**Household deaths and children's schooling: Quantifying the effects of HIV/AIDS on adolescent's work-schooling choices in Malawi**

Introduction

Malawi is one of the countries in Africa where the extended family system does not seem to be effective in mitigating the negative impacts of HIV/AIDS on children's welfare. For example, Lloyd and Blanc (1996) found that overall child's biological parents appear to play a less critical role in explaining children's education outcomes in the 7 sub-Saharan countries that they analyze. However, in Malawi the enrollment rate for children without a mother were 20 times lower than that of children with mothers while for fathers, it was 7% lower for the children without fathers compared to those with fathers. On the health side, Taha *et al.* (1995) also found that mortality rates for children born to HIV-positive mothers were 3 times higher than that of children born to HIV-negative mothers in urban Malawi while in Zaire, Ryder *et al.* (1994) found no difference in morbidity or indicators of social well-being among age-matched children of HIV-positive and HIV-negative mothers. These studies suggest that relative to other sub-Saharan African countries, Malawi may not be coping well with the HIV/AIDS epidemic and its impact on children's welfare. Garbus (2003) stated that reports by recent missions to Malawi cite 'taking children out of school' as one of the coping mechanisms to the HIV/AIDS epidemic. However, to my knowledge, there is no study that has analyzed the effects of HIV/AIDS related deaths or non-HIV/AIDS related deaths on children's schooling in Malawi, at a household level. Household deaths can have serious implications on the welfare of surviving members. For example, in their study of household's coping mechanisms and children's nutrition, Carter and Maluccio (2003) show that death of a household member is the most frequently mentioned shock (32.2% of the times) that a household in South Africa experienced in 1993 and 1998 Kwazulu-Natal Income Dynamics Study surveys, followed by serious injury (18% of the time). Following an approach similar to Ainsworth, Beegle, and Koda (2002), this study will show the impact of incidence of adult deaths in a household on adolescent children's probability to attend school and on their allocation of time to schooling and work activities. The study will also show the impact of expected future deaths in the household (indicated by incidence of HIV and STI illnesses and incidence of frequently ill and seriously ill household

members) on adolescent children's schooling. Current illnesses may be viewed as potential future deaths that can induce time re-allocations among healthy household members (Beegle 2003).

## Background

According to UNAIDS, there were 80,000 adult and child AIDS deaths in 2001 in Malawi (UNAIDS 2002). UNAIDS also estimated a total of 850,000 Malawians living with HIV/AIDS by the end of 2001, of which 65,000 were children age 0-14 years and 780, 000 were adults aged 15-49 years. 56.4% of these were women. This translates into an adult HIV-prevalence of 15%, which is the eighth largest in the world (Garbus 2003). According to the Malawi National AIDS Commission, HIV/AIDS is the leading cause of death among those aged 20-49 (Malawi Global Fund Coordinating Committee 2002). The US Bureau of the Census estimated that the crude death rate in Malawi was 22.3 deaths per 1,000 population, but that this would have been about half of this (12.0) in the absence of HIV/AIDS (US Bureau of Census 2002). Family Planet (2003) reported that 390,000 children have been orphaned due to HIV/AIDS in Malawi. It is therefore expected that in Malawi, children's education may be affected due to increased work demands on them as well as financial hardships on families that have experienced a death. Garbus (2003) reports that Malawi is also expected to experience a 4.8% reduction in GDP per capital due to HIV/AIDS (mostly due to loss of knowledge/skill resulting from HIV/AIDS mortality within the workforce). Garbus (2003) also mentions that HIV/AIDS, poverty, macroeconomic policies, and food shortages have rendered traditional coping strategies (informal safety networks of the extended family systems), irrelevant. These conditions make Malawian children vulnerable to the HIV/AIDS epidemic.

## Data

The Malawi Diffusion and Ideation Change Project (MDICP) based at the Population Studies Center of the University of Pennsylvania collected data on about 1,000 girls and boys aged 15 to 21 years in March-August 2004. The MDICP is an ongoing longitudinal survey. The first wave of data collection (MDICP1) was done in 1998, the second

(MDICP2) in 2001, the third (MDICP3) in 2004, and the final wave (MDICP4) is scheduled for 2006. The original intention of the MDICP was to examine the role of social networks in changing attitudes and behavior regarding family size, family planning, and HIV/AIDS in Malawi among married women and men. The adolescent sample was added in 2004 (MDICP3) from households that were or were not part of MDICP. The MDICP3 survey included a time allocation subsection to look at differences in time allocation patterns for households affected or not affected by incidence of an illness or a death. In particular, a dairy of work patterns for the previous work day was administered to the adolescents, giving information on hours spent on different activities during the day from the time the child woke up to the time they slept. The diary also provides information on hours that the child put in schooling or school-related activities.

MDICP3 is uniquely different from the past 2 waves in that biomarker data was collected for HIV/AIDS and sexually transmitted illnesses (STIs) of gonorrhea, chlamydia, and trichomonas for the survey respondents. This gives the MDICP data an advantage (especially for the future) over other data sets in analyses of impacts of HIV/AIDS related deaths on household time allocation decisions. For the current analysis, the paper will use incidence of past deaths of adults as a proxy for the potential impact of deaths from HIV/AIDS since HIV/AIDS-related deaths will only be positively identified in MDICP4. There is some justification for using past deaths. Mortality analyses that were based on attrition due to deaths between 1998-2001 showed that adult mortality in the MDICP surveys tripled compared to mortality rates calculated for the period 1980-1990 using life tables published by the Malawi government (Weinreb and Doctor 2002, Doctor 2003). In these studies, verbal autopsies collected on causes of deaths for the respondents that died between 1998 and 2001 also show that about two-thirds of the deaths appeared to be HIV/AIDS related. However, biomarker data will provide current incidents of HIV/AIDS and STIs among the adolescents. This information will be used in conjunction with information on self-assessed current health. The adolescents also provided information on frequency of illness for each of the household members and whether the household members are currently seriously ill or not. A question on number of deaths that the

household has experienced in the past 3 years as well as the ages at which those deaths occurred was also asked. Such information will allow an analysis of impacts of current deaths (within past year) versus past deaths, within last two years.

The present analysis is limited to adolescent schooling because of data availability. A more thorough investigation would involve younger children as well. However, it is reasonable to expect that older children will bear a larger burden of the domestic, farm and off-farm work responsibilities, at the expense of their schooling, in the event of an illness or death shock in the household. For example, a preliminary analysis using a 1997-98 Integrated Household Survey (IHS) in Malawi showed that there were similar net enrollment rates for children aged 6 to 9 in households that had experienced a death compared to households that had not experienced a death in the past 12 months (84% versus 86%). However, for older children (those aged 10-14), the differences in net school enrollment rates were a little larger (86% versus 90%). Using the same IHS data, Nankhuni and Findeis (2003) also showed that children's work burdens increase linearly with age at the expense of their schooling. Therefore, we expect to find some evidence of this in the adolescent's sample.

Theoretical Framework and Empirical Estimations

The general framework of a household production model will be utilized, in which a household derives utility from consumption of its own produced goods and levels of education of its children. The household also has a household production function for children's education and home produced goods. The deaths affect the household productions through the effect on household income and time allocated to the household productions. In particular, it is expected that children in households that have experienced a death and have serious ill members will be more likely to work but less likely to attend school and more likely to spend less hours in school. These effects are expected to be gender specific due to gender-specialized nature of division of labor in Malawi (Nankhuni and Findeis 2003)

Cross-section analysis of MDICP3 data will involve estimating a series of models that explain how adolescent children's work and schooling (attendance and hours) are affected by incident of past deaths in the household, their own HIV/STI status, and the health status of other members of the household (as reported by the adolescent). This will involve estimating (1) bivariate probit models of school and work participation (farm, off-farm and domestic work) to correct for possible endogeneity of school and work choices for the child, (2) multinomial logit model for participation in the following alternative scenarios: school only, school and domestic work, school and economic work, school, economic work, and domestic work, and no schooling, (3) two-stage conditional maximum likelihood model of school attendance to account for effect of work hours on child schooling, (4) tobit models for different types of work (including schooling) that the adolescents are involved in, since we have censored work hours on these activities. These will be estimated for children aged 15 to18. Most of these children are still in school. For example, using nationally representative data, Nankhuni (2004) reported that 72% of the 15-18 year old Malawian children attended school.

Incidence and /or number of deaths in past 3 years in the household will be included among normal explanatory variables in these models. Impact of future anticipated deaths will be captured by including a dummy variable for incidence of frequent or currently seriously ill members in the household. Impact of the adolescent's own HIV and STI status will be captured through a dummy for HIV and STI positive adolescents. Other determinants of school enrollment and time allocation to schooling will include the child's characteristics (age, sex, orphan status, relationship to household head), household economic status (using information on the household's asset holdings), parental characteristics (household head's education status), and village and other community information (such as access to school).

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