesh	190	Indonesia	189	Nigeria	359
Egypt	121	Nigeria	176	China	265
Vietnam	114	Bangladesh	158	Tanzania	230
China	101	Tanzania	133	Uganda	208
Ethiopia	80	Kenya	116	Zambia	204
Tanzania	79	Mozambique	106	Mozambique	180
Indonesia	70	Uganda	104	Ethiopia	173
Uganda	63	China	84	Kenya	162
Kenya	61	Bolivia	83	Congo DR	159

Source: OECD Database cited in Hailu, 2007.

²¹ External funding to the health sector comes in three main forms: 1. General budget support which is channelled through the overall budget and cannot be separated from GOU funding; 2. Sector budget support which is included within the Poverty Action Fund budget lines for health, and for which a total can in theory be identified through the contributions of the respective sector budget support partners, but which is again co-mingled with GOU funds (including HIPC debt relief) for the purposes of the MTEF; and 3. Project funding, which is (sometimes) reflected in the MTEF under a separate heading, "donor projects".

Table 17: Top 10 Recipients of Aid to the control of HIV/AIDS in Africa, 2000-2002

	Total million (US\$)	Per capita (US\$)
Nigeria	91.2	0.7
Kenya	61.3	2.0
Uganda	53.4	2.3
Zambia	43.2	4.1
Ethiopia	42.5	0.6
South Africa	35.6	0.8
Mozambique	31.3	1.7
Ghana	29.9	1.5
Tanzania	29.2	0.8
Zimbabwe	25.6	2.2

Source: OECD Database cited in Degol Hailu 2007.

Evidence on the Macroeconomic Effects of Aid

The Dutch Disease Effect of Aid

While there are strong arguments in principle that a rapid scaling up of aid flows can result in macroeconomic problems and instability, work is needed to quantify these effects – they may be there but not large enough to be a serious policy concern. Unfortunately, there are remarkably few empirical studies of Dutch Disease impacts in aid-receiving countries. The few studies that have been done yield mixed and sometimes ambiguous results, and the macroeconomic evidence of how aid flows affect the real exchange rate and the structure of domestic production, and the size of these effects, is weak. Econometric estimates often show these effects to be small and statistically insignificant.²² One problem is that all empirical work in this area is plagued by severe measurement problems, both of the real exchange rate itself and across alternative concepts of tradable and non-tradable goods (Adam, 2006).

Elbadawi (1999) examined the relationship between aid, real exchange rates and non-traditional exports for a sample of sixty-two countries. He found that a 35 percent increase in aid levels was associated with a real exchange rate appreciation of three percent. However, exchange rate overvaluation was associated with an increase in non-traditional exports, rather than the contraction predicted by the Dutch disease model. This also implied a positive relationship between aid and non-traditional exports. However, that relationship was found to be nonlinear. The initial positive relationship eventually becomes negative as aid increases – exhibiting a Laffer curve effect. The implication is that aid has a positive effect on the production of tradable goods, but that effect eventually evaporates at very high levels of aid and a Dutch disease type effect takes over. Elbadawi concludes that Uganda has acute aid dependency and is likely to experience real exchange rate overvaluation.

²² For a summary of the literature see Adam (2006).

Sekkat and Varoudakis (2000) examined one aspect of the Dutch disease story for 33 sub-Saharan African countries – i.e., the relationship between exchange rate overvaluation and manufacturing exports. They found a negative relationship between exchange rate overvaluation and manufacturing exports. Other authors (e.g. Rodrik, 2007) have found similar results, that real exchange rate undervaluation promotes growth, and that real exchange rate overvaluation is a major impediment to growth. However, in the absence of a corresponding link between aid and overvaluation, this does not amount to a verification of the Dutch disease story (Serieux, 2007).

Rajan and Subramanian (2005) used both the direct and indirect approaches in investigating the empirical evidence for aid-related Dutch disease. They examined the relationship between the level of aid receipts (relative to income) and the performance of exporting sectors versus sectors producing non-exportables. They found that, in high aid-receiving countries, the exportable-producing (tradable) sectors grew significantly more slowly than the sectors producing non-exportables (nontradables). The authors argue that the Dutch disease explanation for that effect is confirmed by the finding of a positive relationship between aid and exchange rate overvaluation and between the retarded growth of export-producing sectors (relative to non-export-producing sectors) in the face of exchange rate overvaluations. However, Serieux (2007) argues that this is not sufficient to confirm Dutch disease effects. The observed effects (aid increase, exchange rate appreciation and lower relative growth of tradables sectors) are also consistent with the condition where there is, initially, an underutilization of capacity. Verification of Dutch disease would have to be demonstrated either by an actual contraction of the export-producing sectors or sustained and substantially slower growth sufficient to produce a considerable imbalance in the economy over the long run.

Studies which examine single-country experiences have generally found weak or unimportant Dutch Disease effects. For Tanzania, Nyoni (1998) found that contrary to expectations, high aid levels (relative to GDP) were associated with a depreciating real exchange rate, accelerated export growth and a positive growth record. Nkusu (2004a) indicates that Botswana experienced a depreciating exchange rate and rapid growth during the period when it received a windfall from the rapid expansion of diamond mining. As noted by Serieux (2007), while Botswana would appear to have been a classic case study for the typical (resource-related) Dutch disease effect, the country also received very large aid inflows; between 1960 and 1980, the very period when mining operations were expanding, Botswana received an annual average aid inflow equivalent to fifteen percent of its GDP. Thus, Botswana would appear to be a test case for the *combined* Dutch disease effects; nevertheless, both Serieux and Nkusu conclude that no Dutch Disease appears to be present. Nkusu suggests that the expansion of unused capacity and productivity improvements must be considered as possible countervailing effects. However, the Botswana story is not quite as clear-cut as these authors suggest, as the country does have competitiveness problems, and efforts to diversify the economy beyond mining (which, together with government accounts for 60% of GDP) have been generally unsuccessful. Nevertheless, Botswana's exchange rate policy has been closely focused on preventing real appreciation, which has largely been achieved.

The issue of whether increased budget support to finance Uganda's poverty reduction has resulted in a Dutch disease has been a subject of much discussion. Neither the behaviour of exchange rates

and performance of exports, nor data of financial flows and macroeconomic performance in general give any clear cut evidence on the issue.

Nkusu (2004b) argues that the fears for aid-induced Dutch disease in Uganda may be unfounded. During the period 1992/93 and 1995/96 there was, on an annual average basis, an appreciation of real effective exchange rate (REER) of 7.5 percent, while the terms of trade improved by 16.6 percent and total financial inflows increased by 24.3 percent. Between 1996/97 and 2000/01 the REER depreciated by an annual average of 1 percent, while the terms of trade deteriorated by 8 percent and total financial inflows increased by almost 3 percent. She argues that growing financial inflows, developments in terms of trade and structural reforms that the economy has undergone, indicate that the behaviour of the REER cannot be ascribed to movements in financial inflows only.

Since there has neither been a significant appreciation in Uganda's REER nor a decline in real exports, despite massive financial inflows, Nkusu (2004b) concludes that the applicability of the core Dutch disease model to Uganda has been weak. She specifically advances three factors that explain the observed weak applicability of the prediction of the core Dutch disease for Uganda. First, some characteristics of the Ugandan economy depart from key assumptions of the Dutch disease model, i.e., Uganda is very likely still producing within its production possibility frontier. Unused or inefficiently used production factors, such as labour and, to some extent land, can prevent a resource transfer effect as assumed by the Dutch disease theory. Second, economic reforms aimed at liberalizing the economy in general and trade system in particular have encouraged both exports and imports and widened the trade balance. The increase in foreign inflows compensated for the shortfall in exports proceeds emanating from the adverse terms of trade shock that has affected Uganda since 1998/99. And finally, prudent monetary and exchange rate management have achieved price stability and has controlled real exchange rate appreciation.

However, she acknowledges that there is a limit to the level of aid that can be managed, beyond which it could exceed the sterilization capacity of the monetary authorities and render macroeconomic management difficult and even undermine the growth prospects. Developments since the period considered may be an illustration of this, with even larger aid inflows. Atingi-Ego (2005) notes that more recent appreciation pressures should at least be partly attributed to the strong sterilization effects on account of a shilling injections resulting from the donor flow to finance Government fiscal deficits.

The Diagnostic Trade Integration Study (DTIS) (2006) points out that much of the recent concern in Uganda has been focused on the appreciation of the Ugandan shilling with respect to the US dollar. The Ugandan shilling appreciated 12.3 percent in real terms compared to the dollar between 2003 and 2005. However, the dollar exchange rate may not be the best indicator of Uganda's overall export competitiveness, since the United States is not an important export destination for Uganda (while being a major aid donor, only 2.8 percent of Uganda's exports are destined for the United States). The DTIS concludes that the real exchange rate with the euro provides a better measure of Uganda's export competitiveness (nearly 30 percent of the exports are absorbed by the European Union), and shows a smaller appreciation of 5 percent during the same time period.

In recent years, simulation models calibrated by data have been used to understand the dynamic responses and assess the quantitative significance of the macroeconomic effects of aid flows. Adams

and Bevan (2003) develop a Computable General Equilibrium (CGE)-model of aid and public expenditure where public infrastructure capital generates inter-temporal productivity spillovers for both tradable and non-tradable sectors. The model also provides for a learning-by-doing externality, through which total factor productivity in the tradable sector is an increasing function of past export volumes. The model is calibrated to contemporary conditions in Uganda to simulate the effect of increased aid. They find that public expenditures whose productivity effects are skewed towards the non-tradable sector deliver the highest growth in exports and total output. The bias in productivity effects increases the supply of non-tradable goods, which is sufficiently strong to almost entirely offset the demand effects of increased aid flows. The results also show that exchange rate appreciation is reduced or even reversed enhancing export sector performance. However, in terms of poverty reduction, the results show that income gains largely accrue to urban skilled and unskilled households leaving the rural poor relatively worse off.

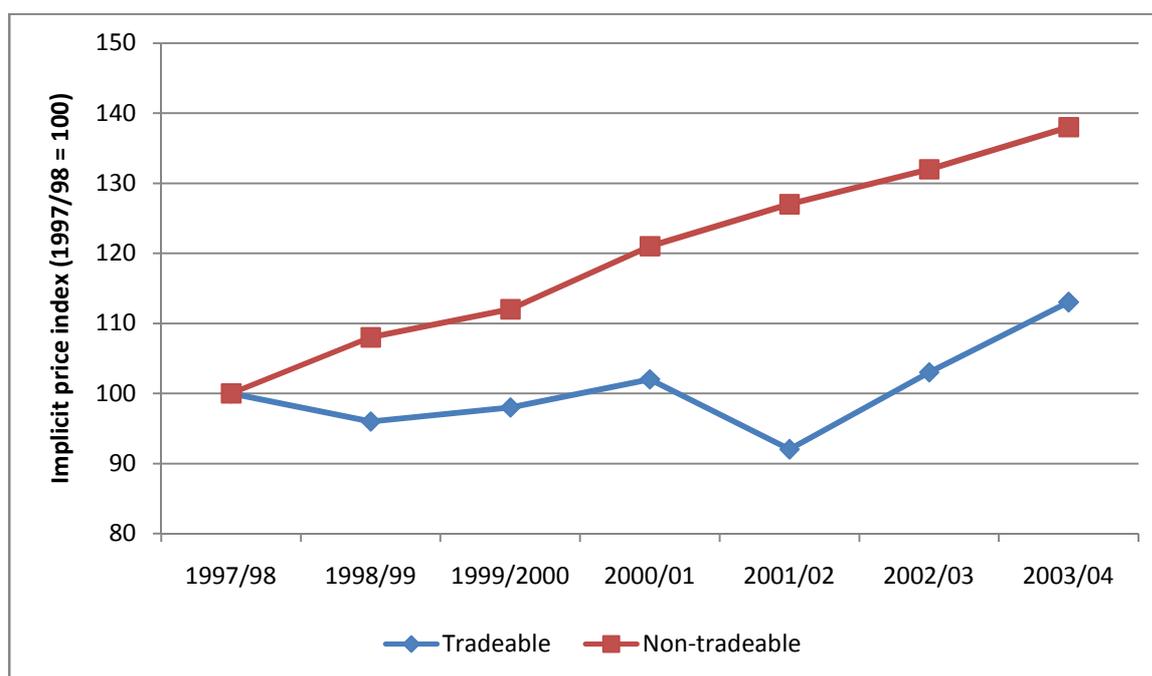
In a discussion paper Atingi-Ego (2005) comments on the studies by Nkusu (2004) and Adam and Bevan (2003) that both point to the fact that the fears for a Dutch disease in Uganda may be unfounded. Whereas he acknowledges the Nkusu argument - that if there is excess capacity (which could be the case in Uganda), then an increase in aid will only move the economy closer to the production possibility frontier - he is more skeptical to the assumptions encompassed in the Adam-Bevan (2003) model. First, for the productivity spillover effects to counteract the appreciation tendency, the price elasticity of supply must be elastic, i.e. larger than one. This is most likely not the case in Uganda, at least in the short run. Second, he questions to what extent these spillover effects do exist. Uganda lacks institutions to ensure efficiency of the investments, i.e. value for money. Atingi-Ego claims that even if Dutch disease exists in Uganda, the impact cannot be distinguished. Since exports, and non-traditional exports in particular, are increasing, there are probably certain subsectors in the export sector that could be realizing productivity efficiencies to be able to offset appreciating export rates.

Examining the trends in the price indices for the major components of GDP, Atingi-Ego finds that prices for non-traded goods in Uganda have grown much faster than prices for traded goods, exactly as Dutch Disease theory would predict (see figure 1). This implies a shift of price incentives away from traded goods production towards non-traded goods production in the last few years on account of the increased demand for non-traded goods arising from increased government expenditures. Given the fixed supply of these goods in the short-run, price increases have been the inevitable. It is also possible that the aid-funded fiscal expansion has contributed to the increase in the trade deficit from 7.2 percent of GDP in 1997/98 to 10.1 percent of GDP in 2003/4. A shift in relative prices from tradable to non-tradable might also undermine the national objective of creating a dynamic export-led economy. Private sector led-export promotion is central to the Medium Term Competitiveness Strategy (MTCS) and this objective should not be compromised by an excessive fiscal deficit.

Atingi-Ego notes that the developments in the tradable and non-tradable prices shown in Figure 11 seem contrary to the findings of Adams and Bevan (2003), who show that a skew of public expenditures towards the non-tradable sector could deliver productivity effects in the non-tradable sector that could sufficiently offset the demand effects of increased aid flows. It may be then that donor funded increases in Government expenditures have generated high income elasticity of

demand for non-tradables resulting into appreciation pressures in the REER witnessed in 2003/4. These price developments could also highlight that both price elasticity of supply and demand for non-tradables is inelastic thus REER appreciation experienced on account of increased Government expenditures. To the extent that the price elasticity of supply of non-traded goods appears low in Uganda, Atingi questions the observations made by Nkuzu (2004). The appreciation pressures arising from the relative increases in non-traded prices raise some questions about the utilization of idle capacity in the economy that should have satisfied the demand for nontradables that is induced by ODA inflows.

Figure 11: Traded versus Non-Traded Prices



Source: Atingi-Ego (2005)

Exchange rate and export Sector Competitiveness

A joint study carried out by the Ministry of Finance, Planning and Economic Development (MFPED) and Bank of Uganda (BoU) in (2005) to investigate the impact of the exchange rate appreciation observed during 2003-2004²³ on competitiveness of the export sector found general negative consequences of the appreciation on some exports namely: (i) reduction in export profitability (and even large losses in some sectors) and/ or reduction in farm gate prices, with reduced incentives having major implications for future production and value addition; (ii) reduced export competitiveness and loss of major contracts to foreign competitors; and (iii) reduced investment in the export sector. The paper demonstrates that the appreciation of the shilling that has occurred in recent years has adversely affected exporter profitability and export competitiveness and may have contributed to an increase in poverty, and that “Uganda’s large aid-financed fiscal deficit is not

²³ The nominal exchange rate appreciated from an average of Shs1998 per US\$ in June 2003 to an average of Shs1700 per US\$ in August 2004.

necessarily compatible with the objectives of poverty reduction and strong export-led growth, even though its purpose is to finance expenditures aimed at poverty reduction” (BoU-MoFPED, 2005, p.37).

Atingi-Ego (2005) notes that these short-term consequences also have significant longer-term implications for the wider economy in that a permanently appreciated REER will discourage export diversification and export-led growth in general, in addition to shifting incentives towards the non-tradable sector and encouraging imports. Lower farm-gate prices also reduce rural incomes and thus reduce demand for locally manufactured goods and services. The increase in poverty between 2000 and 2003 is partly attributed to falling farm-gate prices of several export crops and coincides with a slowdown in formal manufacturing growth.

Other macroeconomic consequences of aid observed in Uganda include: (i) high fiscal deficits; (ii) high domestic interest costs arising out of sales of treasury bills to sterilise shilling liquidity injections from aid induced government spending; and (iii) high real and nominal interest rates.

Fiscal Deficit

The increased availability of donor aid has been associated with an increase in the budget deficit. Large aid-funded increases in expenditure, equivalent to some 8% of GDP, occurred from 1999/00 while revenues rose by barely 2% of GDP. As a result, the fiscal deficit excluding grants – mainly budget support and HIPC debt relief – doubled from 6.3% to 12.8% of GDP.

Sales of government treasury bills to sterilize the effect of aid induced reserve accumulation on the money supply (and thus meet low inflation targets) and avoid an exchange rate appreciation also resulted into high real and nominal interest rates. Besides the predictable domestic effect of these high interest rates, Uganda had to cope with a significant net private capital inflow in 2003 as the high domestic interest rates (and an only slowly depreciating currency) led to foreign purchases of Ugandan Treasury Bills.

Further, as the stock of treasury bonds and bills continues to grow, there is a growing worry of the impact of domestic interest costs on the fiscal deficit in addition to other macroeconomic effects. The huge increase in Treasury bill sales may also crowd out the private sector as it has reduced the available funds in the banking system for lending to the private sector – hence the fiscal deficit is directly crowding out private sector borrowing. In this regard it is noted that commercial banks holdings of TB's as a share of their assets, increased from 23 percent to 32 percent between June 2000 and June 2002. This period was marked by slow growth in Private Sector Credit (PSC) at 12 percent.

Aid Volatility

While much of the concern about the effect of rapid increases or high levels of aid inflows has been the potential Dutch disease effect, an ever present, but less central, feature has been the volatility of aid. Aid, as noted earlier, becomes more volatile as it increases and that volatility can pose major concerns and challenges for recipient countries. Atingi-Ego (2005), for instance, noted, in passing, that the increased budget support had meant less predictable budget outcomes with related economic disruptions. IMF (2005) indeed notes that aid levels were hard to predict from one year to the next and when two countries (Ethiopia and Uganda) experienced exogenous (terms of trade)

shocks, the donor response (in terms of sharp increases in aid receipts) was fully one year after the peak of the crisis. While limited flexibility in terms of budgetary spending outcomes, due to PRGF conditionality, meant that aid volatility did not necessarily translate into expenditure volatility, the former was still transmitted into the economy via changes in the domestic funding of budget deficits. The transmission mechanisms were greater interest rate volatility and increased variability in available credit to the private sector (from the alternative tightening and relaxation of bank credit rationing).

In conclusion, there is no consensus in the discussions on whether Uganda is suffering from aid-induced Dutch disease. Nonetheless, both theorists and practitioners seem to acknowledge that there is a limit to the level of aid that can be managed, beyond which it could render macroeconomic management difficult and undermine the growth prospects of the economy.

The Macroeconomic Impact of HIV/AIDS in Uganda

Demographic and Economic Background

Population

According to the 2002 census the Ugandan population was 24.2 million persons, with an annual population growth rate between 1991 and 2002 censuses of 3.2 percent. According to UDHS 2000/2001 the total fertility rate 1995 and 2000/2001 was 6.9%. Observing the Uganda population age structure over 3 census, it is apparent that Uganda has a relatively young population. For instance in 1969, the population aged below 15 years were 46.2%, in 1991 it was 47.3%, in 2002 it was 49.3% and is projected to be 50.7% in 2006. On the other hand the share of the productive and reproductive age group (i.e. 15-64 years) decreased from 50% in 1969 to 47.7% in 2002, implying that the dependency ratio is on the increase thereby affecting the economic growth. This may exacerbate the impact of HIV/AIDS which mainly targets this age group.

Table 18: Percent Population Distribution by Age Group, 1969 – 2002

Age Group	1969	1991	2002	2006
0-14 years	46.2	47.3	49.3	50.7
15-64 years	50.0	49.4	47.7	46.2
65+ years	3.8	3.3	3.0	3.1
Total	100.0	100.0	100.0	100.0

Source: 2002 Population and Housing Census Report, UBOS

As a result of the high population growth, Uganda's population density has been increasing. According to the Population and Housing Census (2002), the population density for Uganda was 123 persons per square kilometre of land, which was much higher than Tanzania (39), Kenya (54) and Sudan (66) for the same year. The population density for 2006 was projected to have increased by 13% over the four years to 139 people per square kilometre of land.

The distribution of Uganda's population by region is shown in Table 19, and it is clear that in 1991, out of the total population of 16.7 millions, the highest proportion was from the central (29%) followed by western region (27%) while the northern became the last (19%). Whereas in 2002 census, still the north was last in population share (21%) it had made a positive stride as opposed to the central (27%) and western (26%) which had declined in terms of their population share and this trend was estimated for the mid population of 2006 which gave central 26.5%, western 25.6% and northern 22%. The population increases seen in the north which is not matched with economic growth poses a big challenge to the economy.

Table 19: Population by Region: 1991, 2002 and 2006

Region	1991		2002		Mid-2006	
	Population	% of total	Population	% of total	Population	% of total
Central	4,843,594	29.05	6,575,425	27.14	7,245,900	26.49
Eastern	4,128,469	24.76	6,204,915	25.61	7,063,800	25.82
Northern	3,151,955	18.91	5,148,882	21.25	6,050,300	22.12
Western	4,547,687	27.28	6,298,075	26.00	6,996,900	25.58
Total	16,671,705	100.00	24,227,297	100.00	27,356,900	100.00

Source: 2006 Statistical abstract UBOS

The gender composition shows a ratio of 49:51 female to male (11,824,557 males and 12,402,740 females). Besides HIV/AIDS and war-related male deaths, the proportion of the elderly and female-headed households is currently emerging as one of the most critical demographic phenomenon in rural areas as young people and men migrate to the urban areas.

Uganda's urban population has risen from 6.7% in 1989 to 15.4% in 2006. The central region has highest proportion of its population in urban (26.4%) followed by the Northern region (14.3%) while the eastern (7.8%) and western (7.6%) regions are not very different. The rate of rural to urban migration (urbanization) that is attributed to insecurity and rural poverty is outrunning the capacity of urban centres to provide the expected necessary social services and employment, thus, worsening urban poverty (NHC, 2007), increases redundant population in urban areas and likely to increase the spread of HIV/AIDS. As the results of the sero-prevalence survey show, HIV prevalence is higher in the urban areas.

Table 20: Population by Rural-Urban Divide (2002 and 2006)

Region	Urban %		Rural %		Total (number)	
	2002	2006	2002	2006	2002	2006
Central	27.1	29.4	72.9	70.6	7 484 465	7 937 226
Eastern	7.8	7.8	92.2	92.2	6 934 413	6 840 523
Northern	7.9	14.3	92.1	85.7	4 605 676	5 362 679
Western	8.7	7.6	91.3	92.4	6 252 314	7 030 717
Total	13.8	15.4	86.2	84.6	25 276 314	27 171 144

Education and Health

Uganda has recorded dramatic increase in enrolment levels and institutional development at all levels of education since 1997. Because of the free education policy under UPE, by 2004, about 17 percent of total primary school enrolled pupils were orphans, including HIV/AIDS orphaned children. Likewise the secondary enrolment more than doubled between 1999 (285,263 students) and 2004 (697,507 students). Because of increased access to basic education, 70% of the persons aged 10 years and above were literate according to the 2002/03 UNHS.

On health, malaria was the most prevalent (51%) illness among the outpatient cases during the period 2002-2005 while 6.3% of the adults aged 15-59 are infected with HIV and about 0.7% of the children below 5 years are infected with HIV.

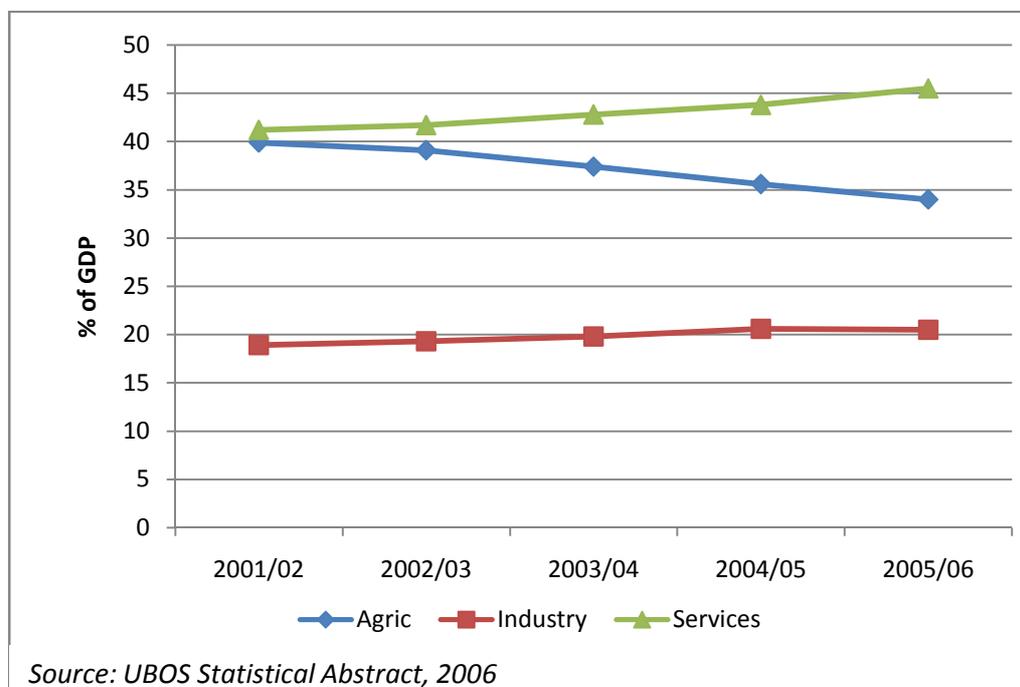
Economic Background

Agriculture comprises the largest share of GDP, accounting for around 32% of total production in 2005. About two-thirds of this represented production of food crops, although cash crops such as tobacco, coffee and tea production are also important. However, agricultural performance has been poor and incomes are generally low; 70% of the people below the poverty line in 2003 were crop farmers. This was partly attributable to prolonged droughts, loss in soil fertility and high incidence of pests and diseases and a reduction in farm size and agricultural land.

Uganda's efforts to diversify export markets has seen international markets proving important for the country's fish, horticulture and other high value crops e.g. spices, essential oils, fruits and nuts, vegetables and flowers, while regional markets have become increasingly important for the low-value crops such as maize, beans, bananas, dairy products. Hence progressively, the non-traditional exports (fish, roses and cut flowers, maize, cocoa beans, beans, other legumes, etc) have overtaken the traditional exports (coffee, cotton, tea and tobacco) in importance. The reduced food crop production coupled with regional markets for the same has exposed many homes to hunger and poverty and this reduced supply to local markets has led to increased food prices hence to some extent affecting the inflation rate.

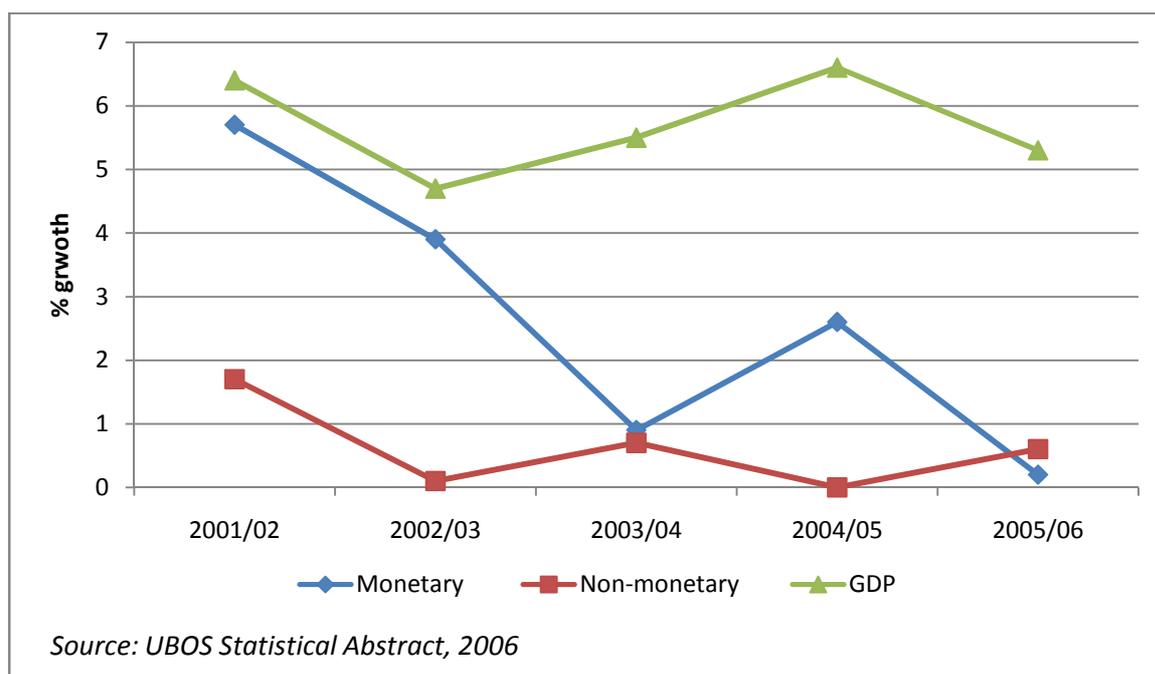
Of concern is that there has generally been a decline in the growth rate of the agricultural sector and its overall contribution to GDP. In the mid 1980s, agricultural sector's contribution to GDP was over 60%, but fell to 51% in 1991 and further dropped down to 34% in 2005/06. This has affected the majority of Ugandans (72%) who are employed and draw their livelihoods directly or indirectly from the agricultural sector.

Figure 12: Sector Contribution to GDP at Basic Prices



The decline in the agricultural contribution to GDP which has been growing at 5.5% per annum in 2003/2004, is not necessarily that the economy is shifting to non-agricultural activities, but rather that the sector's growth rate is declining. As shown in figure 11, the agricultural sector growth has since 2003/2004 continued to decline at a very high rate in real terms. The sector which was growing at 3.8% per annum in 2003/4²⁴ declined to 1.5% in 2004/5 and further declined to 0.4% in 2005/06. It should be noted that this decline affected both crop and animal production.

Figure 13: Trends in Agriculture sector growth

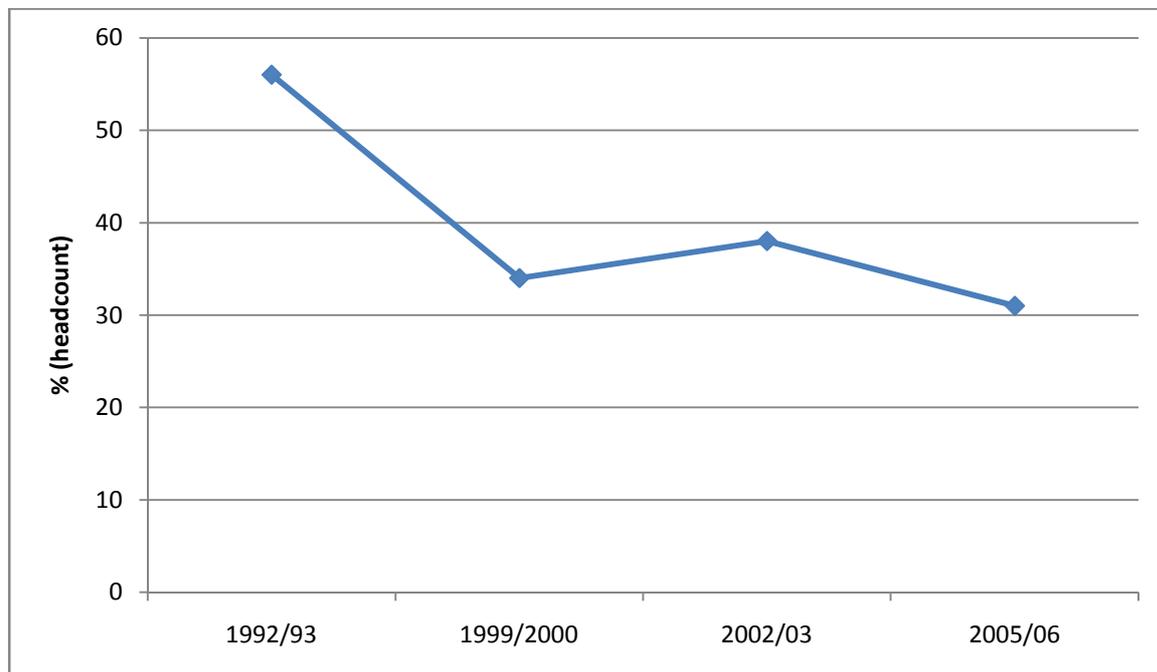


Poverty trends

Uganda has successfully had a visible impact in the fight against poverty. In 1992/93, 56% of Ugandans were living below the poverty line, and this proportion fell to 35% in 1999/2000. Though this proportion increased to 38% in 2002/03, it again declined to 31% in 2005/2006 as shown below.

²⁴ 2003/4 is the baseline year for the PEAP 2004/08

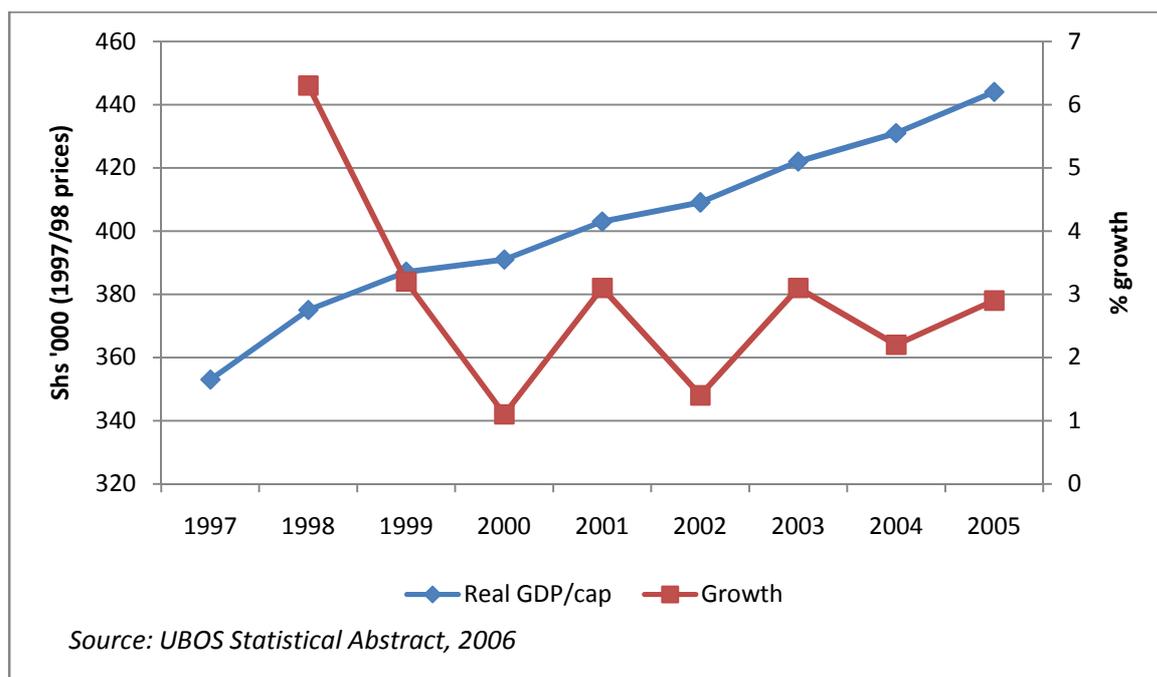
Figure 14: Proportion of Ugandans living below the poverty line over the years



GDP Growth

Real per capita GDP has continued to grow at a reasonable rate despite the negative impact of increasing population. Between 1997 and 2005, real GDP per capita increased by around 25%. In general, GDP annual growth rate for 2004/05 was 6.6 % while that for 2005/06 was 5.3%.

Figure 15: Real Per Capita GDP



Source: UBOS Statistical Abstract, 2006

Studies on the Macroeconomic Impact of HIV/AIDS in Uganda

Although Uganda was one of the first countries to have been seriously affected by HIV/AIDS, no detailed macroeconomic studies have been carried on the macroeconomic impact of the epidemic. While there are some publications on the macroeconomic impact – none of which are recent – they are general discussions of the processes that are likely to take place as a result of HIV/AIDS rather than a quantification of the impact (Armstrong, 1995; Bollinger, Stover & Kibirige, 1999). Nevertheless there is a concern that the impact is likely to have been substantial, because: (i) the bulk of economic activity takes place in rural areas, (ii) agriculture is labour intensive; (iii) despite rapid population growth, labour is relatively scarce, and (iv) HIV/AIDS has a significant impact in terms of reducing the size of the labour force.

Availability of Statistics Relevant to the Analysis of the Macroeconomic Impact of HIV/AIDS

Three key national surveys have been carried out that are relevant to the analysis of the macroeconomic impact of HIV/AIDS. These are:

- **Uganda Demographic Health Survey (2006)**. This contains extensive information on household demographic characteristics as well as socio-economic and health-related data at household and individual level
- **Uganda National Household Survey (2002/03 and 2005/06)**: contains information on the following:
 - Household roster-sex, age, marital status, education and occupation of fathers and mothers,
 - migration
 - schooling
 - Health – different sicknesses and associated costs
 - Malaria, fever, and disability
 - Activities of household members –working, searching for work, main employment (gives categorization of government (permanent/temp), private (perm/temp).
 - Wage employment giving some cash estimate income
 - Non-agricultural household enterprises
 - Transfer and other incomes to the household
 - Housing conditions
 - Household and enterprise assets
 - Outstanding loans –Borrowing capacity, Loan details
 - Household consumption expenditure
 - Non-durable goods household expenditure
 - Semi-durable household expenditure
 - Non-consumption household expenditure
 - Welfare indicators
 - Major shocks experienced in last 5 years
- In addition, the 2002/03 UNHS contained a detailed Labour Force Survey with additional information on skills, occupations and incomes.
- **Sero-prevalence survey (2004/05)**: contains information on the following:

- *Household*: Location (village) and Rural/Urban categorization; Household schedule (sex and age, sickness, education, parental survivorship); Support for vulnerable households –Support for chronically ill persons, -Support for persons who have died, --support for orphans and vulnerable children; Blood testing decisions
- *Individual*: Respondent's background information including main occupation; Reproduction; Marriage and sexual activity; Husband's background; Other reproductive health issues. A sero-prevalence test was also carried out.

Recommendations – Phase II

Phase II of the overall study will comprise a number of mini-studies. These are intended to serve two purposes:

- (i) to provide more detail on specific aspects of the macroeconomic impact of HIV/AIDS and fill gaps revealed by the literature review, and
- (ii) to provide information specifically required by the macroeconomic modelling analysis to be conducted in Phase III.

Data Requirements for Phase III

The following data are required for Phase III of the project:

- Recent macroeconomic and sectoral data
 - Capital stock and labour force (wages, employment) data in different sectors
 - Output and GDP data
- Demographic projections under different scenarios (e.g. levels of ART rollout)
- Variations in HIV-prevalence (e.g. by age, gender, region, skill / occupation)
- Household income and expenditure data
- Data for calibration of model parameters (e.g. productivity impact of HIV and AIDS)
- Data on HIV-related costs, financing and expenditure types
- Quantitative information on macroeconomic relationships, e.g.
 - Impact of exchange rate changes on exports
 - Impact of money supply expansion on inflation

Furthermore, a great deal of analysis at sectoral and regional levels can be done using available datasets (assuming that access can be gained), i.e.

- Sero-prevalence survey (MoH, 2004/05)
- Household survey (UBOS, 2005/06)
- Demographic projections (UBOS, not yet available)
- Labour force survey/Labour market indicators (UBOS, 2006)

Following consultations at the stakeholder workshop held in August 2005, it was decided that the following mini-studies will be carried out in Phase II:

1. Modelling of household and poverty impact
2. Modelling of sectoral HIV-vulnerability/risk exposure
3. HIV costing, financing and expenditure
4. Demographic Projections
5. Analytical (Econometric) Studies on Macroeconomic Relationships

Further details of the content and methodology of these studies is provided below.

It was also concluded that detailed sectoral studies involving primary data collection were beyond the scope of this project in terms of time and resources required. Furthermore, key parameters (productivity impact etc.) can be obtained from existing sectoral studies in Uganda and elsewhere.

While follow-up research may be useful at a sectoral level, especially in agriculture, manufacturing and the informal sector, but this is a long-term project (e.g. productivity monitoring, time allocation).

Phase II Mini-Studies

1. Modelling of household and poverty impact

The aim of this study will be to model the impact of HIV/AIDS on household incomes and poverty levels. It will utilise the technique used by Salinas & Haacker (2006) in their study of Swaziland, Zambia, Ghana and Kenya, and in two Botswana studies (BIDPA, 2000 and Jefferis et al, 2006).

The methodology is thoroughly described in Haacker (2004) and Greener (2004). The starting point is household level data (from a nationwide household survey) on incomes and expenditure, from which poverty levels (headcount rates) can be calculated. The household level data must include data on the individuals in each household.

The data sources used in the Salinas & Haacker paper are specified below:

Table 2. Data Sources

	Ghana (1998/99)	Kenya (1997)	Swaziland (1995)	Zambia (1998)
HIV prevalence data				
Source	Demographic and health survey	Demographic and health survey	8th sentinel report	Demographic and health survey
Year	2003	2003	2002	2001/02
Prevalence rates by...	Region, urb. vs rur., sex, age, wealth	Region, urb. vs rur., sex, age, wealth	Region, urb. vs rur., age	Region, urb. vs rur., sex, age
Prevalence linked to all demographic survey information	Yes	Yes	Not applicable	No
Sample size	9,760 individuals	8,486 individuals	2,787 pregnant women	3,950 individuals
Overall HIV prevalence (In percent)	2.1	6.7	31.4	15.6
Income/expenditure data				
Source	Living standards measurement survey	Welfare monitoring survey	Household income and expenditure survey	Living conditions monitoring survey
Year	1998/99	1997	1995	1998
Household characteristics used	Income, expenditure, employment	Expenditure, employment	Income, expenditure, employment	Income, expenditure, employment
Sample size		50,713 individuals; 10,874 households		
Coverage	All regions	All regions	All regions	All regions

Sources: Macro International Inc. (ORC Macro) kindly supplied DHS surveys. The World Bank similarly provided income and expenditure household surveys, with the authorization of the statistics institution of each sample country.

The following **individual** data fields are needed from the household survey (if available):

- Gender
- Age
- Relationship to household head
- Whether working or unemployed
- Occupation
- Industry of employment
- Level of schooling achieved

The following **household** data fields are needed from the household survey (if available):

- Income

-
- Expenditure
 - Wealth/assets
 - Location (urban/rural; region)

The following **individual** fields are needed from the sero-prevalence survey (if available):

- Gender
- Age
- Relationship to household head
- Whether working or unemployed
- Occupation and industry
- Level of schooling achieved
- Location (urban/rural; region)
- Household income and wealth

Information is also needed on Poverty Datum Lines.

The sero-prevalence data is then used to calculate the probability of being HIV-positive for different types of individuals (according to age, gender, place of residence, level of education, occupation etc.). This probability is then applied (using random variables) to each individual in the household survey data, so that each individual is then either HIV+ or HIV-.

The impact of HIV on each household can then be modelled. For households with an HIV+ member the basic analysis would be to model income effects as follows:

- Adjustments would be made for reduced income for an income-earner (due to sickness/time off work) and eventual lost income (due to death)
- Adjustments would be made for reduced income for a household farming unit or an informal household enterprise (due to sickness/time off work by HIV+ working household members) and eventual lost income (due to death);

The household would also be faced with increased expenditure, specifically on health care (medication), transport (to health facilities), and the eventual cost of a funeral. Effectively this adds to the level of expenditure needed to achieve a given level of household welfare, so this can be modelled through an appropriate adjustment upwards of the household PDL.

Estimates of the magnitude of the adjustments that should be made for these effects are given in Salinas & Haacker.

The poverty status of the household can then be recalculated (on the basis of the higher expenditure-adjusted PDL and reduced income), and new regional and national poverty rates calculated.

Salinas & Haacker model two other effects. The first is in the labour market, whereby when an employee dies a firm will recruit a replacement, and thus provide a job for someone who is otherwise unemployed. This is an important channel for countries with relatively high levels of formal employment (notably southern African countries such as Botswana, Swaziland, and Zambia) but may be less important in Uganda where wage employment occupies a relatively small

proportion of the labour force (15% according to UBSO Report on Labour Market Conditions) and where formal unemployment is low (3.5% of the labour force).

The second effect, which is likely to be more important, is the impact of social support mechanisms such as informal community structures and formal social/medical insurance. These can be relatively easily incorporated into the estimates of income or expenditure effects.

2. Modelling of sectoral HIV-vulnerability/risk exposure

This analysis focuses on the extent to which different sectors of the economy are vulnerable to the negative impacts of HIV prevalence amongst their workforces. It makes use of information regarding the variation in HIV prevalence amongst demographic and occupation groups, and of the differing occupational and demographic structures in the workforce in differing industries.

The basis for the analysis is a matrix of the following form (either absolute numbers of employees or percentages) (the following is an example only):

Occupation	Industry					
	Agriculture (household)	Agriculture (commercial)	Manufacturing	Transport & communications	etc.	etc.
Legislators, senior officials & managers						
Professionals						
Technicians & associate professionals						
Clerks						
Service & market workers						
Agriculture & fisheries workers						
Craft workers						
Plant & machine operators						
Elementary occupations						
etc.						
etc.						

(NB The more detailed the occupational breakdown of the workforce in each industry the better).

Data should also be collected on the labour force structure for each industry by age (i.e. replace the left hand column by age cohorts) and by gender and location.

The industry-level labour force data is then combined with data from the sero-prevalence survey on HIV prevalence by occupation. This will provide a projection of the level of HIV prevalence in each industry, according to its occupational structure. Similar analyses can be done for industry labour force structure by age, gender and location.

This basic analysis can be supplemented by estimates of the training and recruitment costs of replacing workers who die (e.g., this would be higher in the case of more skilled workers).

It can also be supplemented by analysis of demand side vulnerability by looking at the composition of each sector's output (whether domestic final demand, intermediate demand, or exports). This should be available from the Social Accounting Matrix.

3. HIV costing, financing and expenditure

One of the major determinants of the macroeconomic impact of HIV/AIDS expenditure is the extent to which that spending is sourced domestically (from the Government budget) or externally (from donor funds). A second important aspect is whether the funds are spent externally (on, for instance imported drugs or expatriate salaries) or domestically (e.g. on salaries for Ugandans). Most of the concerns about the expenditure impact of HIV/AIDS stems from concerns that large amounts of external funds will flow into the country and boost aggregate demand, which will in turn cause inflation and real exchange rate appreciation (and loss of international competitiveness), and destabilise the macroeconomic achievements that have been secured over the past 15 years. This potential destabilisation can occur whether or not the expenditure is funded externally – indeed, externally funded expenditure will have a greater net impact on aggregate demand than expenditure funded from domestic sources. If, however, most of the spending is on external resources, domestic aggregate demand will be much less affected, as the money will be spent on imported goods and services rather domestic goods and services.

While there is some information on the sourcing of HIV/AIDS funding (e.g. Lake & Mwijuka, 2006), there is little or no information on how the money is spent, or what it is spent on. The purpose of this assignment is to track the flows of resources received through to spending, to determine what HIV/AIDS related funds are spent on, and in particular, whether that expenditure is on domestic or imported goods and services.

The methodology to be followed will comprise the gathering of information from resource providers (donors and GoU) relating to the sources of funds. This will provide information on the sources of funds (supplementing information that is already available from the Sector-Based Spending Study).

The most important source of information for this study is on expenditure. Three types of information will be sought:

Information from resource providers (incl. GoU):

- are resources provided in the form of money or goods / services in kind (e.g., do donors provide money to buy drugs, or the drugs themselves?).
- if resources are provided in money form, what is the nature of the expenditure that is undertaken? How much is spent locally on goods and services, and how much externally? How much is used to fund other organisations (e.g. NGOs) that undertake that actual spending?

Information from recipients of funding (NGOs)

- information will be gathered on the nature of their spending (goods, services, salaries, etc., domestic vs. foreign)

Essentially the purpose of this assignment will be to carry out a mini-National AIDS Spending Assessment (NASA), which has been carried out in some countries, but with the emphasis being on domestic and foreign sources of funding and destination of expenditure.

The emphasis will be on tracking the *main* financial flows, rather than *all* financial flows. It is in the nature of an exercise such as this that information is messy and incomplete, but the objective is to isolate the main flows in order to ascertain the macroeconomic magnitudes.

4. Demographic Projections

Demographic projections under different scenarios are required for the macroeconomic modelling in phase 3. These projections can be generated by using the Spectrum model that has been developed by UBOS. Projections are required for the period to 2022 (15 years into the future, as specified in the ToR), and should preferably go back to 2000. They should cover the following four scenarios:

- No HIV/AIDS
- HIV/AIDS without treatment interventions
- HIV/AIDS with treatment interventions (ARV) – low scenario
- HIV/AIDS with treatment interventions (ARV) – high scenario

The ARV high scenario would entail treating a high proportion (say 90%) of those clinically eligible for ARV treatment.

The ARV low scenario would entail treating a small proportion (say 35%) of those clinically eligible for ARV treatment.

The projections should provide annual estimates of the following (under each of the four scenarios):

- Total population in each age cohort (5 years), by gender
- No. of HIV-positive individuals in each age cohort, by gender
- No. of those suffering from AIDS in each age cohort, by gender.

A template for the data required is shown below:

Demographic Projections Required

Total Male Population						Total Female Population					
Age Group	2000	2001	to	2021	2022	Age Group	2000	2001	to	2021	2022
15-19						15-19					
20-24						20-24					
25-29						25-29					
30-34						30-34					
35-39						35-39					
40-44						40-44					
45-49						45-49					
50-54						50-54					
55-59						55-59					
60-64						60-64					
Total 15-64						Total 15-64					
Total Population						Total Population					

Total HIV+ Male Population						Total HIV+ Female Population					
Age Group	2000	2001	to	2021	2022	Age Group	2000	2001	to	2021	2022
15-19						15-19					
20-24						20-24					
25-29						25-29					
30-34						30-34					
35-39						35-39					
40-44						40-44					
45-49						45-49					
50-54						50-54					
55-59						55-59					
60-64						60-64					
Total 15-64						Total 15-64					
Total HIV+ Population						Total HIV+ Population					

Total Male Population with AIDS						Total Female Population with AIDS					
Age Group	2000	2001	to	2021	2022	Age Group	2000	2001	to	2021	2022
15-19						15-19					
20-24						20-24					
25-29						25-29					
30-34						30-34					
35-39						35-39					
40-44						40-44					
45-49						45-49					
50-54						50-54					
55-59						55-59					
60-64						60-64					
Total 15-64						Total 15-64					
Total Population with AIDS						Total Population with AIDS					

5. Analytical (Econometric) Studies on Macroeconomic Relationships

The main channels through which inflows of external donor assistance (ODA) may impact on the economy are well known. These include:

- potential exchange rate appreciation due to foreign inflows;
- monetary expansion and inflation if these inflows are taken into reserves (to prevent exchange rate appreciation);
- fiscal costs and higher interest rates if reserves sterilised (to prevent monetary expansion)

While the channels are well understood there is less information regarding the magnitude of these relationships. The aim of this study is to quantify these transmission channels.

Econometric analyses of the following are required:

- The determinants of inflation in Uganda (principally exchange rates, interest rates and money supply; other factors as necessary);
- The determinants of Uganda's exports (principally the exchange rate; other factors as necessary).

Data for conducting this analysis should be available from the usual sources of macroeconomic and trade data (BoU, UBOS). It is preferable that quarterly data over the past 10-15 years should be used.

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