The Impact of HIV morbidity and AIDS-related mortality on
Intra-household Time Allocation in rural Malawi

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Introduction

Malawi is one of the countries most seriously affected by the HIV/AIDS epidemic. It is the eighth hardest hit in the world, with an estimated prevalence rate of 14.2% at the end of 2003 (Population Reference Bureau 2005). HIV/AIDS is the leading cause of death among those aged 20-49 (Malawi Global Fund Coordinating Committee 2002) and it is estimated that the crude death rate would have been about half in the absence of HIV/AIDS (US Bureau of Census 2002).

AIDS morbidity and mortality are expected to have a large economic impact in Malawi since they reduce the time that adults can spend on income generating activities. However, because of the lack of data no systematic analysis has been carried out to evaluate the impact of HIV/AIDS on household time allocation in Malawi. In this paper, we take advantage of quantitative and qualitative data collected by the Malawi Diffusion and Ideational Change Project between 2004 and 2005 to achieve this goal.

Literature Review

Intra-household labor substitution is found to be an important coping strategy of illness-afflicted households to compensate for any production loss (Goudge and Govender, 2000; Weisbrod, 1973; Nur, 1993; Sauerborn *et al.,* 1996). In particular, Sauerborn *et al.* (1996) reported that intra-household labor substitution among healthy members was the most frequently chosen strategy to cope with anticipated production losses from illnesses in Burkina Faso. The ability to re-allocate labor among healthy members depends on several

characteristics of the household such as household size, dependency ratio and access to resources. Importance of intra-household time allocation analyses cannot be overemphasized. For example, Sauerborn *at el*. (1996) found that in the predominantly subsistence farming environment of Burkina Faso, much like Malawi, working as a wage laborer at the expense of working on own farm, was used as a last resort coping mechanism among households lacking assets, credit, and kin support. Beegle (2003) also found small but significant scaling back effects on cultivation of some farm crops in Tanzania due to incidence of an adult male death in the household.

These studies concentrated on analyzing general illnesses and deaths. However, few studies have attempted to analyze the role of intra-household labor substitution as a coping mechanism for HIV/AIDS-specific illnesses and deaths. Such analyses are important for quantifying socio-economic impacts of HIV/AIDS. In addition, HIV/AIDS-specific illnesses and deaths may have different impacts from other illnesses. For example, Beegle (2003) argues that HIV/AIDS deaths are preceded by *severe* debilitating illnesses that limit daily activities and that these illnesses are concentrated among the working group. Finally, future adult deaths after HIV/AIDS illnesses can easily be anticipated, inducing labor re-allocations even before the death.

Theoretical Framework

There is a large literature on the theory and determinants of labor supply, as well as empirical evidence bearing on the economics of time use in developing economies (see Juster and Stafford, 1991, for a review of this literature). Some of this research focuses on total or off-farm labor supply and response to wage rates or shadow wages in farming (Rosenzweig, 1980; Jacoby, 1993). Other work has examined time allocation across activities in agricultural households (such as Evenson *et al*., 1980; Khandker, 1988; Mueller, 1984; Skoufias, 1993). In these models, the solution to the utility maximization problem yields the conventional result that the reduced-form time-demand function for individual i in activity j will be a function of prices, wages, total time available and unearned income. Beegle (2003) has extended these models to incorporate mortality of household members by considering its effect through full income.

To evaluate the impact of HIV morbidity and AIDS mortality in rural Malawi, we adapt Beegle's approach to our cross-sectional data (described in the next section) and we estimate a time allocation model that can be formalized as follows:

$$T^j_i = \beta_0 + \beta_1 V_i + \beta_2 X_i + \beta_3 Z_h + \beta_4 D_h + + \beta_6 I_h + \upsilon_i + \upsilon_{hh} + \varepsilon_i$$

where T^j_i is the amount of time that individual i spends on a particular activity j; V_i is a vector of dummy variables which captures village-level characteristics (such as infrastructure); X_i is a vector of individual characteristics including age, education, and type of family arrangement; Z_h is a vector of household production characteristics, that include characteristics of the household head (age, sex, education) and asset mix measure (calculated using principal component analysis), D_h is a dummy variable for the incidence of a death in the household during the three years preceding the survey; I_h is a set a variables for the burden of illness in the household (constructed as detailed below); υ_i and υ_{hh} are individual and household time-invariant unobservables, respectively; and ε_{it} is an individual error term.

Data

The data for the study consists of quantitative and qualitative information collected by the Malawi Diffusion and Ideational Change Project (MDICP), a household panel survey that examines the role of social networks in changing attitudes and behavior regarding HIV/AIDS and other topics in rural Malawi.

Quantitative data. The quantitative data used in the present study come from the third wave of the MDICP, which was carried out in the summer of 2004 with approximately 4000 respondents. The survey for the first time included a biomarker testing component for HIV (Bignami-Van Assche et al., 2004) and a time allocation questionnaire section. A diary of work patterns for the working day preceding the interview was administered to all respondents, giving information on the number of hours spent on different activities from the time the respondent woke up until the time he/she went to sleep. Information from the time diary is used to calculate the respondent's time allocation in the following broad categories of work: own-farm, off-farm wage/non-wage employment, salaried employment, off-farm self employment, and domestic work. The

MDICP questionnaire also included a question on the number of deaths experienced by the household in the three years preceding the survey, as well as the ages at which those deaths occurred. This information is used to evaluate the burden of AIDS-related mortality for each household. Finally, information on health status of household members was derived from the biomarker data (for the respondent, if tested); from survey questions on self-reported health that were asked to the respondents with reference to themselves and other household members; and from information on frequency and seriousness of illness for each of the household members which was asked during the household interview.

Qualitative data. The qualitative data for the study come from a set of qualitative interviews with MDICP respondents that were carried out in the summer of 2005 under the supervision of Van de Ruit and Fleming. These interviews targeted HIV seropositive and HIV seronegative households, as well as households that had experienced a death between 2001 and 2004 and households who had not. Interviews were conducted to better understand: 1) narrative accounts of negative socioeconomic shocks, including ill health and death; 2) social outcomes (e.g. changes in livelihoods, family disruption and growing demands by extended kinship and community networks); and 3) coping strategies (e.g removing children from school, changes in livelihood strategies, and indebtedness). The qualitative data is thus used in this study to compare households of higher and lower socio-economic status in terms of the magnitude of household-level crises and coping strategies. Interviews were open ended, and interviewers returned at least twice to each of the families participating in this study. Van de Ruit and Fleming worked with the fieldworkers to develop culturally sensitive interview guides, and every effort was made to encourage rapport between fieldworkers and the families that participated in the study. Emphasis was placed upon the timing and sequence of events to explore the relationship between crises and their consequences. A time allocation survey was also collected from each member of the households included in the qualitative interviews to measure their contribution to daily activities, and qualitative commentaries about these activities were also recorded.

By exploiting various analytic methods with quantitative and qualitative data, we expect to contribute to an understanding of the impacts of HIV morbidity and AIDS-related mortality on intra-household time allocation in a highly AIDS-affected context.

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