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RESEARC REPORT
ON
THE IMPACT OF HIV/AIDS ON HOUSEHOLDS INVESTMENTS AND
WELFARE
EVIDENCE FROM UGANDA

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1. Introduction

Acquired Immune Deficiency Syndrome (AIDS) is caused by a human immunodeficiency virus (HIV) that weakens the immune system, making the body susceptible to opportunistic diseases that often lead to death. The world over and in the different social, cultural, religious and political beliefs both in the developed and underdeveloped nations, the predominant mode of HIV transmission is through heterosexual contact, followed in magnitude by perinatal transmission, in which the mother passes the virus to the child during pregnancy, delivery or breastfeeding. Other modes of transmission are through infected blood and unsafe injections. Knowledge about HIV transmission and ways to prevent it are less useful if people feel powerless to negotiate safer sex with their partners whether married or not.

Over 40 million people worldwide are living with HIV/AIDS today, 90 percent of them in developing countries. UNAIDS (2002) notes that more than 60 million people have been infected with the virus and more than 20 million people have died of AIDS since the first clinical evidence of HIV/AIDS was reported in 1981. AIDS is by far now the leading cause of death in sub Saharan Africa, and the fourth biggest global killer (WHO, 2002). SSA is currently the worst affected region, with 29.4 million people living with HIV/AIDS whereas it's a home of only nine percent of the world's population (Caldwell et al., 2002). Most AIDS sufferers are found in countries of the AIDS belt, from Uganda southward, which contain less than three percent of the world's population. Caldwell (2002) argue that the long belt stretches from central African republic and Southern Sudan through Uganda, Rwanda, Burundi, Kenya and Tanzania to Malawi, Zambia, Zimbabwe, Botswana, South Africa and Namibia.

Gradually, more and more countries around the world are starting to realise that they must take decisive action if they are to avert a major AIDS crisis not only by averting the infection rates but more specifically addressing the long-term negative impact of AIDS on the household productivity and welfare, human capital stock and labour productivity for sustainable economic growth and development. More and more money is being channeled into Africa, especially by the US which has pledged \$15 billion to fight AIDS in resource-poor countries. Uganda is lucky enough to be one of the countries on the list and, given the decline that has been seen in its HIV prevalence, is being held up as an example of good

planning and action that others should emulate. However, the policy makers should look beyond reducing numbers and rates of HIV/AIDS infections because AIDS is there to stay, and therefore they should design more aggressive programs of enhancing household productivity and income generation and in general ensuring increased investments in human capital accumulation.

Uganda is estimated to have a population of about 30 million people and the country has braved a severe and devastating epidemic of HIV infection and AIDS for almost a quarter of a century. The epidemic started on the shores of Lake Victoria in Rakai district, the initial epicentre of the illness. Thereafter, HIV infection spread quickly, initially in major urban areas and along highways. By 1986, HIV had reached all districts in the country, resulting in what is classified as a generalised epidemic. HIV infection continued to spread relentlessly throughout the 1980s and early 1990s and soon gave rise to a wave of AIDS as more HIV-infected people succumbed to opportunistic infections arising from their suppressed immune systems. As in other countries in sub-Saharan Africa, Uganda's HIV/AIDS epidemic is predominantly spread through heterosexual contact.

The HIV/AIDS economic consequences can be seen in terms of the stigma at the individual and community levels. Stigma refers to the fact that, in some societies, people living with HIV/AIDS are viewed as shameful and the disease is perceived to be a result of personal irresponsibility. If not counteracted, such attitudes fuel prejudice against those living with HIV/AIDS, marginalising and excluding individuals. Ultimately such attitudes allow societies to excuse themselves from the responsibility of caring for and looking after those who are infected. More importantly, stigma leads to secrecy and denial that hinders people from seeking counselling and testing for HIV, as well as care and support services. In Uganda, efforts have been made to reduce fear and discrimination towards those living with HIV/AIDS.

The extreme mortality of AIDS has had an effect on this figure, which would otherwise be higher. As another consequence of AIDS, healthy life expectancy in Uganda is only around 50 years. Uganda is one of the few African countries where rates of HIV infection have declined, and it is seen as a rare example of success in a continent facing a severe AIDS

crisis (WHO, 2006). Uganda's policies are credited with helping to bring adult HIV prevalence rates down from around 15% in the early 1990s to around 5% in 2001. At the end of 2005, UNAIDS estimates that 6.7% of adults were living with the virus. Also the country's HIV prevalence among pregnant women in Kampala, for example, has fallen for eight years in a row (UNAIDS, 2002), while HIV/AIDS prevalence has soared in South Africa, with national HIV prevalence rates of 38.0 percent in Botswana, 31 percent in Lesotho, 33.4 percent in Swaziland and 33.7 percent in Zimbabwe. Thus the country is seen as having implemented a well-timed and successful public education campaign.

But the results seen in Uganda don't have a simple recipe, and with so many lives and such large sums of money at stake, it is important to look carefully at what has been done there. Even though HIV prevalence in Uganda is much lower than it once was, it still remains very high, and AIDS is still claiming tens of thousands of lives each year. Such a severe epidemic has a considerable social and economic impact. As AIDS usually kills young adults, it depletes a country's labour force, and weakens educational and health services. Deaths among young adults also leave behind thousands of orphaned children and grandparents, placing an additional burden on the community or the state.

Uganda is one of the most successful countries in Africa in reducing prevalence of HIV/AIDS significantly from 18% (1992) to 6.4 % (2005) over the last two decades. The 2004/05 Ministry of Health National HIV Sero and Behavioural Survey (NHSBS) established that for both sexes, HIV infection levels are highest among those aged 30-34 and lowest in the 15-19 years age category. **Throughout** the 25 years of the epidemic in Uganda, people living in urban areas have had higher prevalence relative to those in rural areas. In all, it is estimated that about 2 million people were infected by HIV during this period, of whom about 1 million have died and another 1 million are living with the infection today. This represents an upward shift in age of highest prevalence over the last two decades. Ugandan adults living in urban areas are almost twice as likely to be HIV infected compared to their counterparts in rural areas, in Kampala City alone the prevalence rate is as high as 8.5%. There are significant regional disparities, with the Northern region affected by conflict at 8.3% and central at 8.6%, and the lowest at 2.3% in West Nile region (Government of Uganda, 2003). In addition, women have higher prevalence of HIV infection across all age categories and regions of the country (7.3% of

women have HIV compared to 5.2% of men aged 15-59 years). Prevalence has also been shown to increase among women as educational attainment and wealth increases.

It is estimated that, 1 million people are currently infected and with approximately 130,000 new infections annually (100,000 infections are adults). The number of new infections each year has been rising in some age groups. This has potentially devastating consequences on the economy, labour supply and productivity, overall production, revenues, and impact on families and communities (World Bank, 1997). Indeed, at the macroeconomic level, issues of fiscal stability, resource allocation, and sectoral impacts and implications for the economy are extremely crucial for a fuller understanding of the links between HIV/AIDS and the economy. It is generally argued that the epidemic is likely to have devastating consequences for the overall economic development of Uganda, and that these consequences are likely to be felt in the future due to the impact of the skill losses.

The world over, one of the most salient clinical characteristic of HIV/AIDS is the long period of illness before the infected person finally succumbs. Evidence from recent cohort study in rural Uganda (Morgan and others, 2002) suggests that the median time from infection to death in that setting is about 10 years, during which the illness becomes more and more debilitating, which the last 10 months usually spent in a state of complete incapacity. Since those infected are likely to be adult of working age, this protracted illness hits households saving and investment twice. Firstly, by depriving the household of a wage earner, and then by requiring part of household's resources to care for the infected person. Although some of these outlays are financed by diverting present consumption or through inter household transfers, evidence suggests that most of it is financed by reductions in savings and the selling off of physical assets (Bechu, 1998). Poorer households, when forced to make these adjustments, are obviously more likely to have to forego investment in the human capital of their children.

The impact of HIV/AIDS on household's assets accumulation lies at the core of household economic development in particular and the country at large and indeed as a key for development (ILO, 2000). Thus, the study findings of this paper are quite relevant to our country in that individual's assets as a form of savings are the cornerstone for overall

social and economic development in an economy like that of Uganda. In aggregate, the HIV epidemic is eroding the capacity for development through its myriad effects on assets possession at individuals and household level. It follows that the epidemic undermines development, that social and economic development will be most adversely affected in those Ugandan communities with high levels of HIV prevalence, where morbidity and mortality will lead to severe losses of labour, skills and experience (MOH, 2004/5).

The impact of the disease has been mainly felt through the escalating morbidity and mortality that disproportionately affects women and men during the prime of their productive life. The consequences of the epidemic span across all spheres of life at both individuals and communities nationwide. It has imposed a severe and unsustainable burden on the meager health sector resources, as funds are diverted from other areas to HIV prevention and AIDS care and treatment services. HIV infection has also given rise to an epidemic of opportunistic infections, including tuberculosis (TB). Treatment of some of these opportunistic infections is more expensive than that of AIDS (UHSBS, 2004/5).

Similarly the HIV epidemic erodes the savings capacity of households, formal and informal productive enterprises, and of government, through its effects directly on flows of income and levels of expenditure. Reduced rates of savings will over time lead to slower growth of aggregate output, with the likelihood of declining per capita income. Thus it is estimated by UNAIDS that annual per capita income of half the countries of sub-Saharan Africa is falling by 0.5-1.2 per cent, and that GDP in the hardest hit countries may decline by 8 per cent by 2010. The decline in savings will be broad in its impact on the economy through its effects on levels of capital accumulation, including human investment. It is already the case that lower levels of household savings are having effects on investment in children's education, with consequences for the future stock of those with relevant education and skills. Public services in all countries are facing widespread attrition of trained staff and are unable to replace losses due to budget constraints. The same is happening with directly productive activities, such as mines and plantations, where losses of personnel are taking place at an accelerating rate.

We note that there are several mechanisms through which AIDS may have a potential impact on the economy. Unlike most other deadly illnesses, HIV's prime target is people

of working age. Moreover, AIDS is debilitating, particularly in the final 2 years before death, and absenteeism both for those infected and for those caring for them may have an economic impact on businesses and the impact on productivity may also decrease an economy's attractiveness to foreign investors, and diminish tax revenue. High rates of AIDS-related deaths could act to reduce the stock of human capital because people will have less incentive to acquire costly educational capital if they do not expect to live long enough to enjoy substantial gains from acquiring it. And the future stock of educational capital could also be affected if children whose parents die prematurely due to AIDS are unable to afford to continue their education. The susceptibility of working-age individuals leads to a potential reduction in savings rates and disposable income, which may have an economic impact. Savings will decline both because there are fewer working-age people available to earn, and the high costs of treating the virus will eat into household savings.

There are several ways in which individual households are likely to be economically affected by AIDS. The expenses incurred by households with a member infected with the virus are the most visible impact. A second key impact is on earnings and incomes of households with members with HIV/AIDS, especially since, as discussed earlier, HIV/AIDS usually affects working-age individuals in their most productive years. Lost earnings when individuals are sick or die prematurely of AIDS can be quite large given that they accumulate over several years. Bloom et. al., (1997), in their study they estimated that lost lifetime earnings were nearly three and one-half times the annual costs of treating AIDS. For example, in Sri Lanka, lost lifetime earnings due to an AIDS-death were nearly eleven times the annual treatment costs of AIDS. Incomes and earnings can also be lost due to the loss of a job from stigma associated with HIV infection, even if the HIV-positive individual is not sick with opportunistic infections associated with HIV/AIDS. In these cases, the discounted value of lost earnings is even greater than in the case of an AIDS death, since the period over which the household does not have access to an individual's earnings is greater.

Lost earnings and increased expenditures due to AIDS infections and deaths among adults result in a number of short and long-term consequences for households that are not generally fully ameliorated by the counteracting influences of support from the community and extended family, or by health and life insurance. These could include declines in household savings and asset holdings. Studies in Thailand demonstrate that households

with AIDS deaths experienced a greater decline in asset holdings than households with non-AIDS related adult deaths, or those with no deaths at all. There is also evidence from a number of African countries to suggest that, even after changes in the living arrangements of extended family members are taken into account, overall labor input in agricultural activities declined in households that experienced an adult death. Not surprisingly, the magnitude of the adverse effects varied with the initial economic position of the household with richer households better able to cope than poorer ones.

In addition to long-term declines in household asset holdings, some evidence suggests that members of households affected by HIV/AIDS will have lower long-run accumulations of human capital, measured in terms of achievements in education or health. A study of 324 rural and urban households in Zambia suggests that AIDS deaths within households are likely to be associated with declines in nutrition and the loss of educational continuity among children, with the effects likely to be especially concentrated among rural households and the urban poor.

In addition to the above, at community level the lack of availability of formal health and life insurance can also cause economic damage to households. In any case, a variety of excludability clauses prevent access to such insurance by the few people with HIV/AIDS who might otherwise be able to afford it. This, combined with very limited private insurance coverage in the country, implies that safety nets offered by the public sector, or public sector insurance coverage, are the sole options open to households. However, in many developing countries the availability of suitable public safety nets is hampered by the poor fiscal situation and the predominance of informal sector employment.

The micro- and macro-economic consequences of HIV/AIDs are diverse. On the supply side of the economy, economic productivity has been adversely affected by the premature death of women and men during their most productive age, leaving orphans and widows. The loss of critical human capital has affected industrial and private sector growth, and the development of institutional capacity, all of which require skilled workers and leaders. Morbidity and mortality also results in the loss of skilled manpower for teaching, medical care, agricultural production, and other professions that are not easily replaced. Indeed, it is for this reason that the attainment of human development in areas of economic growth, poverty reduction, and improved quality of life indicators is below what it would have

been in the absence of AIDS. The demographic consequences of the epidemic are reflected in the quality of life indices in the country, such as infant mortality and life expectancy that are currently lower than what would have been achieved in the absence of HIV. In general, the evidence on the economic impact of HIV/AIDS on workforces is therefore mixed. The effect on the workforce is felt mainly through increased absenteeism, burial and funeral costs, recruitment and training costs, lost knowledge, and damaged morale.

On the demand side of the economy, HIV/AIDS can also reduce a firm's customer base or limit its disposable income. The group hardest hit by AIDS young adults of working age is also the major source of demand for goods and services. Moreover, caring for people with AIDS is expensive, so while certain sectors such as health might see increased demand, most others are likely to experience spending redirected away from them. Such effects will only be detected by individual firms when many people's consumption decreases. Effects on the customer base are more likely to be transparent if there are dominant firms, or firms organized into business associations.

Men and women tend to own assets and money separately, and tend to have separate income earning activities with men owning more land and dominating wage employment. Yet because care giving usually falls on women, it appears that the rise of prolonged sickness and care due to AIDS has reduced the time available for women to engage in income-earning activities more so than for men (Opiyo, 2001), and this trend is likely to become even more pronounced in future decades in the hardest-hit households as the casualties of the disease escalate. In a study by Yamano and Jayne (2004), they found that households suffering the death of head-of-household or spouse were largely unable to replace the labour lost through the death, whereas households suffering the death of another adult (other than the head or spouse) were largely able to attract new household members. This at least partially stabilizes the supply of family labour for agriculture, but implies that off-farm and remittance incomes may in some cases be reduced, exacerbating capital constraints in agriculture.

While health improvements can promote virtuous development spirals, health shocks can set off vicious spirals. HIV/AIDS is slashing life expectancy in many African countries by up to 30 years. Based on estimates in the literature of the link from life expectancy to

economic growth (Bloom and Canning [2000]), AIDS in Africa has the potential to consume two percentage points of economic growth. With average annual growth rates of real per capita income in most of Sub-Saharan Africa ranging from -2% to 3%, the damage will be significant. Other health problems can also impede growth. For example, Gallup and Sachs report that countries with high levels of malaria have much lower levels of income, even after controlling for potentially confounding factors. Health, therefore, poses a complex and pressing series of challenges for individuals and governments. Major shifts in health status are sometimes built on the same foundations as economic growth—new knowledge and technology, new investment, and new labor structures.

The humanitarian case for taking action to prevent HIV/AIDS is abundantly clear. However, there is also value in exploring the economic case for action. Therefore, this paper presents the empirical evidence of the effects of HIV/AIDS on the wealth stock of individuals and households affected with the epidemic and provides a number of policy stance that could mitigate the negative impacts of AIDS/HIV on households savings, physical and human capital investments and uplift overall macroeconomic performance in Uganda..

2. The Database and Sample

Our empirical analysis will be based on the 2004/2005 Uganda National Household Survey (UNHS). The UNHS is a nationally representative survey of 10,696 households, fielded between August 2004 and September 2005. The survey covered both rural and urban areas in the four regions of Eastern, Northern, Southern and Western covering a total of 65 districts of Uganda. The questionnaire was developed to closely match the one used in the Integrated Household Survey of 1992 and a panel of approximately 1300 households who were interviewed in both periods was included. Use of the panel enables us to not only to make inferences about changes in the incidence of AIDS and household's assets accumulation over time, but also to assess the impact of having an AIDS patient in the household during the period under concern.

In fact, economically, HIV/AIDS contraction has been observed to be associated with a transfer of wealth to the household taking care of the sick family member, which then is generally expected to earn income for the household or do better in school than its peers

(Ainsworth, 2001). Any estimates of economic hardship caused by the receipt of an HIV/AIDS person derived from such a sample would thus underestimate the effect of crisis or shock-related, implying that the figures given will constitute a lower bound for the true shock-induced impact of this phenomenon.

The intuition underlying the household asset accumulation effect is straightforward; households subjected to an unanticipated shock in the form of having to accommodate an additional AIDS infected household head or member are likely to reduce their level of savings and investment, thereby affecting the household asset stock. Formally, let households be indexed by k and individual members by j and assume that at any point in time t , the household maximizes a unitary utility function given by

$$U_k(C, H_j, E_j) \dots\dots\dots (1)$$

Equation (1) means that household utility depends on total consumption C as well as on the health and education status of each member, H_j , and E_j . Let unobserved individual ability be given by A_j , supply of health and education services by SH and SE , and spending on health and education by QH_j and QE_j . With health and education for each j produced according to standard neoclassical production functions $H_j = H(A_j, QH_j, SH)$ and $E_j = E(A_j, QE_j, SE)$ and QH_k and QE_k denoting spending for the whole household, respectively, the period budget constraint can be written as

$$C_t + QH_{k,t} + QE_{k,t} + I_t \leq Y_t \dots\dots\dots (2)$$

where I denotes household investment.

The optimal amount to be invested in business assets in each period t , I_t^* solves the intertemporal value function $V(t) = U(t) + \beta V(t+1)$ and depend on a number of parameters such as initial endowments of education, the number of family members, and the health status of the household. Now, suppose that the household is faced with a sudden shock in the form the household head or member contracting HIV/AIDS. This will not

only affect contemporaneous consumption, but also the household income earnings, savings and amount of investment. Distinguishing between households who, in the period under concern, experienced such a shock and those who did not, allows us to estimate multinomial logistic model of the form

$$\Delta HHA_k = \alpha + \beta \Delta F_k + \varphi H_k + \varepsilon_k \dots\dots\dots (3)$$

where HHA_k is the change in the asset stock owned by household k between the initial and the final period (2001 and 2005 respectively), ΔF_k denotes the change in the household health status by contraction of HIV/AIDS experienced by the household during the same period, H_k is a vector of household attributes including initial characteristics and changes over the period, and ε_k is an error term. Clearly, with unchanged levels of household asset stock, addition of a HIV infected member to the household would decrease household assets given household income and or with a fall in income earnings and increased household outlay. At the same time, to the degree that affected member may own assets that are (temporarily or permanently) added to the endowment of the household, the impact on asset levels may be more ambiguous. In both cases, we are particularly interested to find out how the impact of contracting HIV/AIDS by a family member differs from that of a non infected household.

To estimate this equation, we use the change in household assets stock between 2001 and 2005 as the dependent variables and AIDS infection by households, poverty status, household size, household education levels of the household head and other household characteristics as independent variables respectively.

2.1 Variables and Descriptive statistics

Variables used in the empirical analysis and the main descriptive statistics, are presented in Table 1. Both objective and subjective measures have been used as indicators of the AIDS status of the household. The household education status is defined varying between 1 and 5, representing 1 for no education and 5 for the highest education (graduate). Variables AIDS and No AIDS have been derived from the self assessment; their value is equal to 0 if the household reported symptoms of an AIDS patient and 1 if no symptoms of an AIDS

patient were reported. Also the asset variable in terms of change in asset accumulation between 2001 and 2004/5 was derived from the self assessment of household members; their value is equal to 3 if household assets in 2004 are less than in 2001, 4 no change in assets and 5 if household assets in 2004/5 are more than 2001 assets. The data indicate that AIDS cases are more among poor households with 1,187 cases compared to 507 cases among the non poor households.

In addition to these variables, other indicators used in the analysis are provided by responses to the survey questionnaire include household size, urban status and household poverty status. Also our data provides an insight on the AIDS status according to urban status. That is, AIDS cases are more in rural areas compared to urban areas. Furthermore, the data reveal that AIDS cases are highest among the households with no formal education with 927 cases compared to households with formal education (766 cases).

Descriptive statistics on household assets accumulation, AIDS status, and household's formal education can provide a first indication of whether or not these variables are significantly different for households who, during the 2001- 2005 period, experienced a change in household assets due to getting an AIDS patient or an increase in the number of AIDS patients they had to care for, as compared to those who did not have. While education and household residential status are defined in a standard way , the `change in the value of assets for both 2001 and 2005 was computed based on retrospective information given in the 2005 survey as discussed above.

In regions, descriptive data point towards a marked increase in overall AIDS patients in war affected areas, and very little difference between households with and without an AIDS patient either in the initial or in the second period. While this would prima facie suggest that urban educated household's children do not suffer from disadvantages in education access and school drop out due to AIDS infection, none of these descriptive statistics holds constant for other observable and unobservable factors that may have an impact on such outcomes. To avoid drawing spurious conclusions, it will be necessary to account for such factors like household education status and nature of employment.

Table 1: Summary statistics on Region AIDS HHASSETACCUM HH-size Poor HH and RESSTATUSHH

Variable	Obs	Mean	Std. Dev.	Min	Max
AIDS	6082	.7214732	.4483109	0	1
HH-size	7421	.1024121	.3032099	0	1
Region	7426	2.412604	1.133499	1	4
HHASSETACCUM	6981	3.87953	.645869	3	6
Poor HH	7421	.2685622	.4432415	0	1
RESSTATUSHH	7426	2.123081	1.782274	1	7

3 Empirical results

The empirical analysis focuses on the household's AIDS/HIV status on its capacity to accumulate household assets as a form of savings. Firstly, we begin by examining the impact of having an AIDS patient in a household on its ability to accumulate assets and the household's human capital. The analysis presented in this paper underlies the existence of two distinct channels of the influence of AIDS/HIV on the health status of individuals which affect their asset accumulation at household levels and, thus on the capacity to generate income.

First, the empirical study permits to conclude that the household AIDS status of the household members affect the capacity of the household as a whole to earn income, save and invest in asset accumulation. The AIDS health status of a household is a transmissible factor across the household members and generations. Secondly, it has been proved that members of households endowed with a more favourable health status enter in the labour market at later ages. That is, the healthier a household member, the longer the educational periods. This result has been interpreted as “quantity effect” due to the influence of household health on the incentives and ability to invest in human capital. The reduction in earnings and assets stock of expected lower benefits of human capital implied by expected shorter life spans and reduced life time earnings, act as a disincentive for parents of unhealthy households that rationally choose to invest less in household members' intellectual human capital.

The model was estimated using data from the Uganda National Household Survey 2004/5. The study estimated a multinomial logistic regression model using Stata version 9.0 and the results of the estimated model are presented in Table 2 below.

Table 2: Estimated Multinomial logistic regression Results

Log likelihood = -5480.4194						
						Number of obs =5763
						LR chi2(18) =209.23
						Prob > chi2 =0.0000
						Pseudo R2 = 0.0187
HHASSETACCUM	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
3						
AIDS	.1228609	.0698847	1.76**	0.079	-.0141106	.2598324
FEDUC	-.0098202	.0644286	-0.15	0.879	-.136098	.1164576
Poor-HH	.1856895	.0721592	2.57***	0.010	.0442601	.3271189
Region	-.2104239	.029411	-7.15***	0.000	-.2680684	-.1527794
RESSTATUSHH	-.0300764	.0177869	-1.69**	0.091	-.0649381	.0047853
HH-size	.1643234	.1276787	1.29	0.198	-.0859222	.414569
_cons	-.3523504	.1512063	-2.33	0.020	-.6487094	-.0559915
5						
AIDS	-.1585539	.0827589	-1.92**	0.055	-.3207583	.0036505
FEDUC	.061683	.0778083	0.79	0.428	-.0908186	.2141845
Poor-HH	.428064	.0839258	5.10***	0.000	.2635724	.5925555
Region	.2671895	.0356827	7.49***	0.000	.1972527	.3371263
RESSTATUSHH	.0872313	.0200142	4.36***	0.000	.0480041	.1264584
HH-size	.1340743	.1681781	0.80	0.425	-.1955488	.4636974
_cons	-2.302899	.1892987	-12.17	0.000	-2.673918	-1.93188
6						
AIDS	-.4045829	.8812466	-0.46	0.646	-2.131795	1.322629
FEDUC	2.223759	1.095924	2.03**	0.042	.0757871	4.371731
Poor-HH	.1316093	1.139945	0.12	0.908	-2.102642	2.36586
Region	.07804	.3667243	0.21	0.831	-.6407265	.7968064
RESSTATUSHH	-.1517116	.2969636	-0.51	0.609	-.7337497	.4303264
HH-size	1.8399	.9176637	2.00**	0.045	.0413118	3.638487
_cons	-10.24875	2.588007	-3.96	0.000	-15.32115	-5.176353
(HHASSEAACCUM= =4 is the base outcome)						

From our analysis, the study reveals that AIDS/HIV has a long term negative effects on household productivity in an economy. Thus, Uganda's new efforts as regards the AIDS scourge should focus on the consequences of HIV/AIDS on the macroeconomic performance of the economy in terms of the social and economic effects of AIDS at the

household levels. The study reveals that AIDS erodes away household's efforts to make any savings, investments and therefore assets accumulation of the households more specifically those caring and that have at least had an AIDS patient.

The empirical evidence is that AIDS not only affects the loss of work hours for a household member (s) but greatly affect the school performance of the school going children when on one hand they are caring for the sick parents, or any household members and on the other hand when the sick parents fail to raise their school requirements like school uniforms, books and other basic scholastic material given the Government Universal Education program at both primary and secondary school levels. This doesn't only affect their performance in schools but has a strong bearing on their school completion and hence their future potential earnings. This to a reasonable extent explains the persistence of poverty among the AIDS affected homesteads more specifically in rural areas **which is in line with the descriptive statistics** where incomes are raised on seasonal basis.

The second interesting empirical result of the study is that the household poverty status negatively affects the household's ability to accumulate assets. The poverty coefficient is negative and significant at 5% level of significance. Given that AIDS is one of the key causes of poverty in the new empirical literature, then poor and AIDS affected households suffer from a twine problem because they cannot save what they don't have not only meeting the high medical expenditures for caring for an AIDS patient and the key basic household needs. Thus AIDS reinforces poverty in undermining the household's efforts to save and acquire assets and overall macroeconomic performance of the economy.

Another interesting empirical result of the study we came up with is that the household formal education negatively affects the household's ability to accumulate assets. For the three levels of asset status of the household as per 2001 and 2005, the coefficient for formal education is negative and significant at 5% level of significance. This means that households with no formal education and having an AIDS patient experienced a decline in assets holdings between 2001 and 2005. This means that households with formal education

can easily change behavioral attitudes and as it's always acknowledged educated women can easily get wage employment and are less vulnerable and not easy to be induced into open sex for money as compared to their uneducated counter parts with no defined means of surviving. This also explains the high incidence of AIDS among the rural communities compared to urban areas.

Note that the same results were realised in regard to the effect of AIDS on households' assets accumulation on the regional basis. Whereby the northern part of the country where three human generations have lived in refuge camps in the country, the impact of AIDS on household assets is quite desirable. The three generation human loss should be seen in terms of people who joined the camps when are twenty years and above, most of them are basically dead according to the country's life expectance of 45 years (WHO, 2006). Then those who where between one and ten years, means they completely lost out any opportunity to acquire formal education, they married in camps and on average are thirty years old and cannot be trained. The last human generation lost is the children of the second generation who have also started producing but with no any formal training and no any form of assets since they were borne and grown living on hand outs from the donor community and NGOs. All these three generations have not contributed to the country's growth and the country has lost in terms of tax revenue it would collect from their incomes and the unproductive expenditures to maintain them in camps and provide security around the camps which revenue would have been invested in more productive ventures. The northern region is the poorest part of the country and with high levels of illiteracy and low formal education, low or no form employment, which make women more vulnerable to AIDS/HIV and therefore households assets are basically non existent.

The main result that should be highlighted is that the AIDS status of a household is a transmissible factor across household members and generations. These findings allow for the identification of the mechanism through which the AIDS status of a household member affects household members' assets accumulation. The model that has been estimated using data from the Uganda National Household Survey 2004/5, points out that the household members with an AIDS patient are endowed with a poor health status and tend to inherit

their unfortunate conditions. This is extremely important in order to understand the role of the AIDS health status in the inter-household members and cross transmission of the capacity to generate income and accumulate assets. Nevertheless, health status can explain the process of household asset accumulation if it's possible to demonstrate that it influences household earnings.

4 Policy implications of the study findings

The evidence from Uganda suggests that AIDS has at household levels had a significant impact on household assets accumulation, especially for the poor, and the propensity to invest, part of which may derive from the fact that additional expenses have to be incurred for treatment and clothing of the new AIDS patient in the household. That is, having AIDS implies that, in addition to the direct loss of welfare through medical expenses and destruction of human capital, the legacy of AIDS reduces permanent income, investment, and (human) capital accumulation even for those who have not been directly affected by the disease, an issue that is of great importance from a macro-economic point of view.

Indeed, we note that the reduction of school fees associated with the UPE program has helped to eliminate the disadvantage of school going age children of the AIDS affected household and more the AIDS orphan patient. At the same time, the AIDS/HIV affected household members are less likely to be involved in heavy manual income generating activities which heavily constrain on the households' earnings on one hand and increased treatment and consumption expenditures on the other hand. This implies that the household may resort to disposition of its existing assets to meet the increased household demands. This has an impact on the poverty outcomes at household levels and devastating macro effects for the country in general.

Unfortunately, there is no easy solution to an HIV epidemic. Uganda may have decreased its HIV prevalence but there have been many deaths in the country, and will be many more yet (NHSBS, 2004/5). There is no simple way to reducing the number of new infections and therefore the likelihood to undermined economic growth in the country cannot be overemphasized. Note that AIDS undermines productivity in the economy given that it mostly affects the skilled individuals who are not easy to replace. Despite the far-reaching and deleterious impact of AIDS-related deaths, it is possible to design interventions that

help minimize the negative long-term economic consequences of such a shock at household and macro levels.

A first finding is that AIDS negatively impact households' ability to save and accumulate assets for the period under investigation. This suggests that, even if the immediate impact of AIDS on mortality is on the decline, the legacy of longer-term impacts that has to be dealt with will constitute a formidable challenge for the foreseeable future because AIDS affected households are extremely vulnerable and prone to poverty due to loss of savings and investment for future earnings. In fact, the increase in the number of AIDS patient and the households hosting them observed during the period, suggests that even if the overall incidence of the disease may be on the decline, its longer-term consequences on the economic structure may be felt for a long time in the future through the reduction in the household assets and productivity that are considered crucial for future growth.

Development of labour saving technologies: This may be appropriate for all afflicted households or in all hard-hit communities. The payoffs to research in labour saving technologies will be quite valuable given the existence of AIDS. In fact, the improved labour saving technologies may make this one of the most effective means to raise the livelihoods of afflicted and non-afflicted households alike over the longer run given that Uganda is an agro based economy. In addition, low-external input technologies with soil fertility enhancement mean substantially high yields and production, and higher returns to land and labour. Promoting such a response in the aggregate would most likely alleviate poverty and misery among households.

Education and skill development: As men and women die of AIDS, much of their accumulated knowledge and skill is lost to the succeeding generation. Problems of intergenerational knowledge transfer need to be redressed, in order to increase the productivity of labour at household level, as well as the contribution of people to society, and the contribution of society to individuals. This highlights the importance of education and skill development, which goes far beyond the households. Educational attainment is a key determinant of an individual's life style and status. It also affects many aspects of human life, including those related to demographic and health issues. The educational

attainment that is strongly associated with awareness, knowledge, attitudes, and reckless sexual behaviour related with HIV/AIDS affect household savings and asset accumulation.

Redress Gender Biases and empowerment effect in the country: Marked gender inequalities in the access and ownership of productive resources make the whole society more vulnerable in the wake of an external shock such as AIDS. In Uganda like in large parts of Africa, while men traditionally control and own many resources, women gain access and use rights through marriage. When marriage links are broken through the death of the spouse and women are denied access or use of the resources or lose them through property grabbing, they are frequently left only with their body to gain access to food, money or rights. The AIDS epidemic has evidenced the inheritance danger in acute gender inequalities in access to resources. Therefore, programmes that seek to ensure gender equality in participation and access will have a protective effect for the society. In addition, they will have an empowerment effect on women, further protecting them against HIV/AIDS epidemic. All agricultural policies and programmes should be revised in order to take gender issues adequately into account. They should ensure equal access to valuable resources such as land, knowledge, skills, credit, extension, and equal participation in all activities.

Note that empowerment of women through greater economic independence is associated with a lower HIV prevalence rate. Increasing women's economic independence does two things. First, it provides women with the financial and legal independence they need to take into account their own welfare at crucial times. Without such independence, women are often not in a position to follow safe prevention techniques which have been found to reduce the risk of HIV infection. Limits on independence include land inheritance laws and legal obstacles to opening banking accounts and starting their own businesses. Second, the availability of market employment opportunities increases the opportunity cost of prostitution. On one hand this implies that fewer women will become commercial sex workers to survive, and on the other hand it also leads to more condom use by commercial sex workers. A key determinant of economic independence is education. It is therefore not surprising that formal education is associated with a positive effect on household assets accumulation. Education operates to raise the costs of becoming infected and, particularly if it includes sexual education, it will improve the knowledge of the risks entailed by

unprotected sexual relations. Both factors increase the incentives to invest in HIV prevention activities and account for the broad positive relationship between formal education of households and household assets that are seen as the engine of growth.

Households earning potentials through NGOS-Government collaboration: This suggests that NGO programs might help support the general thrust of broader government policies in the case of education and health, efforts by NGOs alone may, in a policy environment that is less conducive, not be sufficient to overcome the barriers confronted by AIDS patient hosting households. This implies that, instead of focusing on specific interventions directed towards AIDS patients, it would be more effective to improve the overall framework of policies regarding households earning potentials. The fact that, even though AIDS patient hosting households did initially suffer from a disadvantage, government programs in education and health appear to have affected them in ways similar to non AIDS affected households who may have the same income status but enjoying similar government programs like UPE and UPS. Then this would require special government programs designed to uplift the AIDS infected households like providing scholastic material to school going children of these households that they do not drop out of school as it's the case. Also, interest free loans can be provided to these AIDS affected households to do some business. Note that in both cases, more individuals will go for AIDS check up and this will help government greatly to fight against the epidemic.

Modifying further the system of incentives faced by individuals: We note that unless incentives are provided for HIV-infected adults to change their general behavior, HIV prevention activities may not be effective. One immediate policy could be to restore hope by improving access to health care and treatment. Treatment of AIDS-related opportunistic infectious diseases such as tuberculosis as well as treatment of key cofactors of HIV such as STDs, have the potential of extending life expectancy substantially. Both the drugs and the medical knowledge to address these diseases should be made more available to households in both rural and urban communities. This particular policy stance can only work in a corruption free environment, therefore, Uganda government and NGOs in the cause AIDS should champion an effective way of uprooting corruption in the society for the services to reach the actual HIV/AIDS beneficiaries.

Sound macroeconomic and Structural policy reforms: In view of recent work showing that growth has a substantial impact on poverty (Dollar, 2000), growth-enhancing policies may create a virtuous circle. Growth can provide the fiscal resources needed for governments to address on a sustainable basis the effects of the HIV/AIDS epidemic on household productivity and asset accumulation. On the other hand, Structural policy reforms aimed at addressing some of the factors that account for the spread of HIV, namely income inequality, gender inequality and the adverse impact of ethnic divisions could do to mitigate the effect of AIDS on household saving and asset accumulation.

Equal regional development government policy: The study reveals that the North and eastern parts of the country with poor social and economic infrastructures as the dominantly poor regions and these are the worst hit parts by HIV/AIDs in the country. Therefore, it's important for government of Uganda to undertake equal development opportunities in its budget allocations to mitigate the spread of the AIDS epidemic and it's micro and macroeconomic consequences on the economy. Also there is need for the government to ensure peace and security for the people and their property in all parts of the country, establish transparency and observe human rights so as to establish an enabling investment climate in the country and reduce on the vulnerability of individual to risk sex as a means of survival.

Conclusion

This study has explored the effects of AIDS/HIV on household assets accumulation in Uganda, which may affect the size, rate of growth and productivity of the country's human capital stock and overall economic growth and development of the country. Therefore, the results of this study have been interpreted as "quantity effect" due to the influence of AIDS on the household's ability to accumulate assets. The reduction in household assets and expected lower welfare implied by expected shorter life spans and reduced lifetime when the household bread winner is the one affected with AIDS act as a disincentive for the household heads to rationally choose to invest less in child intellectual human capital which affect their intergenerational mobility of income thus children tend to inherit their unfortunate conditions that they continue to live in poverty. This is extremely important to understand the volatile effects of AIDS on households' capacity to generate assets and the likely negative growth effects.

First, the epidemic threatens to sap away the saving and physical capital assets of households in the country, thereby reducing the productivity of workers who rely on physical capital to make use of their skills. The depletion of household savings and assets implies a fall in household productivity, which not only has a strong bearing at household incomes, but has fiscal implications in terms of government tax revenue and fiscal expenditures to provide health services, education and poverty reduction as per the millennium development goals. AIDS epidemic foreshorten the time horizon and increases the opportunity cost of household members' time, thus making investment in schooling less attractive. The epidemic also threatens to erode the already existing human capital stock, as the death of many of the country's most skilled workers reduces the average productivity of those left behind.

Secondly, mitigating the spread and the consequences of HIV/AIDS requires a coordinated approach involving agencies responsible for social and economic development to fully be involved. It is critical that policy makers anticipate the changes that HIV/AIDS will bring to the household livelihood, and proactively respond through the development of policies and programmes that factor in these projected impacts of the disease. Because many policies and programmes take years to implement and provide tangible results with a time lag after implementation, there is urgency to put in place an appropriate set of public investments and programmes that can cushion the blow by the time the long-wave impacts of AIDS are in full force, rather than respond reactively after crises caused by structural changes in the economy have already manifested.

One of the most important ways in which household income-asset policy can contribute to reducing the spread and consequences of AIDS is to contribute effectively to poverty reduction. Moreover, raising households' and communities' living standards over the long-run -through productivity-enhancing investments in labour saving technology generation and diffusion, improved household savings systems, basic education, infrastructure, and governance will improve their ability to withstand the social and economic stresses caused by the disease. Many of the household developmental policies and investments identified in this report would have remained critically important regardless of whether HIV/AIDS had become a major development problem. But the onset of the epidemic makes labour

saving technologies/productivity and household income growth all the more critical, especially if poverty exacerbates the spread of the disease, as is increasingly believed. Therefore, greater focus on these productivity-enhancing investments is likely to be a critical part of an effective response to the HIV/AIDS pandemic, and the extent to which progress is made in these areas over the next 20 years is likely to greatly influence living standards in these hardest-hit households in Uganda.

Of course, the effects of the epidemic on the accumulation of assets and household productivity of human capital in Uganda are likely to go beyond those explored here. For example, to the extent government reorient its fiscal priorities to health spending, to care for those already infected and dying, education systems may find themselves starve for funding. Furthermore, the orphaning of thousands of children across the country may be expected to leave communities unable to rear children with the traditional level of care or attention. The analysis has implications for expected growth in the country, and thus for fiscal expectation and sustainability as for any worst hit country by the AIDS epidemic, it reinforces the logic of massive donor support to reduce the probability of the country to fall into the wrong, low-level, “poverty trap” equilibrium by fighting the disease itself and by helping finance the additional costs of meeting all the development challenges the country faces.

Abstaining from sex, being faithful to one uninfected partner, and using condoms are important ways to avoid the spread of HIV/AIDS. Current strategies in Uganda call for reducing the mother-to-child transmission of HIV. Increasing the level of general knowledge of transmission of the virus from mother to child and of knowledge about the use of antiretroviral drugs is critical to achieving this goal.

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