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**AIDS-induced Orphanhood as a Systemic Shock:
Magnitude, Impact and Program Interventions in Africa**

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Abstract.

The AIDS crisis has swelled the number of orphans at risk, changed the nature of risks faced by households and communities, expanded the human development agenda of many African countries, and may threaten the care-giving capacity of communities. This paper begins with a brief overview of the Regional situation with respect to the crisis of orphans. It then examines the impact of orphanhood on education and health outcomes in Uganda. The paper argues that to the extent sectoral policies are inclusive and equitable, orphans may not confront discrimination, as is the case with education enrollments in Uganda. But where sectoral policies are inadequate, orphans suffer from a distinct disadvantage. In Uganda, orphans' health and nutritonal status is worse than that of non-orphans. While fostering by the extended has been the mainstay in Uganda, the paper shows that it is not an unmixed blessing. Fostering households consume less, save less and invest less, with serious implications for aggregate savings and investment in the economy. The paper shows that, even though general policies have had a pronounced impact on foster children, they were not sufficient to prevent an erosion of investment and thus the long-term prospects faced by such households. A more integrated approach to mitigate the orphans crisis might thus be called for although our analysis suggests that the costs of mounting such an effort are not negligible: tentative estimates suggest that assistance to families fostering 20 percent of the critical vulnerable group (maternal orphans and double orphans) would require an annual investment of about \$300 million.

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AIDS-induced Orphanhood as a Systemic Shock: Magnitude, Impact and Program Interventions in Africa

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1. Introduction.

In the past, vulnerable children comprised largely of street children, children exposed to strenuous labor, children engaged in trafficking, and children affected by armed conflict. The AIDS crisis has swelled the number of children at risk, changed the nature of risks they face, expanded the human development agenda of countries, and is beginning to threaten the care-giving capacity of communities. Will it also threaten the capacity of governments to handle the crisis? Is the crisis of orphanhood so serious as to become a systemic shock? This paper addresses these questions. The paper is organized as follows. The next section provides a Regional overview of the crisis of orphans in Sub Sharan Africa. A case study of the impact of orphanhood on orphans themselves, households fostering orphans, and the economy is attempted in section 3. The next section explores the role of interventions and public action in mitigating the crisis of orphans. The last section offers some concluding remarks and implications for policy.

2. The Orphans crisis and Impacts: A Regional Overview²

The magnitude. Unfortunately, statistics on orphans often reflect inconsistent definitions. Three definitions are used in the literature: *maternal orphans* are children under 15 years of age whose mother has died; *paternal orphans* are children under 15 whose father died; and *double orphans* are children under 15 who have lost both parents. While the major cause of death of parents is the AIDS pandemic, armed conflict is an additional factor causing the death of adults in some countries. We have some estimates for AIDS orphans – by far the largest group. The estimates are based on a number of known and assumed parameters: the age pattern of HIV/AIDS infection, the age pattern

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² For a comprehensive Regional overview, see K. Subbarao et. al. (2001).

of fertility, the perinatal transmission rates, the average survival time after infection, the mortality rate for those under 15 (for orphans and non-orphans), the morality rates for adults from other causes, and the population distribution by age and sex.

In early 1980s barely 2 percent of African children were orphaned (i.e., children under age 14 who have lost one or both parents). That proportion has now reached 15-17 percent in some countries (see Table 1). Recent estimates for Sub Saharan Africa Region as a whole placed the cumulative AIDS-orphaned children (maternal and double, but excluding paternal) at 12 million in 2000 (USAID). For some countries, DHS surveys provide an additional source for estimating the number of orphans. A recent DHS survey estimates that every fourth family in Uganda is hosting an orphan. The total number of orphans in that country is estimated to be between 1.4 – 1.7 million, a very high number compared to its total population of 21 million.

Table 1
AIDS Orphans and the Dependency Ratio in Selected Countries

Country	AIDS orphans, 2000		Age dependency ratio, 1998
	Estimated number	Percentage of total population aged 0–14	
Botswana	66,000	10	.82
Burundi	230,000	7	.94
Côte d’Ivoire	420,000	6	.87
Kenya	730,000	6	.90
Namibia	67,000	9	.84
Uganda	1,700,000	15	4.0
Zambia	650,000	15	3.0
Zimbabwe	900,000	17	.80

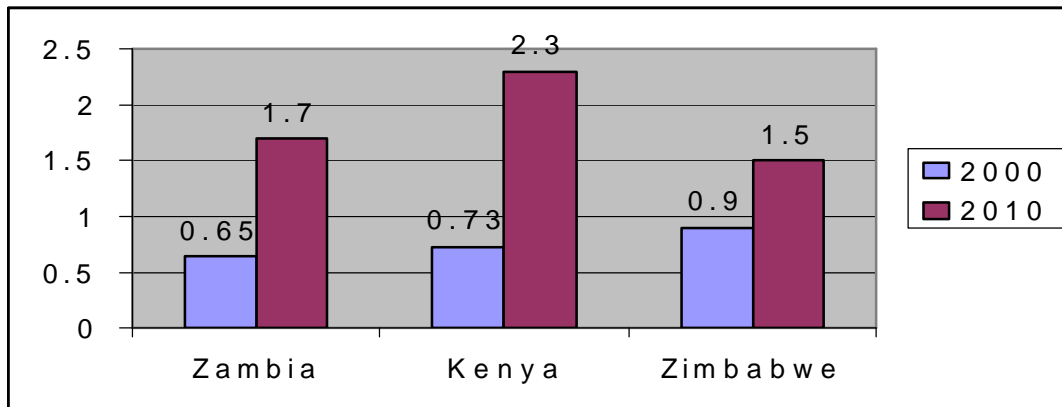
Sources: UNAIDS (2000); World Bank (2000c).

Projections of orphans are alarming (see Figure 1). In Zambia, for example, the number of orphans is expected to increase from 650,000 now to 1.7 million by 2010. Many countries, such as Cote d’Ivoire and Nigeria, have not yet reached the peak of the epidemic, and more and more people are being infected. By the year 2010, USAID

estimates that there will be 35 million AIDS orphans in the African continent. To this must be added the number of orphans due to other causes, conflicts in particular.

Figure 1

Current Estimates and Projections of AIDS Orphans in Selected Countries



Source: World Bank (2000b).

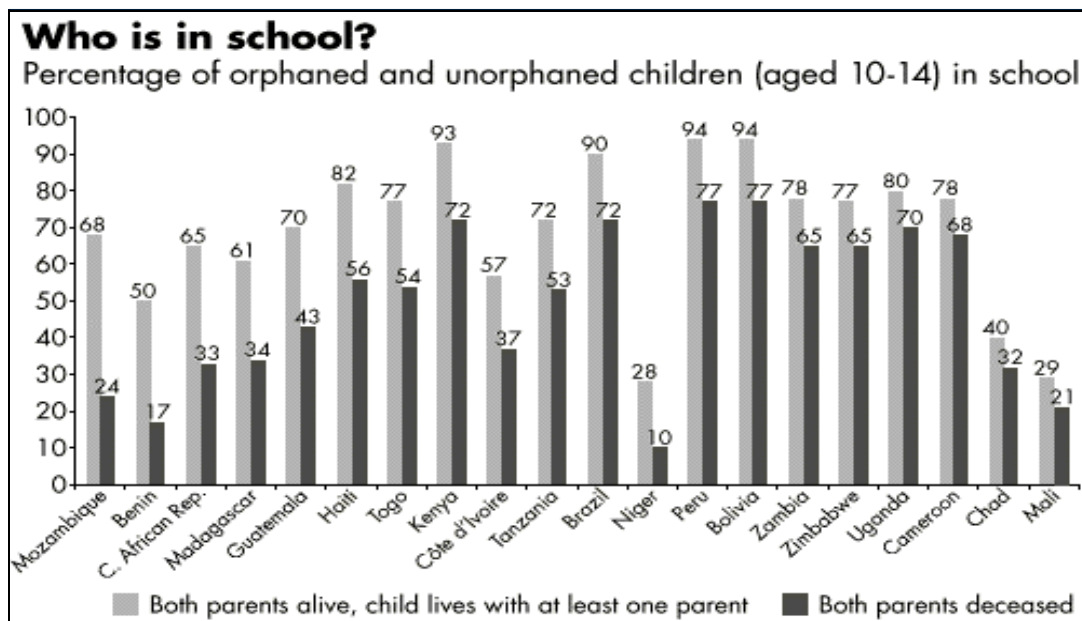
Impact of the crisis: Educational outcomes. The impact of the orphans crisis in Africa is being felt on households and communities and, due to the sheer numbers involved, it is also being felt as a systemic shock on the economy. At the household and community level, the immediate impact has been a drop in school enrollment for orphans. Data assembled by the UNICEF for 1994-99 shows that there exist systematic differences in enrollments between children with both parents dead, and children with one or both parents alive (see Figure 2). Recent data collected by UNICEF on over 10,000 children in Burundi confirms that a significantly lower percentage of children with both parents deceased are in school, compared with children with both parents alive (see Table 2). Thus, at the national or macro level, the orphan crisis poses a challenge to preserve Africa's human capital assets for the future.

Health costs. Research by Martha Ainsworth (1992), and Marth Ainsworth and I. Semali (2000) has shown that the loss of either parent and deaths of other adults in the household worsen the height for age and raise stunting of children. Controlling for recent deaths, both maternal and paternal orphans are substantially more likely to be short for their age than non-orphans. In non-poor families, the loss of a parent raises stunting to

levels found among poor; orphanhood actually raises stunting even higher. The UNICEF data for Burundi (for the year 2000) shows that a higher percentage of double orphans and maternal orphans are malnourished, compared with children with both parents alive (K. Subbarao et. al. 2001).

Orphanhood of the scale found today in Africa is also likely to have economy-wide impacts. The numbers mask the broader ruptures in the social fabric and state's capacity

Figure 2
Orphaned and Unorphaned Children in School in Selected Countries



Note: Countries are shown in decreasing order of disparity between children whose parents are living and orphaned children.

Source: DHS, UNICEF, 1994–1999. <http://www.unicef.org/pon00/outof.htm>

to deliver a response. Any intervention to protect orphans stretches further the already strained fiscal capacity of governments, crowds out other potential investments also critical for the poor's welfare such as health and educational investments.



Table 2
Percentage of Children Aged 7–13 Who Attend School,
by Survival of Parents, Burundi, 2000

Survival status of parents	Sex		Age		Total
	Male	Female	7–9 years	10–13 years	
Both parents alive	53.3	45.8	40.4	57.0	49.5
One or both parents deceased	42.4	37.3	29.2	47.1	39.8
Mother deceased	33.6	30.2	20.8	38.6	31.7
Father deceased	47.6	40.4	32.7	52.5	44.0
Both parents deceased	33.0	35.4	24.6	39.0	34.1
All children	50.5	43.7	37.8	54.3	47.0

Source: Enquête Nationale d’Evaluation des Conditions de vie de l’Enfant et de la Femme au Burundi, Institut de Statistiques et d’Etudes Economiques du Burundi et Unicef, 2000.

3. The Crisis of Orphans in Uganda: A Case Study

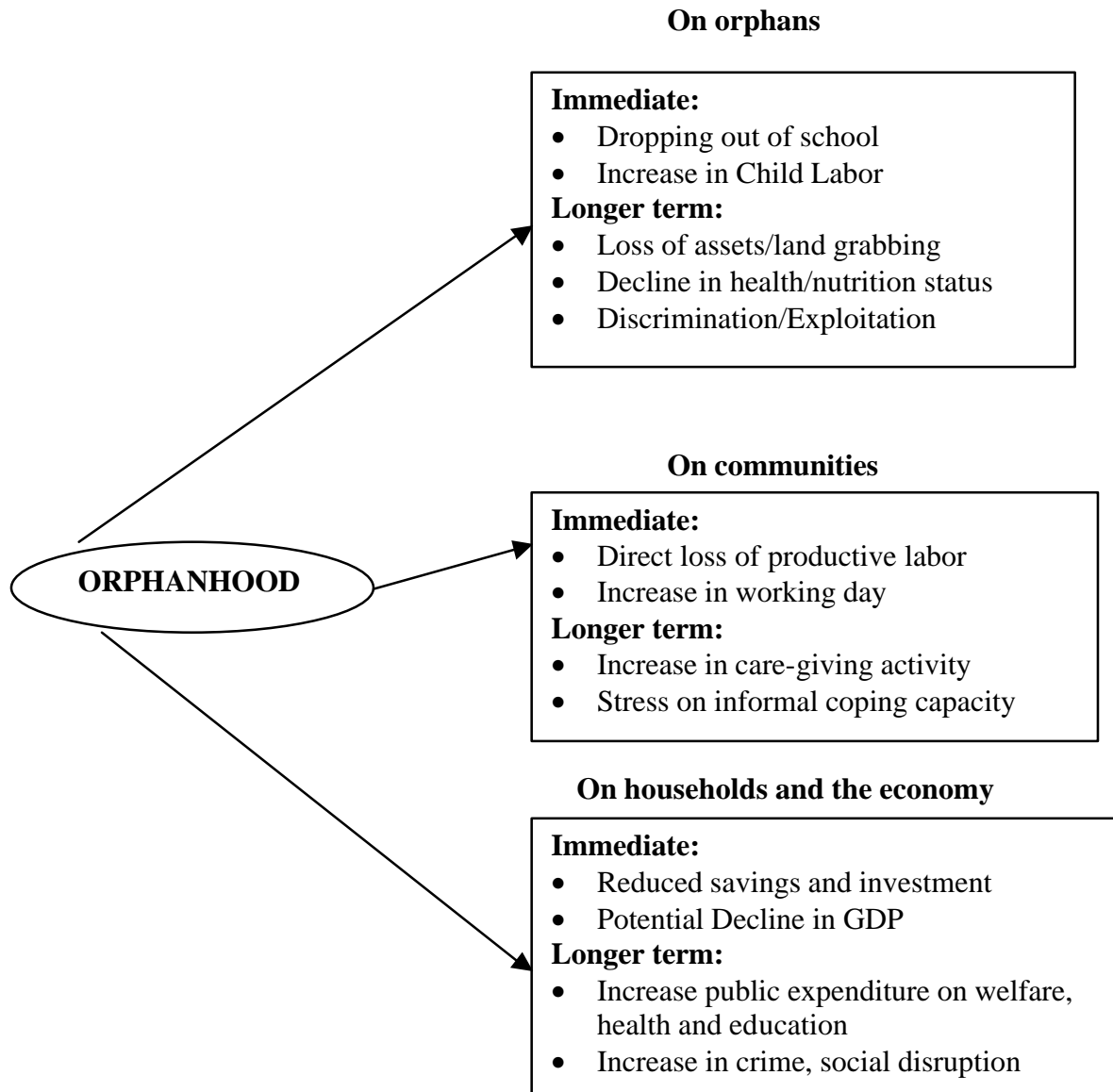
Framework and descriptive evidence In this section, we provide a conceptual framework that distinguishes the impacts of orphanhood on the orphans themselves, households and the broader economy, as well as the communities hosting orphans and their parents in the short and the long term. We describe the data at hand, discuss ways of testing the hypotheses discussed, and provide quantitative evidence to show that, in Uganda, fostering is not only a serious phenomenon imposing a serious burden on communities but also is of considerable quantitative magnitude hurting the economy as a whole.

Key issues and data sources Figure 3 provides a diagrammatic representation of the key short- and longer-term impacts of orphanhood on orphans themselves, the community, and the host household as well as the broader economy. The costs to children include the strong possibility of dropping out of school, a decline in nutritional status, possible increase in child labor, potential loss of assets including land, and discrimination and exploitation. The costs to communities include the extra burden associated with the care-giving activity, a potential decline in available productive labor, and a general weakening of informal coping capacity. A large literature has set out to describe and quantify these impacts, especially the ones that arise in the short term (e.g. loss of productive labor). Rough quantifications of the different channels are often used to provide an estimate of the macro-economic impact of AIDS. At the same time,

there is as of yet little information on the impacts that arise in the medium to longer term.

Uganda is of great interest to study the broader impacts of AIDS as it is one of the few countries in Africa where, as a consequence of quick and decisive action by government, the incidence of new infections is now generally believed to be declining (Ntozi and Ahimbisibwe, 2000). This provides an opportunity to explore indirect effects that occur after the death of a specific person and at the same time focus on the longer-term impact of the disease. Doing so explicitly acknowledges that the longer term impact of AIDS on surviving adults and children may be as important as the loss associated with a specific death. The changes in children's school attendance and nutrition (Ainsworth and Semali 2000a; Ainsworth et al 2000b) taken together may well have a social impact that is at least equal to that of the death of an adult household member. On the other hand, the ability to draw on extended networks to smooth consumption may help to somewhat compensate for the immediate loss (Lundberg and Over 2000). The ability to assess the impact of AIDS deaths in a longer-term perspective is of great relevance in terms of the persistence of the shock and therefore the possible justification for government intervention.

**Figure 3:
Impacts of Orphanhood**



Evidence on foster children from two surveys from 1992 and 2000 provides an opportunity to address these issues, in three ways. First, we assess the extent to which the number of foster children has increased between the two periods, even though the overall incidence of AIDS has declined. Second, we aim to identify to what extent addition of a foster child to a household is equivalent to a shock that results in a reduction in long-term productive investment, in addition to the reduction of per capita consumption which one

would obviously expect to be associated with such a phenomenon. Finally, to obtain another independent assessment of the longer-term impact of adult death on the accumulation of human capital and the future productivity of the labor force, we focus on changes in foster children's access to health and education services.

To distinguish short-term adjustments from longer-term impacts, it is critical to have longitudinal information, preferably collected for the same household at different periods in time. For Uganda, adding additional rounds to initial surveys has provided greatly improved information on households' coping mechanisms as well as the incidence of the impact (Ntozi and Ahimbisibwe 1999). We use a relatively long panel data set which is formed by the 1992 Integrated Household Survey (IHS) and the 1999/2000 Uganda National Household Survey (UNHS). The IHS is a comprehensive multi-purpose household survey based on a nationally representative sample of 9886 households. In addition to the standard socio-economic and expenditure information, the survey contains detailed information on economic activities. The UNHS is a nationally representative survey of 10,696 households, fielded between August 1999 and September 2000. The questionnaire was developed to closely match the one used in 1992 and a panel of approximately 1300 households who were interviewed in both periods was included.³ Use of the panel enables us to not only to make inferences about changes in the incidence of AIDS and of foster children over time but also to assess the impact of the addition of a foster child to the household during the period under concern.

The magnitude of the orphan crisis in Uganda. Descriptive statistics suggest that the incidence of fostering has increased rapidly, even for the age group below 6 years. The data provided in table 4 point towards a considerable, though regionally

³ The ability of using a panel of households that spans a long time period comes at the cost of not being able to identify true orphans. We therefore focus on foster children, i.e. children who are not physically related to the household head, throughout. Three arguments suggest that this may be less of a limitation than one would think. First, while the lack of an overlap would be a serious limitation if we were concerned only about the impact of AIDS, whether or not the physical parents are still alive is less of an issue if the interest is to adopt a broader perspective that includes other shocks (e.g. fostering that is induced by the displacement of children or families caused by civil strife in various parts of the country). In fact, even for AIDS victims, children may be sent to relatives some time before the person actually dies, especially in the case of single parent households. Second, under the assumption that the magnitude of measurement error does not change over time (i.e. the share of foster children that is not related to AIDS in the respective age group does not change), the variable of interest, i.e. the change in AIDS-related foster children will still be measured accurately. Finally, economically motivated fostering (e.g. mothers leaving their children in the village to be able to pursue urban careers) is normally associated with a transfer of wealth to the household taking care of the kid, which is generally expected to do better in school than its peers (Ainsworth 1996). Any estimates of economic hardship caused by the receipt of a foster child derived from such a sample would thus underestimate the effect of crisis- or shock-related fostering, implying that the figures given will constitute a lower bound for the true shock-induced impact of fostering. Also note that, especially for children below the age of 6, it is unlikely that economic motivations are the most decisive.

differentiated, improvements in living standards during the period, albeit from a very low basis. A clear indicator is the improvement of housing conditions. The share of households who live under a thatched roof decreased from almost 70% to less than 50% during the period although there are marked regional differences and the share remains high, at about 94% in the North. Also, the share of households with cement walls more than doubled, from 5% to 13%. This is corroborated by the decrease in the share of stunted children, a figure that decreased from 53% in 1992 to 43% in 2000.

In sharp contrast to the improvement in living standards, the share of households who hosted a foster child shows a marked increase over time, suggesting that, even though the number of new infections is on the decline, major long-term impacts of the AIDS crisis are still to be grappled with. The increase of fostering has been particularly dramatic for children below school age where between 1992 and 2000 the share of foster children increased from 10% to almost 20%, with an even stronger increase in the North (from 7.2% to 19.3%). With almost every fifth child not living with its physical parents, the distribution of foster children over households has also increased – while in 1992 it was only 5% of households who hosted a foster child, this figure tripled to 15% in 2000. With almost one third of households having a foster child, this phenomenon may well have broader macro-economic consequences.

A first impression of the possible magnitude of such consequences can be gained from information on households' income, expenditure, and investment.⁴ Table 5 presents evidence on the changes in real per capita expenditure and income as well as the mean annual rate of investment for households who, in the 1992-2000 period, received a foster child below the age of 14 based on the approximately 1300 panel households for which information on initial conditions (including presence of a foster child) is available. Both in the aggregate and if only foster children of the age in the 7-14 year age group are considered, one notes large and statistically significant differences between the two groups. While it is not surprising that addition of a foster child would reduce per capita consumption or income,⁵ it is noteworthy that, apparently, mechanisms to cope with such

⁴ While income and consumption are defined in a standard way (the latter including home production), the value of assets for both 1992 and 2000 was computed based on retrospective information given in the 2000 survey.

⁵ In fact, the decline in the growth rate is somewhat larger than is accounted for just by the increase in the denominator, suggesting that addition of a foster child has a slightly welfare-reducing impact.

shocks are of limited effectiveness in offering relief for such crises, implying that the impact of adding a foster child to the household persists for a long time. Data on the mean annual investment in business assets, as described above, are in line with this evidence and suggest that households who had to accommodate an orphan invest significantly less than those who did not. This suggests that shocks of this type draw away resources from economically productive pursuits and thus reduce a household's income generating capacity in the longer term.⁶

The impact on public service access. Table 6 illustrates descriptive statistics for outcome variables in the area of health and education. The former comprise use of vitamin A capsules (a variable which is unfortunately available only for 2000), and vaccination against diphtheria and measles, for all children below the age of 6. For education, we focus on net primary and secondary enrollment for children in the 6-12 and 12-18 age group. The evidence suggesting a general decline in the share of children with access to vaccination and an increase in those having access to education, reinforces the importance of having a control group that allows to distinguish shock-induced changes in service access from those occurring as a consequence of broader changes that are completely unrelated to the specific shock under concern. Specifically, comparison between foster and own children indicates that, even though the former participated in the general decline of health-service access, they had significantly less access to all three types of health services in the 1999/2000 period than those who lived with their physical parents.⁷

The picture is quite different in the case of education. In contrast to the a significant worsening of the situation over time for foster children in health, we find a marked increase in overall enrollment and very little difference between foster and non-foster children either in the initial or in the second period. While this would *prima facie* suggest that foster children do not suffer from disadvantages in education access, none of these descriptive statistics holds constant for other factors that may have an impact on

⁶ The lack of information of higher frequency as well as an indication on precisely when the foster child entered the household prevents us from identifying how households were able to cope and in particular whether the addition of the foster child resulted in a permanent reduction of welfare or whether it led to a big immediate decline from which the household was able to gradually recover. This would be of considerably interest and constitutes an important area for follow-up research.

⁷ This is particularly surprising since foster children were, in 1992, significantly *more* likely to be vaccinated against measles.

observed outcomes.⁸ Controlling for other factors such as initial asset ownership or contemporaneous changes in household composition that may also have an impact on households' investment in a regression framework is important to avoid drawing spurious conclusions. Doing so will also allow to gain an idea of the order of magnitude of the effect caused by the shock as compared to other factors that are normally thought to affect household investment. Exploring these issues in more detail is the purpose of the econometric analysis.

The impact of fostering on household welfare. Based on the above, we are interested in two variables, namely the *investment* effect of having to accommodate an additional member on a household's long-term productive capacity and the *public good access* effect, i.e. the extent to which not being physically related to the head of the household reduces foster children's access to social services. Since policy regimes for health and education which were in force in 1992 and 2000 changed in different ways, this also provides an opportunity to assess the extent to which policy can have an impact on such outcomes.

Econometric approach The intuition underlying the investment effect is simple; households subjected to an unanticipated shock in the form of having to accommodate an additional foster child are likely to reduce not only consumption but also investment.⁹ Based on a standard investment model it is straightforward to derive the optimal amount of investment in business assets in each period t , I_t^* . Assume that the household is faced with a sudden shock in the form of receiving an additional foster child. Distinguishing between households who, in the period under concern, experienced such a shock and those who did not, allows us to estimate a reduced form investment equation which can be estimated empirically.

$$(1) I_{kt} = a + \beta X_{kt} + g Z_{kt} + e_{kt}$$

where X_k is an indicator for whether or not the household received a shock during the previous period, Z_k is a vector of household specific characteristics, and e_k is an error

⁸ For example if, as is frequently reported in the literature (and in fact supported by our data), foster children and their parents live in areas where access to education (but not to health services) is systematically better, they may still be less likely to be sent to school than own children.

⁹ As will be discussed in more detail below, the fact that the shock may not be completely unexpected will not affect the results from the econometric estimation.

term. In this context, the estimate of β will provide a direct measure for the impact of the shock.

Empirical Evidence. To estimate equation (1), we use the increase in enterprise assets between 1992 and 2000 as the dependent variable. This variable includes agricultural assets, structures, and transport equipment, but excludes household durables and other consumer goods. Due to problems in the comparability of asset stocks between the two surveys, the dependent variable, investment (in percentage terms) is obtained from retrospective information contained in the 1999 survey.¹⁰

Results, reported in table 7, with changes in the number of foster children below 14 and in the 7-14 age group entered separately as right hand side variables, support the conclusion from the descriptive statistics. Adding one foster child is estimated to reduce the household's investment by between 0.59 and 0.51 percentage points. In addition, we find that both the age of the head (in squared form) and initial asset value are negative, pointing towards reductions of investment over the life-cycle and a decrease in the propensity to invest with higher initial levels of assets which could point towards conditional convergence in asset endowments. Note that the sign of the addition of foster children is diametrically opposite to "natural" growth in the household size through addition of own children. In fact, while higher initial household size as well as the addition of members to the household during the period is estimated to be associated with an increase in investment of between 0.09 and 0.11 percentage points per person. Thus, everything else constant, households with two children who received a foster child will be much worse off than those who got a third child of their own. The magnitude of the estimates is unlikely to be affected by the fact that we implicitly assume that the increase in foster children (and the associated death) is an exogenous shock.¹¹

To illustrate the magnitude of the shock, note that overall annual investment in the sample was only about 2.2% and that, with an average of almost four children below 14

¹⁰ As it was impossible to obtain precise retrospective information on the value of each of the assets, respondents were asked to provide a qualitative rank for the value of the asset in question in 1992. Based on experience in the field, the 5 rankings (about equal, somewhat more, somewhat less, none, and much more) were transformed into percentage increases (0, + 25%, -25%, -100%, + 50%) to be able to obtain the value of assets in 1992.

¹¹ In the case of an AIDS related death, households are likely to have some period of forewarning and thus can make adjustments implying that this assumption may not hold. However, to the degree that households are able to anticipate this shock take precautionary measures, the measured impact would be biased downwards, implying that our estimate provide a lower bound.

per household, AIDS-related deaths normally create more than only one case of fostering. Comparing the estimated magnitude of the impact to that of other variables such as education and regional dummies suggests that even adding one orphan is equivalent to a reduction in the head's level of education by about 3 years. Noting that the median household head in the sample has only four years of schooling suggests that this is quite significant. Similarly, due to combination of lack of access to infrastructure, low agro-ecological potential, and civil unrest, the North is characterized by significantly lower investment (by 0.75 percentage points) than the rest. Although with 0.58 or 0.50 percentage points still slightly lower, the impact of receiving one foster child is almost equal to the difference between the North and other regions of the country.

All of this suggests that the increase in the phenomenon of fostering observed in the descriptive statistics will have a significant impact on reducing investment. To the extent that such reduced investment is likely to affect the capital stock of the economy, it could be of broader relevance for economic growth. Although further and more specific research would be required to identify mechanisms and policy options that could help prevent such an undesirable outcome, the rapidly growing incidence of fostering will affect households in the longer term and therefore is likely to deserve attention by policy makers.

The impact of fostering on health and education outcomes Increased incidence of fostering may not only reduce a household's level of productive investment but also have a direct impact on the children themselves, in terms of human capital investment and access to health services.

Econometric approach In addition to deriving the households' optimum level of investment, the standard household model also yields demand functions for health and education, respectively. If, with an overall resource constraint, a household has two children, one own and one fostered, it is likely that spending for child m will be lower than for child l . This implies that the observed health or educational status of each child becomes a function of household characteristics, supply of services, and whether or not the child is own or fostered. This can be utilized to estimate cross sectional reduced form

equations for health and educational outcomes for child j in household k .

$$(2) H_{ktj} = a + \beta X_{kt} + g Z_{kjt} + \beta_T X_{kt}T + g_T Z_{kjt}T + c T + e_{kjt}$$

where H_{kj} is the health outcome (e.g. being vaccinated or not) or the educational outcome (i.e. school attendance) and X_k is a vector of household specific characteristics that include household income, the head's age and education, etc., Z_j is a vector of child specific characteristics including an indicator for whether or not the child is a foster child, and e_{kj} is an error term that is composed of a household-specific effect η_k and a random white noise term v_{kj} . As for most of the outcome variables, there is at two observations at different points in time are available either for two cross sections or for a true panel, we add a time dummy T equaling zero if the observation is from 1992 and one if the observation is from 1999. The coefficient c then denotes the magnitude of an independent time trend and $\beta + \beta_T$ or $g + g_T$ are the coefficients on household or individual characteristics, respectively, in the second period. This allows to evaluate overall changes in health or educational outcomes that can be attributed to general policy shifts separately from changes in other household characteristics, including whether or not the household had to care for foster children, and that statistical tests can be conducted for the significance of specific variables.

From a policy perspective, our interest in the time dummy arises from the fact that, during the period under concern (i.e. 1992-2000), policies in the education and health sector differed considerably from each other. The program of Universal Primary Education (UPE) was introduced in 1997. By eliminating the costs of schooling for up to four children per household (of which at least two had to be girls), this program aimed to boost enrollment and thus human capital acquisition especially by the poor. In addition to the elimination of fees, publicity campaigns and mobilization drives at the local level were conducted and appear to have been quite successful (Watkins 2001). In the health sector, the period coincides with an increase in user fees as a measure to improve availability and quality of supplies. While the latter appears to have been achieved, household surveys suggest that the policy also led to a considerable increase in health

spending by the average household (Deininger 2001).¹² The framework sketched above allows us to identify empirically whether these policies had a differential impacts on foster children who are likely to be among the most vulnerable groups in society.

While this equation can be estimated using standard OLS, presence of unobserved household characteristics, if correlated with other right hand side variables, may result in biased estimates. This can be eliminated by focusing on variation within the same household, thus estimating a fixed effects equation

$$(3) H_{kjt} - \bar{H}_k = g(\mathbf{Z}_{jkt} - \bar{\mathbf{Z}}_{ik}) + g_T \mathbf{T}(\mathbf{Z}_{jkt} - \bar{\mathbf{Z}}_{ik}) + \mathbf{c} T + v_{kjt}$$

As the sample includes about 1300 households who were observed in both periods, the coefficient \mathbf{c} can be identified, something that would not be possible if we had two pooled cross sections only.

Education levels. Results for educational enrollment are reported in table 8, separately for different age groups. Both cross sectional and household fixed effect regressions suggest that foster children had faced a distinct disadvantage in 1992 but that, in parallel with a considerable expansion of enrollment opportunities for the whole population, this disadvantage has disappeared over time. As the table illustrates, the coefficient on the foster child dummy is highly significant and negative both for primary education of 6-12 year olds as well as for secondary education of 6-18 year olds, both in the cross section and, for a smaller sample, with household fixed effects. This suggests that foster children were at a distinct disadvantage in terms of access to opportunities, for primary and secondary education. For primary, the time dummy is significant and highly positive in both equations, suggesting that the implementation of UPE has helped to increase primary enrollment across the population irrespectively of their socio-economic status. A the slightly smaller but similarly highly significant coefficient in the case of secondary education for the cross section (though not for the fixed effect regression) implies that we can not exclude the possibility that, in addition to directly improving primary levels of enrollment, UPE has generated spillover effects that helped to improve enrollment at the secondary level as well.

¹² In fact, following intense lobbying by various stakeholders, user fees for health services were abandoned in run-up to the 2001 elections. It remains to be seen to what extent this will affect availability of supplies and staff motivation as well as households' ability to receive adequate services.

Comparing over allows us to conclude that in addition to improving access to education for the population as a whole, UPE and the associated policy reforms have been particularly beneficial to foster children. Thus, foster children have not only benefited from the increased nation-wide availability of educational opportunities, the positive and significant interaction between the foster and year dummies (for the whole group) indicates that they have been able to compensate for their initial disadvantage as regards to both primary as well as secondary education. Indeed, we can no longer reject that in 2000, i.e. after the adoption of UPE, being a foster child does no longer convey a disadvantage with respect to access to education.

Health access. The equations for vaccination against diphtheria and measles suggest that, for the case of health, changes have been quite different from those observed in education. Specifically, we fail to find any evidence for discrimination against this group in the initial period, as evidenced by the lack of significance of the dummies for both the cross section and the fixed effects regression. At the same time, the negative coefficient of the interaction between foster and time dummies suggests that, contrary to the improved access to education, the access of young foster children to health services has actually worsened more disproportionately over time, compared to the population overall. While foster children did not have a disadvantage with respect to vaccination in 1992, they were less likely to be vaccinated in 2000. This provides a first indication to suggest that government policies can make a difference in terms of access to services and household welfare. While part of this phenomenon may be due to supply-side factors (there are reports that clinic staff are, for various reasons that range from social stigma to fear of contracting diseases themselves, averse to dealing with foster children), the result clearly points towards the fact that, in the health sector, there was no policy that would have helped foster children to overcome their natural disadvantage. Apparently, the absence of such a policy has led to a distinct worsening of access to health services.

Restricting the sample to the same households (columns 2 and 4 of table 8) for a fixed effects estimation as discussed above confirms this result and at the same time yields a negative and significant coefficient on the time dummy, pointing towards a more universal decline in households' ability to access vaccination services between the two periods. To what extent this is correlated with the simultaneous adoption of increased

user fees for the provision of health services remains an issue for further research. Nonetheless, it is clear that, in the absence of government policies to broaden access to such services, the ability of foster children to gain access has seen a marked deterioration.

4. Interventions in support of orphans

How is Uganda and countries in Africa coping with the orphan problem? Who is caring for the orphans? And what public policy and interventions are required to mitigate the impact of this systemic shock in the most affected countries? In this section we highlight interventions being tried in several countries in Africa, and we provide some insights into their strengths and deficiencies in addressing the problem. Considering that the available evidence on costs and program effectiveness is rather thin, this section does no more than offer a broad discussion of the difficulties in making cost comparisons across programs. We provide some tentative estimates of the likely scale and cost of mounting a credible effort to help orphans and families cope with the problem.

Subbarao et. al (2001) categorize interventions to support orphans into seven broad groups (see Table 10). The experience with these interventions is very limited, and much too recent to reveal robust good practices or insights into their cost-effectiveness.

Table 10

Interventions for Foster Families and Children in Vulnerable Circumstances

Intervention	Advantages	Disadvantages
Fostering	<ul style="list-style-type: none"> *Family members are most likely to act in child’s best interest. *Family integration promotes psychological and intellectual development of children. * Fostered children are integrated into society more readily than children in orphanages. 	<ul style="list-style-type: none"> *Discrimination in food allocation, workload, education, etc., may exist.
Subsidies distributed through the family	<ul style="list-style-type: none"> *Encourages even poor families to foster orphans with the additional costs of caring for orphans borne by the government. 	<ul style="list-style-type: none"> *Difficult to monitor. *Subsidies sometimes benefit head-of household only. *Subsidies may be shared among too many family members, thus diluting the amount of support going to the orphan. * Subsidies exclusively for the orphan may stigmatize the orphan
Subsidies distributed through the community	<ul style="list-style-type: none"> *Communities will better know needs of family. * If distributed by churches, stigma may be reduced. 	<ul style="list-style-type: none"> *May not work in urban areas where sense of community is weak. *May not work in communities where ethnic tension or discrimination exists.
School vouchers/subsidies; health vouchers redeemed by clinics	<ul style="list-style-type: none"> * School subsidies are easy to monitor. *Most likely to prevent future loss of human capital. 	<ul style="list-style-type: none"> *May entail horizontal inequity, to the extent children with parents alive but living in abject poverty do not receive any subsidy.
Income-generation schemes for fostering families	<ul style="list-style-type: none"> *Increase short-term incentives of households to adopt children. *If successful, improve the welfare of orphans. 	<ul style="list-style-type: none"> *Rarely succeed without training, follow-up, and leadership. *Provide no long-term

		incentive for caring for orphans.
Family tracing	*Being reunited with family members brings psychological benefits.	*May not be viable in post-conflict situations, in areas where a large percentage of the population has died or is missing, or in war-torn economies where family members are unable to care for orphans.
Orphanages	*Better than child-headed households or being a street child. *Orphanages run by religious groups may reduce stigma and attract donor and charitable funds.	*Lack incentive to act on behalf of orphan. *May harm psychological development of orphans. *Not cost-effective. *Can easily become commercial institutions rather than welfare institutions. *May not meet the emotional needs of children.

Source: Subbarao, Mattimore and Plangemann (2001)

Responses from Households, extended families, communities’ NGOs and other donors. “Fostering” of orphans by relatives in an extended family is the most prevalent practice in Africa today. It is considered to be the best intervention, provided that care is of an acceptable level. Fostering in the extended family is more attuned to the African socio-cultural milieu than most other options. Data from Uganda shows that nearly every fourth to every third household in the country is fostering an orphan. More detailed data indicates how families are trying to cope: grandparents are responding as caregivers in many situations, for example 32% of grandparents in Uganda, 43% in Tanzania, and 38% in Zambia are caring for orphans of their children (table 11). The extended family of aunts, uncles and cousins were found to host the orphans. The national survey in Zambia indicates that 55% of orphans are cared for by these extended family members. This is quite the norm in most of Africa, where family members are most likely to act in the child’s best interest. These private responses are more advantageous in many ways because the fostered children are better integrated into society more readily than in an

institutional setting such as an orphanage. It also promotes psychological and intellectual development of children.

Table 11
Who is caring for orphans?

	Sample covered	Caregivers
Uganda	Luweero District, Survey of 732 orphans	32% grandparents 50% surviving parent 16% extended family 5% community
Zambia	National Survey (1996)	38% grandparents 55% extended family 11% older orphan 6% non-relative
Rural Tanzania	297 rural orphans in Mawezi Regional Hospital	43% grandparents 27% surviving parent 15% extended family 10% older orphan 5% community

Sources: Monk, N. (2001); Government of Zambia (1999); Lusk, Huggman and O’Gara (2000).

However, scattered evidence from social assessments indicates also that there are abuses even by relatives. Allocation of food, education and health care do not favor the orphans. Sometimes even the property rights of the orphans have been violated, and oversight is sometimes required.

Our analysis of the household responses from the Uganda national data (comparing 1992 and 2000) indicates that absorbing orphans could pose economic hardship: the host households will likely reduce household investment by one-fourth compared to the average. While the host families maybe able to protect the child by providing care in their homes, the data shows that the orphans are likely to be dropping out of school, reduced access to health care, and more generally a big threat to their

human capital. The orphans are living with caregivers too old or too young and most often impoverished to provide adequately for them.

The burden of caring orphans are is thus putting too heavy strain to the extended family, and if these familial arrangements buckle under such pressure, this could lead to the disintegration of the family, and may result in a massive social problem that many of these countries will face in the immediate future.

Support outside of the extended family fostering comes from various donors, national and international NGOs, religious groups, community-based organizations and communities themselves. Support is given mostly to the foster families, and in some situations through institutional care in children's homes, or orphanages. Communities actively participate in activities intended to benefit the orphans, such as contribution of labor and materials, management of orphans program, and sometimes oversight of households headed by children-orphans themselves.

In Uganda, a survey of the extent of such outside assistance done by the Uganda AIDS Commission (2000) indicates that the level of effort is increasing, but the scale of interventions is no match to the scale of the problem. Out of roughly 1.7 million estimated number of orphans in Uganda, only about 83,100 (or about 4.8%) receive support of some kind. Some 183 organizations provided assistance for the period between 1998 and 2000 (table 12). Notwithstanding these efforts by various organizations, it is worth stressing that even in Uganda – a country which has recognized the problem early on – the totality of effort is inadequate relative to the problem on hand: as already noted, assistance reached only about 5 percent of orphans. The programs supported by NGOs are particularly small in relative to the size of the problem. Some programs run only for a year or two, and disappear when donor funds dry up. Few programs are really sustainable.

Table 12
Uganda: Orphan support programs, 2000

Type of Organization	Number of Agency Units Operating	Budget (1998-2000)	Orphans Assisted
International NGOs	29	\$6,052,000	27,200
National NGOs	32	7,096,000	33,855
CBOs	62	515,000	6,300
Religious Groups	31	1,221,000	10,100
Local Govt. Agencies	22	937,000	7,210
Private Sector	7	654,000	3,400
Total	183	\$17,395,000	83,100

Total number of orphans in the country: 1,7000,000
Percent assisted: 4.8%

Source: Based on data from Uganda AIDS Commission, 2000.

In other countries, various kinds of interventions to assist orphans are being tried, some with success, but are mostly in the form of pilots or smaller scale interventions.

In Malawi, similar groups of NGOs such as Community based Options for Protection and Empowerment (COPE) was set up in 1995 to deal with the crisis, and its activities are slowly spreading out into the country. Communities are developing a variety of ways to cope with growing crisis, for example establishment of village orphan committees to monitor their local situation and

In Zambia, a strong collaborative effort between government, NGO groups and UNICEF worked towards the formation of Children in Need Network (CHIN) which provide support to registered NGOs working with vulnerable children.

In Zimbabwe and Kenya, church sponsored orphanages are operated side by side with some private sector support. But their outreach is extremely limited vis-à-vis the number of orphans who are not supported by extended family or their community. Many mosque-sponsored institutions also support to protect orphans, particularly in the North Africa and in Muslim areas. Many of the larger NGOs such as Save the Children Fund, World Vision, CARE and CRS are devoting a good part of their programs towards orphan care in these countries.

In Botswana a number of NGOs and CBOs have taken the lead to support the extended and foster families, including such groups like the Childline Botswana, Botswana Christians Council, and Tirisanyo Catholic Mission which provide services throughout the country ranging from family counseling and day care for orphans, and providing for basic needs including food, clothing and education.

Responses by governments: Role of public action in orphan support: The literature on public economics suggests that public sector intervention is appropriate where there is market failure or where the case for redistributive intervention is strong. On these grounds, the case for direct public interventions for orphans is clearly justified. The inability of households and the community to cope with the problem is analogous to market failure. The data from Uganda has shown that this market failure produced a substantial reduction in household investments by at least one-fourth compared to that of the average. Where familial or community arrangements cannot be carried out for whatever reason, the care for orphaned children lies outside the market and has the potential to become a massive social problem in many countries. To the extent that orphans are concentrated among the very poor families, public interventions are justified on redistributive grounds as well.

The case of Uganda's broader policy on education (the universal primary education program) has clearly assisted the orphans in the latter half of 1990s. Although not directly targeted to orphans, this policy clearly assisted this vulnerable groups. Unlike in the case of education policy, health policy has not been as well implemented resulting in lower access of health care to orphans.

In recent years, we have seen government responses in terms of orphan policy initiatives in many countries, but in terms of actual budgetary resources for orphans support, experience varies a great deal across countries.

In Botswana, the government has set up a National Orphans Programme in 1999, with partnerships between government departments, NGOs, community based organizations, and the private sector. Within the program policies were developed to build and strengthen institutional capacity, provide support for welfare services, support community based initiatives and monitor and evaluate programs. This program is responsible for coordinating for example, the registration of orphan data through a national database, identifying and addressing the needs of foster children and the foster parents, training of community volunteers in basic childcare, and reviewing government child protection policies.

In Eritrea, the government aggressively assisted orphans, supported from its national budget and from donor funds in reintegrating orphans with their nearest relatives. These provided one-time economic support to the foster families through provision for example of economic assets like oxen to sustain the support. Eritrea is by far the only country which has explicitly provided budgetary support of substantial magnitude to help orphans.

In Zambia, Uganda, Tanzania, Kenya, Malawi, Ethiopia, Burundi, the governments have begun to borrow from the World Bank for AIDS prevention and care. In these programs, it is possible that the care of orphans and vulnerable children will be included as one of the components at least in some countries. For example in Ethiopia,

funds were channeled for use of educational materials, education, and scholarships to orphans; a similar operation is in progress in Burundi.

Public interventions: Available Alternatives There is no single “best practice” option applicable to all countries in all circumstances. The program choice and the targeting method depend a great deal on the country circumstances and the nature and intensity of the problem. Interventions need to be carefully chosen to address (a) the specific risks faced by orphans in a given country environment, and (b) strengthen the existing community coping strategies.

To promote “fostering” in countries in normal or post-conflict country conditions—both direct subsidies (cash transfers) and indirect subsidies (such as education fee waivers and food supplements) have potential role to play. Indirect subsidies such as education fee waivers are preferable because they can be easily monitored to ensure that they benefit the orphan. It minimizes the leakage and could be strongly grounded on community policing and oversight by NGOs or religious groups. A community driven approach to targeting orphans make sense for identifying orphans and delivering these assistance.

As demonstrated in the Uganda case study, families fostering orphans are themselves likely to be poor and are likely to reduce household investments because of the weight of adding more individuals in the extended family. Thus, interventions which provide income-generating schemes are crucial in stabilizing income and investments of these households. Programs using such schemes have found success in some countries such as in Uganda and Eritrea. The effectiveness, however, depends on follow up training and marketing support.

Costs and Cost-effectiveness. How much does it cost to support an orphan? The answer to this question is not easy. What level of subsidy is required to assist the fostering families? It depends on (a) the nature of the intervention, (b) the specific

arrangement through which assistance is transferred to the orphan, and (c) the extent of assistance provided.

Let us first consider the cost of subsidizing families *fostering* orphans. One can approach the problem in three ways.

Approach 1. We noted in the Uganda case study that the entry of an orphan into the household reduces their investment by at least 20 percent. Assuming that only 20 percent of households currently fostering orphans actually do need support, and further assuming the extent of assistance to be equal to the investment loss sustained by such households fostering an orphan, an amount of about \$17 million would be required annually to enable the most vulnerable fostering families to cope with the addition of orphans. If Ugandan experience is to be regarded as applicable across the continent, an amount of about \$350 million would be required annually to support 20% of vulnerable families currently fostering orphans in Sub Saharan Africa.

Approach 2. We do have some direct estimates of how much it costs to provide an orphan with schooling and nutrition supplementation. The need to avoid stigma associated with such direct intervention would require assistance to be provided not only to an orphan, but also to one or two other children (often equally vulnerable) in the family fostering an orphan. Current estimates place this cost at about \$105 per orphan per year in Uganda and \$148 in Burundi. If 20 percent of double and maternal orphans alone are considered the target group, and taking the lower bound of the above two estimates, an amount of \$252 million would be required annually for the continent as a whole.

The above estimates exclude the cost of administering the subsidy.

Let us now consider the cost of *tracing and re-integrating the orphan with the extended family*. This option is particularly recommended in post-conflict situations. Estimates for Burundi and Eritrea placed this cost to be \$228 and \$305 per child

respectively. Unlike in the case of “fostering” by very poor vulnerable families, this option involves a one-time cost, and hence not comparable with other options. Also, it is difficult to estimate the cost for the entire continent in the absence of reliable estimates of orphans in post-conflict countries.

Finally, in countries where orphans are in big numbers and community and household fostering has reached its limits, the case for wider institutional innovations such as children’s villages appear strong. Such interventions have now been tried in Eritrea, Uganda and Zambia. The challenge, however, is to keep costs down. The unit costs are high, preventing their scaling up into larger programs.

For *orphanages*, the unit cost figures range from \$649 per child in Tanzania in 1990 to \$1350 per child in Eritrea in 1998. In Burundi, the NGO APECOS spent on an average \$689 per child in 1999 for placement in an orphanage. Clearly these numbers are so large that scaling up is simply an uneconomic proposition for most African economies.

However, an innovation more suitable to the socio-cultural milieu of Africa is the notion of “*children’s village*”. What this involves is basically converting the concept of orphanage by enabling better integration of children with the nearest community. There are numerous advantages: NGOs are easily attracted, economies of scale can be realized, and children are located within communities so that community oversight is ensured. Though costs of such intervention are not available, the presumption is that it costs a lot less than a typical “orphanage”.

In summary, large scale and systematic approach to the orphans issue is needed. Today, the response, mostly of NGOs and religious groups, is piecemeal , uncoordinated and inadequate; it needs to be scaled up to address the enormity of the problem. Each country situation and societal infrastructure is different, and the approach needs to be adapted to the cultural mileu and institutional capacity. The most needy groups, the double orphans, and maternal orphans, should be the first priority for assistance. We

estimate that public assistance were to reach even one-fifth of this vulnerable group, an annual investment of about \$300 million would be required for the entire continent.

5. Conclusions and Implications for Policy

Throughout Sub Saharan Africa, orphans have emerged as an important high risk vulnerable group. Conflicts and the AIDS crisis have swelled their numbers in the recent past. In some countries, the AIDS-induced orphanhood itself has reached alarming proportions. Orphanhood imposes a heavy burden on the orphans themselves, and on households and communities who have taken the responsibility to foster them. The impact of the crisis of orphans is being reflected in terms of adverse education and health outcomes. There is now credible evidence for many countries to show that school enrollments of “double orphans” is substantially below that of children with both parents alive. Likewise, the available nutritional and anthropometrical evidence suggests that orphans are at a distinct disadvantage.

Are these impacts limited to only households and communities? How do these micro- (household-) level impacts translate themselves into macro level impacts at the national level? To answer this question, a case study of Uganda was undertaken. This study exploits the available longitudinal data set for Uganda for 1992 and 2000.

A first finding is the sheer magnitude of fostering in Uganda and the extent to which the phenomenon has increased over time. This suggests that, even if the immediate impact of AIDS on mortality may be on the decline, the legacy of longer-term impacts that has to be dealt with will constitute a formidable challenge for the foreseeable future. In fact, the dramatic increase in the number of foster children and the households hosting them observed during the period suggests that the crisis may as of yet affect the broader social system in African countries and that, even where the incidence of the disease may be on the decline, the longer term consequences may be felt for a long time in the future. From a methodological point of view, information to clarify the correspondence between orphans and foster children would be very desirable to determine more precisely how much of observed shocks is due to AIDS as compared to other crises. This would also help not only to draw conclusions as to the incidence of different types of shocks but

would also be of interest to be able to relate these to each other and to make inferences about the relative magnitude of their impact.

Second, it is surprising to see that the large negative impact of receiving foster children not only on households' consumption but also on their capital accumulation in the long-term. The magnitude of the effect, which is estimated to reduce investment by between one fifth and one fourth as compared to the average, implies that addition of four foster children will effectively reduce a household's investment to zero. This is of importance in an environment where investment is unequivocally considered crucial for future growth, and where returns to both education and productive assets have considerably increased during the last years (Deininger and Okidi, 2001). Research to explore the mechanisms at work in more detail would be desirable and should identify cost-effective policies that could help to alleviate the impact of such a shock and to avoid that it results in a permanent downward-spiral. A first step would be to identify the time profile of this reduction in investment as well as the channels through which it comes about. To the extent that fostering in our sample is due to AIDS, this would imply 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.

Regarding the accumulation of human capital by foster children themselves, our data suggest that foster children face particular difficulties in accessing services but that sector-specific policies can go a long way towards helping them to overcome these barriers. It may not come as a surprise that policies that affected the population as a whole also had an impact on some of its most vulnerable members. Thus, orphans in Uganda did not experience a serious disadvantage in education since the country's education sector policies have been fairly inclusive, equitable and effective. On the other hand, orphans in Uganda are at a distinct disadvantage in health outcomes including immunization. This implies that even though NGO programs and donor-assisted programs are important, these may not yield desirable outcomes in a policy environment that is less conducive to overcome the barriers confronted by foster children.

Ugandan experience further shows that the shock of orphanhood does not end at the door of the household. Households fostering orphans reduce their savings and investment, thus impacting indirectly the aggregate savings and savings in the downward direction. While fostering is often considered the best option from the point of view of orphans, it is not unmixed blessing to the extent it could have adverse macro implications.

The above findings underscore the need for programs to assist fostering families not only to prevent an erosion of human capital and health profiles of orphans themselves, but also to maintain fostering households' pre-fostering consumption standards and investment decisions.

What can we learn from interventions and specific programs thus far? First, these efforts have been piecemeal and inadequate relative to the crisis on hand. Current estimates suggest that the totality of efforts thus far (NGOs, governments and donors) is addressing no more than about 5 percent of orphans. Second, interventions need to be carefully chosen to address the specific risks faced by orphans in a given country environment, and for strengthening the existing community coping strategies. Third, the cost of assisting orphans and their extended families is not negligible: even assuming that assistance is provided only to 20 percent of the most needy group, namely double orphans and maternal orphans, the annual requirement would be as much as \$ 300 million for Sub Saharan Africa.

Table 4
Socio-economic characteristics, Uganda 1992 and 1999

	Whole country		Central		East		North		West	
	1992	1999	1992	1999	1992	1999	1992	1999	1992	1999
Population characteristics										
Total no of individuals(mn)	18.50	22.04	5.25	6.40	4.81	5.85	3.89	4.19	4.54	5.59
Total no of households (mn)	3.73	4.11	1.14	1.29	0.95	1.08	0.74	0.77	0.90	0.97
Share of population rural	87.4%	86.5%	74.0%	70.3%	90.3%	91.3%	93.9%	94.9%	94.0%	93.9%
<i>Rate of population growth</i>		2.2%		2.5%		2.5%		0.9%		2.6%
Female headed households	25.6%	26.3%	28.8%	27.8%	21.3%	23.7%	31.1%	34.9%	22.1%	20.8%
Housing conditions and infrastructure access										
Roof thatched	68.7%	47.9%	46.5%	21.3%	70.8%	54.2%	93.9%	93.5%	67.6%	29.7%
Cement walls	5.4%	12.8%	12.0%	24.7%	5.7%	16.1%	2.0%	1.7%	1.2%	6.9%
Health status and shocks										
Stunted children	53.1%	42.5%	53.6%	38.2%	54.5%	42.6%	49.5%	39.4%	54.3%	48.2%
Households w orphan < 14 y	16.6%	28.1%	20.5%	31.3%	16.8%	26.7%	15.5%	27.9%	12.3%	25.4%
Share of orphans < 14 years	13.7%	21.8%	18.5%	28.3%	13.9%	19.2%	11.8%	20.8%	9.9%	18.0%
Households w orphan < 6 y	5.5%	15.0%	6.3%	16.9%	6.6%	13.2%	4.4%	15.9%	4.4%	13.7%
Share of orphans < 6 years	10.5%	19.3%	14.5%	24.4%	12.0%	15.8%	7.2%	19.3%	8.0%	17.7%

Source: Own computation from the 1990/2000 UNHS and 1992 HIS

Table 5
Growth of per capita consumption and income for households receiving foster children

	Change in per capita expenditure	Change in per capita income	Rate of investment
Received foster child less than 14 years old in 1992-2000 period			
No	4.91% ***	8.34% **	2.40% **
Yes	2.95%	5.81%	1.88%
Received foster child 7-14 years years old in 1992-2000 period			
No	4.80% ***	8.12% **	2.41% ***
Yes	2.84%	5.98%	1.71%
Total sample	4.42%	7.70%	2.27%

Note: All rates are mean annual growth rates

Stars indicate significance of differences between groups: * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6
Access to services by children with and without their parents

	All children		Own children		Foster children	
	1992	1999	1992	1999	1992	1999
Health indicators for children 0-6 years old						
Share vaccinated against measles	76.9%	67.8%	76.1%	69.1%	80.9% ***	61.9% ***
Share vaccinated against diphtheria	88.3%	82.5%	88.1%	84.0%	89.3%	75.3% ***
Share using vitamin A capsules		57.4%		59.0%		50.2% ***
Schooling indicators						
Share of 6-12 year olds enrolled in primary	62.1%	83.7%	61.8%	83.7%	63.0%	83.9%
Share of 12-18 year olds enrolled in secondary	10.3%	14.8%	10.4%	15.0%	10.0%	14.3%

Stars indicate significance of differences between foster and own children in 1992 and 1999, respectively: * significant at 10%; ** significant at 5%; *** significant at 1%

Table 7
Impact of increase in foster children on household investment

	Age category of foster children	
	Below 14 years	6-14 years only
Change in no of foster children, 1992-2000a	-0.586** (2.08)	-0.509* (1.73)
Change in no of own children 1992-2000a	0.108** (2.20)	0.095** (2.02)
Head's education (years completed)	0.194** (2.25)	0.195** (2.25)
Education squared	-0.007 (1.02)	-0.007 (1.00)
Head's age (years)	0.054 (1.18)	0.046 (1.03)
Head's age squared	-0.001** (2.12)	-0.001** (1.99)
Assets (US \$ 1000) in 1992	-0.087** (2.20)	-0.086** (2.20)
Urban dummy	0.112 (0.09)	0.107 (0.09)
Household size in 1992	0.092** (2.03)	0.088** (1.98)
Eastern region	-0.278 (0.83)	-0.286 (0.85)
Northern region	-0.748* (1.84)	-0.757* (1.87)
Western region	-0.415 (1.34)	-0.395 (1.28)
Constant	1.432 (1.16)	1.597 (1.30)
Observations	1056	1056
R-squared	0.08	0.07

Robust t statistics in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 8
Logit regression for children's school attendance

	Primary, 6-12 year olds		Secondary school	
	Cross sect.	Fixed effects	Cross sect.	Fixed effects
Foster child	-0.213** (6.40)	-1.249** (7.33)	-0.130** (2.82)	-1.279** (4.66)
Foster child * year	0.237** (5.00)	1.177** (4.90)	0.154* (2.53)	0.700* (2.08)
Household income	0.404** (18.63)	0.547* (2.05)	0.566** (19.55)	0.658 (1.23)
Income * year	-0.230** (7.03)	-1.048** (3.52)	-0.119** (3.08)	-0.523 (0.98)
Female dummy	-0.161** (5.71)	-0.583** (5.86)	-0.281** (6.52)	0.181 (0.99)
Female dummy * year	0.135** (3.36)	0.457** (3.20)	0.355** (6.43)	0.080 (0.35)
Father's education	0.083** (8.82)	0.140** (2.80)	0.072** (6.00)	0.104 (1.38)
Father's educ. * year	-0.042** (4.20)	-0.068 (1.27)	-0.034** (2.66)	-0.056 (0.71)
Mother's education	0.108** (10.85)	0.181** (3.51)	0.049** (4.12)	0.009 (0.11)
Mother's educ. * year	-0.083** (7.59)	-0.135* (2.43)	0.006 (0.46)	0.103 (1.30)
Year dummy	3.576** (8.94)	14.545** (3.96)	1.688** (3.44)	6.202 (0.91)
Western region	0.089** (3.11)		0.016 (0.44)	
Eastern Region	0.229** (7.73)		0.098** (2.73)	
Northern Region	-0.177** (5.71)		-0.099* (2.18)	
No of observations	24216	7424	15535	2560
No. of households		2281		859
Pseudo R²	0.2276		0.2167	
Log likelihood	-10109.91	-1466.71	-5655.28	-868.09

Absolute value of z statistics in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Note: Age dummies (in years) included but not reported

Table 9
Logit regressions for children's access to vaccinations

	Diphtheria		Measles	
	OLS	Fixed effects	OLS	Fixed effects
Foster child	0.036 (0.33)	-0.065 (0.14)	0.132 (1.35)	0.343 (0.86)
Foster child * year	-0.392** (2.98)	-1.233* (2.36)	-0.428** (3.60)	-1.656** (3.64)
Female head	0.417** (6.81)		0.327** (6.15)	
Household income	-0.038 (0.47)		0.028 (0.39)	
Male dummy	0.028 (0.37)	-0.212 (0.89)	0.001 (0.01)	-0.116 (0.59)
Male dummy * year	-0.114 (1.17)	0.142 (0.48)	0.014 (0.16)	0.293 (1.17)
Father's education	0.111** (3.68)		0.085** (3.33)	
Father's educ. * year	-0.053+ (1.71)		-0.049+ (1.84)	
Mother's education	0.153** (4.48)		0.113** (3.87)	
Mother's educ. * year	-0.071* (2.02)		-0.054+ (1.79)	
Year dummy	-0.250 (0.25)	-0.765** (2.58)	-1.087 (1.25)	-0.665* (2.56)
Western region	0.770** (11.40)		0.758** (12.35)	
Eastern Region	0.401** (6.34)		-0.051 (0.92)	
Northern Region	0.594** (7.94)		0.518** (7.59)	
Constant	-2.940** (3.43)		-1.944** (2.63)	
No of observations	16578	1635	16577	3875
No. of households		652		1541
Adj. R²	0.0972		0.253	
Log likelihood		-382.305		-493.079

Absolute value of z statistics in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Note: Age dummies (in months) included but not reported

Table 10
Logit regression for children's vitamin A capsule use

	Specification	
	Cross section	HH fixed effects
Foster Child	-0.156** (4.28)	-1.680** (3.07)
Income (log)	0.070** (2.66)	
Male dummy	0.005 (0.20)	-0.116 (0.54)
Father's education	0.019** (5.19)	
Mother's education	0.006 (1.47)	
Western Region	0.384** (9.99)	
Eastern Region	0.632** (16.26)	
Northern Region	0.345** (7.34)	
Observations	9044	1407
No. of households		574
Pseudo R²	0.1134	
Log likelihood	-5469.67	-163.02

Absolute value of z statistics in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

Note: Age dummies (in months) included but not reported

References

Ainsworth, Martha, Innocent Semali, 2000. The Impact of Adult Deaths on Children's Health in Northwestern Tanzania. The World Bank Development Research Group, Poverty and Human Resources, Washington DC.

Ainsworth, Martha, Kathleen Beegle and Godlike Koda, 2000. The Impact of Adult Mortality on Primary School enrollment in Northwestern Tanzania. World Bank Policy Research Working Paper, Washington, DC.

Bakaki, P and Nangendo F. (2000), *The Orphan Activity Study in Uganda*. Ministry of Health: Nutrition and Early Childhood Development Project. Kampala.

Deininger, K. 2001, Determinants of health service use and health outcomes: Evidence from Uganda, World Bank, mimeo

Deininger, K. and J. Okidi 2001, Growth and poverty reduction in Uganda 1992-2000: Household level evidence. World Bank, mimeo

K. Deininger, A. Crommelynck and G. Kempaka (2001), Long term Welfare and Investment Impacts of AIDS-Related Changes in Family Composition. World Bank and Makerere University.

Lundberg, Mattias and Mead Over. 2000. Transfers and Household Welfare in Kagera. World Bank, mimeo

Ntozi, James P. M. and Fred E. Ahimbisibwe 1999. Some factors in the decline of AIDS in Uganda. *The continuing African HIV/AIDS Epidemic*, pp. 93-107.

Watkins, Kevin 2001, The Oxfam Education Report, Oxford

Government of Zambia (1999), *Situation Analysis of Orphans in Zambia, 1999: A Joint USAID/UNICEF/SIDA Study*. Lusaka.

Monk, N. (2001) Understanding the Magnitude of a Mature Crisis: Dynamics of Orphaning And Fostering in Rural Uganda. *In International Perspectives on Children Left Behind By HIV-AIDS*. Association Francois-Xavier Bagnoud

K. Subbarao, Angel Mattimore and Kathrin Plangemann (2001) *Social Protection of Africa's Orphans and Other Vulnerable Children: Issues and Good Practice Program Options*. AFR HD working paper, 2001.