Chapter 3

HIV/AIDS, Household Income, and Consumption Dynamics in Malawi

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Introduction

A survey of recent writings on the interactions between the AIDS epidemic and livelihoods in Africa leaves one with the impression that development practitioners, academics, and even casual observers of developments in Africa are hell-bent on pinning most of Africa's economic stagnation on the AIDS epidemic. This is all the more troubling because, although in the past 15 years economists have attempted to systematically link AIDS and poverty and to test the strength of those linkages, the relationships among livelihoods, poverty, and the AIDS epidemic remains so complex that we still know little about the actual contribution of AIDS in explaining observed cases of persistent poverty and divergent economic fortunes in Africa. For instance, a number of macro-level forecasts, from the pioneering studies (Ainsworth and Over 1992; Cuddington 1993; Cuddington and Hancock 1994) to more recent ones (e.g., Bloom and Mahal 1997; Greener, Jefferis, and Siphambe 2000; Arndt and Lewis 2001; Haacker 2002; Crafts and Haacker 2003) have generated an almost universal consensus that the AIDS epidemic will have an immense impact on the macroeconomies of hard-hit countries, significantly slowing economic growth and worsening poverty and income distribution (also see summaries in UNFPA 2002; UNAIDS 2002). Yet recent experience seems to suggest that because the HIV population is still a relatively small proportion of the total population, even in hard-hit countries, macro-level economic impacts of AIDS are likely to be barely visible in national statistics (Desbarats 2002).

In contrast, relatively more worthwhile efforts have been made at the micro level, where a number of studies have systematically investigated the link among

the AIDS epidemic, rural livelihoods, and the socioeconomic systems through which those livelihoods are embedded and mediated (see summaries in Haddad and Gillespie 2001; Loevinsohn and Gillespie 2003; Gillespie and Kadiyala 2005). However, although these studies have managed to impose some structure on our understanding of the linkages between AIDS and livelihoods, to date the underlying causal processes are still poorly understood and, with few exceptions, not formulated in precise ways. More importantly, the divergence of findings, positions, and policy implications from these studies seems to highlight the difficulty attendant to any attempt to disentangle the economic stagnation that may be caused by the AIDS epidemic from that produced by a host of other debilitating features of the African landscape such as missing or imperfect factor, product, and financial markets or reliance on rain-fed subsistence agriculture. Yet the design of appropriate public policies depends critically on this knowledge.

This chapter seeks to examine the pathways through which the AIDS epidemic can cause poverty traps in rural agrarian households. A poverty trap is defined as any self-reinforcing mechanism that causes poverty to persist (see Azariadis 1996). Poverty traps do not refer to situations in which it is simply difficult to escape low incomes but to a situation where the evolution of household wealth or well-being is governed by a path-dependent process such that, depending on initial conditions, otherwise identical individuals or households may remain for long periods of time (if not indefinitely) "locked into" poverty or affluence. A key characteristic of a poverty trap is that "good" and "bad" outcomes are self-enforcing, so that small interventions or chance events will not alter the long-term outcome. Using data from the Malawi Integrated Household Survey (GOM 2000) and the Complementary Panel Survey (CPS) of 2000–02, this chapter seeks to capture how the AIDS epidemic can create conditions such that negative economic shocks can cause previously nonpoor households to become poor and to stay poor indefinitely or cause moderately poor households to fall into persistent destitution.

HIV/AIDS as a Possible Source of Poverty Traps

There are a number of pathways through which HIV and AIDS can cause a farm household to fall into perpetual poverty. First is the AIDS-expectations pathway. Because the probability of death from AIDS is unity, knowledge that a household member is infected with HIV inevitably changes the affected household's sense of time–preference, which in turn impacts its intertemporal resource allocation and utility maximization. Knowledge that a household member is infected with HIV will reduce the expected return from various social and economic investments and force affected households either to trade off lower risk for lower return or to heavily discount investments with long-term returns for current consumption. The second

pathway works through labor productivity. HIV-linked illnesses or AIDS affect the health and productivity of those infected with the virus because a person suffering from debilitating HIV or AIDS is unable to do a full workload, resulting in reduced income and reduced capacity for future production. Moreover, HIV-linked illness and AIDS have a depressing effect on the productivity of healthy people because of the absenteeism caused by caregiving or attending funerals. These effects can also conspire to trap a household in perpetual poverty through either diversion of productive resources toward caring for the sick, reductions in household income as a result of illness, or the death of a breadwinner (see Serpell 1999; Bollinger et al. 1999).

Another pathway is through physical capital. The accumulation of voluntary savings and access to reasonable credit has never been easy for the poorest sections of African communities, and seldom has it been easy for women. Yet HIV/AIDS has made it harder. When faced with the costs associated with increase in morbidity and mortality from AIDS, households cope by using up savings, taking additional debt at penal rates of interest, or searching for additional sources of income. However, when households deplete their savings and exhaust debt sources, the next step in the course of impoverishment is to dispose of unproductive assets before ultimately disposing of productive assets such as land, draft animals, and equipment, that is, disinvestment and a nonreversible strategy. The fourth pathway is through vulnerability. Even when HIV-linked illness or AIDS does not immediately throw a farm household into poverty, it nonetheless increases the likelihood of livelihood collapse from other shocks. A characteristic of rural livelihoods across Africa is covariance of risk. Because households rely on rain-fed subsistence agriculture to derive their livelihoods, alternative income-earning opportunities open to farm households in particular locations exhibit high correlation between risks in returns attached to them. Reliance on rain-fed subsistence agriculture renders most farm households vulnerable to the risk of livelihood collapse in the face of weather-related shocks such as droughts or floods because these shocks simultaneously affect all income streams available to the household, be it own-farm or income from casual employment on other people's farms. As a shock, HIV/AIDS might be expected to increase the risk of income failure overall by diluting the diversity of household portfolio and to increase intrayear income variability by amplifying covariate risks and sensitivity of livelihood outcomes.

Poverty and HIV/AIDS in Malawi

Malawi presents a classic example of how untimely action and policy contradictions can provide a catalytic environment for faster spread of HIV and entrenchment of poverty. Although agriculture is the backbone of Malawi's economy, accounting for

40 percent of GDP and 85 percent of exports and formal employment, recent studies suggest that half of all farm households are food insecure, and 60 percent of farm households earn incomes below the official poverty line (GOM 2000). This is because until 1990 the agricultural sector was characterized by the coexistence of estate and smallholder sectors, which were differentiated by land tenure and regulations concerning the production and marketing of different crops. The estate sector was characterized by relatively capital-intensive production of export crops, such as tobacco, tea, and sugar while the smallholder sector was oriented toward subsistence production, accounting for 80 percent of food production. Under the Tobacco and Special Crops Act of 1972, smallholder farmers were prohibited from growing burley tobacco, a labor-intensive cash crop whose expansion underpinned Malawi's high growth rates of the 1960s and 1970s (World Bank 1994). Whereas estate output was marketed at the auction floors at farm-gate export parity prices, smallholder output was marketed through the Agricultural Development and Marketing Corporation (ADMARC) (Kydd and Christiansen 1982). Land cultivated by estates is privately owned (freehold land) or leased from the state on long-term leases (leasehold land), whereas land cultivated by smallholder farmers is governed by customary law (Diagne and Zeller 2001).

In the grand scheme of things, it was assumed that the relationship between the estate and smallholder sectors would be mutually beneficial or benign at worst, as smallholder farmers would benefit from technological spillovers and income diversification from estate employment while at the same time alleviating pressure on their own land (T. Mkandawire 1999). In reality, Malawi's agricultural policy resulted in an agriculture sector with a dual structure, involving a few thousand commercially oriented estates with privileged access to credit and extension and producing for export markets, on the one hand, and a smallholder sector with nearly 2 million farm households producing mainly for subsistence, on the other (GOM 1995). The lack of access to grow cash crops coupled with a lack of appropriate high-yielding food technologies and inadequate supplies and use of inorganic fertilizer reduced the real rate of return to smallholder agriculture, thereby increasing distributional inequity between the estate and smallholder sectors (Kydd and Christiansen 1982; Pryor 1990).

A national economic soul-searching subsequently concluded that "a lack of viable cash crop was keeping rural people poor . . . and that burley tobacco, a crop that is labor intensive and well suited within the smallholder farmers' technical ability, could enable smallholders to participate in the cash-crop economy" (M. Mkandawire 1999). However, implicit in the explanation of agriculture's redefined role in achieving the dual objective of promoting economic growth and rural poverty reduction was an understanding that smallholder agriculture needed to undergo a

process of liberalization and commercialization. Under this framework, two scenarios have come to characterize Malawi's poverty alleviation strategies in the 1990s: the Green Revolution and burley tobacco liberalization (Orr and Orr 2002). Under the Green Revolution scenario, poverty alleviation is premised on growth in smallholder income, which, in turn, is predicated on increasing the production of maize, by far the most important crop in terms of area cultivated, number of growers, and food security. To this end, a program of large-scale distribution of free fertilizer and hybrid maize was implemented under the umbrella of the Starter Pack, a targeted input program that supplies farm households with free improved seed and fertilizers (Orr and Orr 2002). Poverty alleviation through burley tobacco liberalization is based on removal of the long-standing legal and institutional constraints that precluded smallholder farmers cultivating on customary land from growing burley tobacco. According to the World Bank, "the objective of this element was to allow smallholders access to a broader means of increasing their incomes, in order to reduce poverty and, simultaneously, provide farmers with a means of financing the intensification of their maize production" (World Bank 1994, p. 14). To this end, under the World Bank–funded Agricultural Sector Adjustment Credit (ASAC) of 1990, the production of burley tobacco by smallholder farmers on customary land was first permitted on a pilot basis during the 1990/91 growing season.

It was during this time of structural transformation and policy uncertainty that HIV/AIDS waylaid the Malawi population with disastrous consequences for household structure (Floyd et al. 2003), agricultural production and rural livelihoods (Bryceson, Fonseca, and Kadzandira 2004; Harvey 2004), and provision of public services, especially in the ministries of health and education. Since the first case of AIDS was diagnosed in 1985, epidemiologic evidence portends an escalating epidemic. In samples of pregnant women attending antenatal clinics in urban Blantyre, HIV seroprevalence rose from 2.6 percent in 1986 to over 30 percent in 1998, decreasing only slightly to 28.5 percent in 2001. According to the latest national data from UNAIDS/WHO (2004), adult HIV prevalence (15–49 years) in Malawi is estimated at 14.2 percent, with a total of 900,000 adults and children living with HIV. Annual deaths caused by HIV/AIDS are estimated at over 83,000, amounting cumulatively to 555,000 deaths since 1985 (National AIDS Commission of Malawi 2001). In addition, HIV has also increased crude death rates from tuberculosis and other opportunistic diseases.

The extent to which HIV/AIDS and livelihoods are intricately intertwined is exemplified in two recent studies. In explaining the 2001/02 famine in Southern Africa, de Waal and Whiteside (2004) cite the case of Malawi as typifying the new variant famine thesis. They argue that unlike past famines, which could be explained in terms of drought or breakdown of entitlement systems, the HIV/AIDS

epidemic was the major factor explaining why many households faced food shortages and few were able to recover in the most recent famine. In contrast, Bryceson and Fonseca (2005) argue that actually it is poverty and famine that may be the major drivers of the spread of the HIV/AIDS epidemic in Malawi. They observe that during the famine period, because of inadequacy of traditional coping mechanisms, farm households on the margin of destitution were forced to adapt and broaden the scope of long-established traditional coping strategies to include risky coping strategies such as transactional sex.

Data and Methodology

In order to explore the differential impact of negative economic shocks on HIV/AIDS-affected and nonaffected households, we use a panel survey of Malawian households. We use data from the Malawi Integrated Household Survey (GOM 2000) and the Complementary Panel Survey of 2002. The IHS was a nationally representative survey implemented between September 1997 and October 1998 by the Malawi government's National Statistical Office in collaboration with the National Economic Council and the Center for Social Research with technical assistance from the International Food Policy Research Institute. The IHS was administered in two parts. The first involved a large questionnaire administered to respondent households on a single visit, consisting of a dozen modules including those on household composition, educational attainment, health and nutritional status, agriculture, and home-produced and purchased consumption items. The second part was an expenditure diary, maintained over a period of 14 days by literate household heads or through twice-weekly visits by enumerators to the survey households to record any expenditure since their previous visit. Although the survey was administered to 12,960 households, only 6,586 households were adjudged to have reliable consumption and expenditure data. For the CPS, four rounds of additional survey were administered between January 2000 and September 2002 on a subsample of 758 households selected from the 6,586 households enumerated in the IHS. Unfortunately, rather than derive a panel of data, the four rounds collected different modules of data that complemented the IHS but were not repeated. Only CPS round 4 attempted to collect consumption and expenditure data that were comparable to those in IHS.

Measurement of Household Welfare

In the analysis that follows, we use an expenditure-cum-consumption-based measure of household welfare. The use of an expenditure- and consumption-based

measure rather than an income-based measure was motivated by two factors. First was the recognition that expenditure and consumption are smoother measures of welfare than income. Because farm households are wholly dependent on rain-fed agriculture, income is lumpy and seasonal as farm households receive a large lump-sum amount after harvest and little else during the year. Second, given the subsistence nature of rural livelihoods and that a lot of exchange of goods and services takes place outside markets, income understates the value of goods and services consumed by the household. To adjust for the effect of inflation and also fully account for market-based and non-market-based dimensions of household welfare, our measure of welfare is expressed in real terms with the value of consumption normalized to the April 1998 base and is made up of four components:

- Total food consumption: imputed value of all food consumption reported by the household, normalized to a daily consumption of individual food items.

- Total nonfood, non-durable-goods expenses: a daily value in Malawi Kwacha was determined for all nonfood, nondurable goods consumed by the household including the value of outgoing income transfers.

- Estimated use-value of durable goods such as vehicles, furniture, appliances: the value was derived using an imputed value of daily rental rate for each good. The rental rate was computed by taking into account the rate of depreciation for an item, the opportunity cost locked up in the durable good, and the replacement cost of the durable good. The formula is given as: UseValue = current replacement value*((interest rate + depreciation rate) /(1 – depreciation)).

- Actual or imputed value of housing for the household

Table 3.1 summarizes household characteristics and welfare measures for our sample. The top section of the table shows that about 22 percent of all households reported an AIDS-related death. The mean household size among HIV/AIDS-affected households is larger than the nonaffected one, suggesting that household members may have been relocated within the extended family system. Both in 1998 and 2000, the HIV/AIDS-affected households in the sample appear relatively better-off than the average household in the sample, from the viewpoint either of per capita daily expenditure or per capita monthly income. Although, two-thirds of all households in the sample experienced some negative economic shock between 1998 and 2000, the data seem to indicate that HIV-affected households were better able to cope with shocks than nonaffected households. For instance, whereas

Table 3.1 Household characteristics and welfare dynamics in Malawi

Household characteristic	Affected households	Nonaffected households	All households
Demographics			
Mean household size	5.38	5.12	5.18
Female-headed households (%)	14.00	22.00	20.00
Mean age of household head (years)	42.62	43.81	43.55
Dependency ratio	0.44	0.48	0.47
Mother's mean years of education	4.43	3.35	3.59
Maximum years of education in h/hold	5.45	4.50	4.71
H/holds where relative died of AIDS (%)	100	0.00	22.34
Welfare dynamics			
Per capita daily expenditure, 1998 (MKwacha)	14.66	13.20	13.52
Per capita daily expenditure 2002 (MKwacha)	21.32	18.02	18.75
Per capita monthly income 2002 (MKwacha)	184.01	115.33	130.67
H/holds that experienced economic shocks (%)	60.00	59.73	59.79
H/holds dropped 2+ welfare quintiles (%)	12.31	17.70	16.49
H/holds rose 2+ welfare quintiles (%)	24.62	16.37	18.21
Productive activity			
Per capita acreage cultivated (hectares)	0.55	0.46	0.47
Household grows hybrid maize (%)	35.00	38.00	37.00
Household grows tobacco (%)	15.00	14.00	14.00
Household uses fertilizer (%)	30.77	33.19	32.65
Value of inputs used (MKwacha)	1,355.67	937.53	817.27
Per capita livestock value (MKwacha)	314.94	254.64	268.10
Employment			
H/hold head is employer (%)	0.00	0.00	0.00
H/head is self-employed (%)	43.00	41.00	41.00
H/hold head is employee (%)	51.00	48.00	48.00
H/hold member employed by government (%)	17.00	8.00	10.00
H/hold members with agric occupations (%)	40.00	36.00	37.00

about 18 percent of nonaffected households dropped by two or more welfare quintiles between 1998 and 2000, only 12 percent of households affected by HIV/AIDS experienced a welfare decline of two quintiles or more. Similarly, whereas 24 percent of households affected by AIDS improved in welfare by over two welfare quintiles, only 16.37 made any welfare gains in the rest of the population. We hypothesize that these counterintuitive statistics arise from the fact that although both groups have roughly the same proportions in employment, for some reason, HIV/AIDS-affected households in the sample had twice as many household members with government jobs as the rest of the sample. Alternatively, because most people dying of HIV/AIDS are from the city, on death, the recipient households in

the rural areas inherit both members and some property, which raises both household size and, for people living on the margin of destitution, household welfare.

Retrospective Measurement of Shocks

In the module on shocks, household heads were asked whether they had experienced any of a set of events during the previous 2 years (i.e., 1999 and 2000). These shocks included events affecting individuals within or connected to the household (e.g., death, serious illness, injury, or loss of a job), property losses suffered by the household (e.g., through theft, crop failure, loss of livestock, or business failure), and declines in resource flows to the household (e.g., decline or cutoff in private or government remittances). In addition, the module also attempted to assign a value to the economic loss each event caused. For each event that occurred, the household provided information regarding (1) the year it occurred, (2) duration in months, (3) the monthly decline in household income, (4) the total once-off expenditure, and (5) the value of items lost.

Table 3.2 provides the frequency distribution of the various shocks reported for the 758 households. The evidence shows that the most commonly reported shock was death of household member (30.4 percent) followed by widespread death or loss of livestock (23.5 percent) and serious illness or injury. The last two columns show the monetary impact of these shocks. In the fourth column we report the average once-off payment associated with these shocks, and in the last column we present the total cost, which comprises the once-off cost and additional costs such as loss or reduction in income attributable to the shock and additional expenses incurred to cope with the shock. According to the research design, death of a household member, from whatever cause, has a once-off expense, in contrast to most of the other commonly occurring shocks, which have both once-off expenses

Table 3.2 Incidence of negative economic shocks in rural Malawi

Event/shock	Frequency	Percentage	Once-off expense (MKwacha)	Total expenses (MKwacha)
Death of relative or family member	189	30.4	985	985
Widespread death of livestock	146	23.5	850	1,961
Serious illness or injury	113	18.2	1,805	3,509
Major crop failure	95	15.3	101	3,375
Theft, fire, or destruction of property	36	5.8	200	9,596
Bankruptcy	23	3.7	5,739	7,170
Abandonment/divorce	13	2.1	0.0	234
Other	5	0.8	0.0	1,200
Total	622	100		

Table 3.3 Coping mechanisms to shocks among rural households in Malawi

	Percentage of households that			
Event/Shock	Sold assets	Borrowed	Were assisted by community	Used insurance
Death of relative or family member	24.46	20.11	29.57	0.00
Widespread death of livestock	0.00	1.40	3.47	0.00
Serious illness or injury	33.63	14.16	21.24	0.00
Major crop failure	7.45	10.64	17.20	2.17
Theft, fire, or destruction of property	2.78	2.78	13.89	0.00
Bankruptcy	18.18	18.18	9.09	0.00
Abandonment/divorce	0.00	7.69	15.38	0.00

and protracted coping expenses. Bankruptcy has the largest once-off expense, and loss of property (mostly tobacco) to fire or theft was the costliest.

As might be expected, households' coping strategies and the nature of social support tend to be functions of the shock. Table 3.3 shows that whereas in the case of death of a family member, 24 percent of affected households used up savings they had previously accumulated, and 20 percent entered into fresh debt, the single most important coping mechanism was community assistance (30 percent). In contrast, following serious illness or injury, the largest number of households used up savings, and relatively lower proportions got community assistance or sank into debt. The data show that social support systems in rural Malawi generally give priority to health-related human misfortunes but much less emphasis on bailing out those afflicted by economic or nature-induced shocks. This has to be understood in the context of covariance of risk in the rural setting. For instance, in the case of widespread death of animals, there is virtually nothing the household and society did other than sympathize. Similarly, in the case of major crop failure, everyone was facing the same predicament, and therefore no one stood ready to assist another. The last column shows the total absence of rural financial markets for insurance against these shocks.

Empirical Estimation and Results

Because hysteresis is very important in subsistence economies, current-period livelihood outcomes (whether incomes or expenditures) invariably depend on past-period realizations. To implement this notion of state dependence, let the income for household i in period $t-1$ be $Y_{i,t-1}$, and other household characteristics $X_{i,t}$, map into income in period t through an income transformation function given by

$$Y_{i,t} = f(Y_{i,t-1}, X_{i,t}) \tag{4.1}$$

An equilibrium in this model is a steady-state solution that varies with $X_{i,t}$ such that $Y = f(Y, X_{i,t})$. If there is more than one solution, the notion of multiple equilibria requires the existence of at least one unstable equilibrium and thus of increasing returns for a lower range of Y. A poverty trap occurs if there exists a low-level attractor in the growth process so that a group of households converges to a lower equilibrium. The challenge then is to find a functional form for the production function that gives a smooth nonlinear relationship between $Y_{i,t}$ and $Y_{i,t-1}$ and also allows for multiple equilibria. Following Lokshin and Ravallion (2004), we use a partial adjustment model with a cubic function of the form

$$\ln(Y_{i,t}) = \gamma_0 + \gamma t + \sum_{m=1}^{3} \ln(Y_{i,t-1}) + \beta \ln(X_{i,t}) + \varepsilon_{i,t} \tag{4.2}$$

To understand the implication of this functional form, notice that a shock to household income in time $t-1$ transmits to household income in time t through the derivative $\partial Y_t / \partial Y_{t-1}$. Moreover, for any equilibrium (e) defined by $Y_t = Y_{t-1}$, that equilibrium is unstable if $\partial Y_t / \partial Y_{t-1}(e) > 1$. Third, the speed of recovery (i.e., the extent to which a shock is not passed on) can be captured by $1 - \partial Y_t / \partial Y_{t-1}$.

Table 3.4 reports regression results manifesting the differential impacts of economics shocks to rural households, again distinguishing between HIV-affected households and those not directly affected. Although all variables included in the model are considered important, our analysis will concentrate only on the evidence for persistence of shocks and poverty traps. To that end, we must first establish whether expenditures and income in 2002 depend on income in 1998. Results in columns *b* and *c* suggest that past incomes have no impact on subsequent period expenditures in either type of household. In fact, of all household controls, only three are statistically significant. In AIDS-affected households, household expenditures seem to increase with the age of the household head, whereas economic shocks and the per capita amount of land cultivated seem to have a significant negative effect on expenditure. We hypothesize that there is a negative impact on expenditure/consumption because AIDS necessitates changes in household consumption and investment behavior. HIV/AIDS reduces food availability (through falling production and loss of family labor), reduces access to food (through declining income for food purchases), and reduces the stability and quality of food supply through shifts in labor to less labor-intensive production (Topouzis 2003). The fact that economic shocks have a negative impact on consumption/expenditure in AIDS-affected households seems to validate our null hypothesis. This is principally because HIV/AIDS-affected households are less able to adjust to shocks that require labor time to

Table 3.4 Determinants of household income and welfare in rural Malawi

	Per capita total expenditure		Per capita total income	
Variables (a)	Households with AIDS death (b)	Nonaffected households (c)	Households with AIDS death (d)	Nonaffected households (e)
Constant	–1.414	3.469	7.001	–1.310
	(2.2624)	(1.568)	(7.206)	(3.452)
Lagged income	–0.236%	–0.601	–17.119*	2.669
	(3.366)	(1.797)	(9.245)	(3.956)
Lagged income squared	0.350	0.165	7.615*	–1.085
	1.516)	(0.748)	(4.164)	1.647)
Cube of lagged income	–0.049	–0.007	0.958	0.163
	(0.215)	(0.099)	(0.590)	(0.217)
Economic shock	–0.535**	0.252	0.376	0.791***
	(0.265)	(0.389)	(0.727)	(0.302)
Female-headed household	0.054	0.144	–1.742	–0.913
	(0.479)	(0.205)	(1.316)	(0.451)
Age of household	0.973**	(0.229)	0.821	–0.031
	(0.389)	–0.104	(1.068)	(0.503)
Dependency ratio	–0.332	–0.249	3.197*	–1.154*
	(0.663)	(0.299)	(1.820)	(0.659)
Per capita acreage cultivated	–0.381**	0.143	–0.491	–0.446**
	(0.192)	(0.099)	(0.528)	(0.219)
Value of livestock per capita	–0.018	0.078***	–0.401***	–0.131**
	(0.047)	(0.024)	(0.128)	(0.052)
H/hold head is employed	–0.471	–0.067	2.278	3.172***
	(0.697)	(0.270)	(1.913)	(0.594)
H/hold head is self-employed	–0.559	–0.099	0.181	0.829
	(0.730)	(0.290)	(2.006)	(0.637)
Household grows tobacco	0.186	–0.407**	0.309	0.690*
	(0.332)	(0.169)	(0.912)	(0.372)
Adj. R^2	0.277	0.211	0.484	0.395

Notes: Standard errors in parentheses. *, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.**

be switched between different activities. In addition, this may also reflect the fact that, because of underdeveloped or nonexistent formal credit markets, the loss of family and friends may also spell the end of access to informal, affordable credit and hence higher vulnerability.

Among households not directly affected by AIDS, per capita expenditure is a positive function of the value of livestock and a negative function of participation in tobacco. Livestock has a positive impact on nonaffected households because in the absence of death and illness, rural households can kill or sell livestock to bridge any financing gaps and smooth expenditure and consumption. In contrast, tobacco

has a negative impact on consumption and expenditure because tobacco season takes some 9 months, and the income is lumpy and comes with considerable time lag. Thus, for much of the cropping season, tobacco households tie up their capital and are unable to smooth expenditure and consumption.

However, the last two columns show more interesting results. Column *d* presents evidence of possible existence of poverty traps among households that experienced an AIDS death. The coefficient on lagged income is negative and statistically significant (albeit at the 10 percent level) and suggests path dependence between current income and lagged income. In addition, there is a significant positive relationship between current income and the square of past income. However, the choice of the cubic specification of the production function is rejected because the polynomial variable in the third degree is not significant. The results would yield the following empirical version of the partial adjustment model:

$$Y_t = -17.119\,Y_{i,t-1} + 7.615\,Y_{i,t-1}^2 - 79.855 \tag{4.3}$$

where the additional variables have been set at their respective means.

Three aspects of these results are important. First, equation 4.3 yields an equilibrium income per capita per month at $Y_t = Y_{t-1} = MK92.75$, which is equivalent to half the AIDS-affected households mean per capita income absent any negative shocks (MK184.01). The equilibrium income is also lower than the mean income in the entire sample, even that among nonaffected households. Second, because a shock to income in the previous period transmits to current income through $\partial Y_t / \partial Y_{t-1}$, the equation implies that following a shock to income, AIDS-affected households may take up to 18.12 months to fully adjust before finally settling at the lower equilibrium. In contrast, results in column *e* show no evidence of path dependence among households that were not affected by HIV/AIDS-related death. Neither the coefficient on lagged income, its square, nor its cube is statistically significant. In fact, per capita incomes for nonaffected households are a negative function of economic shocks, dependency ratio, the per capita amount of land cultivated, and the value of livestock. Per capita income is likely to increase if the head of the household is employed or if the household is engaged in cash cropping, such as tobacco.

Conclusion

This chapter set out to investigate the existence of poverty traps among households that experienced an AIDS death. Specifically, we sought to examine whether AIDS-affected households respond differently to negative economic shock from

nonaffected household. In other words, does AIDS increase a household's vulnerability to the extent that a negative shock to income could throw previously nonpoor households into perpetual destitution? Our most significant finding is that in households that were affected by AIDS, a shock to income will last about 18 months and take the affected household to a lower-than-average equilibrium monthly income of MK92.75. However, it remains unclear if these responses and adjustments after a shock are better or worse than for nonaffected households because there is no evidence of path dependence and poverty traps among the nonaffected households.

Our results have both normative and positive policy analytic implications. At the positive level, we now have an idea regarding the nature of commonly occurring shocks and how they affect the households' livelihood outcomes and strategies. In addition, we also know the transitional dynamics of both income and expenditure in affected and nonaffected households following a negative shock. At the normative level, a proper understanding of the link between the AIDS epidemic and poverty traps is important because poverty traps may help explain why the poor remain so even when historical structural impediments to their advancement are attenuated and long after the playing field has been leveled. Second, large policy interventions may have long-lasting impacts, whereas the impact of small interventions may quickly die out. A policymaker designing a program on poverty reduction needs to recognize that HIV/AIDS-related illness and death is a shock like no other. Besides being a shock in itself, it also creates conditions that heighten household vulnerability, causing previously nonpoor households to become poor and stay poor indefinitely or cause moderately poor households to fall into persistent destitution. As a result, to lever AIDS-affected households from poverty might require some adjustment to a poverty reduction model principally designed for all households.

Two caveats are in order. First, the survey years for the IHS, 1997/98 and the CPS 2000/02 included years of plenty (1998) and famine (2001/02). Although the measures of welfare were temporally and spatially adjusted to control for differences in prices, adjustment were not made for nonnormal weather conditions. It is very likely that our results are also capturing income and expenditure patterns that are more reflective of coping and survival behavior than steady-state expenditure and consumption behavior. Second, there is a nonnegligible possibility of attrition bias in the sample. Because by design the respondent was usually the household head, households where the respondent died from AIDS or any other disease would automatically be removed from the survey. Thus, the so-called AIDS-affected households in the sample are those where someone other than the respondent died. This likely introduced downward bias in the measured impact and may explain

why the average numbers seem to suggest that AIDS-affected households were not only well off but also better able to cope with shocks than average households in the sample. The most ideal approach would have been one that, rather than use all households affected by HIV, purposively select and compare those households where the breadwinner died with the other HIV/AIDS-affected and nonaffected households.

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