



The Demand for Education for Orphans in Zimbabwe

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ABSTRACT

We examine the effect of orphan status on school enrolment in Zimbabwe, a country strongly impacted by the HIV/AIDS pandemic with a rapidly growing population of orphans. Using data from 2003, after controlling for other determinants of enrolment we find that orphans are less likely to attend school than non-orphans. The result is robust to our correction for selection bias. Two additional results have implications for targeting: we find that the effect of being an orphan is especially large for older children and that, after controlling for previous education, the effect of being an orphan on school enrolment is sharply diminished.

JEL Classification Codes: I21, O15, O55

INTRODUCTION

The HIV/AIDS crisis has had an enormous impact on Sub-Saharan Africa. Of particular import is the resulting dramatic increase in the number of orphans. In the early 1980s, few children were orphans due to HIV/AIDS; in 2004, over 12.3 million children in sub-Saharan Africa were orphans (UNAIDS, 2004). And the situation is not expected to improve anytime soon - by 2010 the number of children orphaned by AIDS is expected to exceed 35 million (Deininger et al, 2003). Further compounding these problems is the ever-present deep poverty in Sub-Saharan Africa and the toll the HIV/AIDS crisis has taken on their economies (Dixon et al, 2001). One possible consequence of this surge in the number of orphans is a decline in school enrollment. In light of the well-established direct and indirect benefits from schooling, a decline in school enrollment would have enormous consequences for the futures of these countries.

The situation in Zimbabwe is even worse than the other countries in the region. In Zimbabwe, it is estimated that approximately 30 percent of all children are orphans, over three quarters of whom have been orphaned due to HIV/AIDS (Catholic Relief Services, 2004, forthcoming; UNAIDS, 2004). This substantial number of orphans occurs in a country with recent dramatic increases in poverty due to the lingering effects of drought, triple digit inflation, political strife, and international isolation. The decline in life expectancy of over 50 years in the mid-to-late 1990s to 43 years in 2003 is evidence of the toll the HIV/AIDS crisis and poverty has taken on Zimbabwe in just the previous five years. The dire situation in Zimbabwe warrants a close examination, both in its own right but also to ascertain what may happen in similarly situated countries if their death toll due to HIV/AIDS continues to escalate, especially if it occurs alongside other economic and non-economic challenges. (Other countries facing conditions

similar to Zimbabwe include Botswana, Lesotho and Swaziland.) Because of its status, we concentrate on the determinants of school enrollment by orphans in Zimbabwe in this paper.

While becoming an orphan is obviously an extremely emotional event for children and has results in the restructuring of households to accommodate orphans, the effect of orphan status on school enrollment is not immediately clear. As a consequence, the literature has reached mixed conclusions about the school enrollment status of orphans versus non-orphans (Bennell et al, 2002; Case et al, 2004; Deininger et al, 2003; Ainsworth and Filmer, 2002).

In this paper we contribute to the understanding of the effect of orphan status on school enrollment in a country with a disproportionately high number of orphans by answering three broad questions. First, controlling for other factors, are orphans less likely than non-orphans to attend school? For this baseline question, we use a sample composed of households with orphans and households without orphans. While we can control for observed characteristics, we can not control for unobserved characteristics which would influence the decision to care for an orphan. If these characteristics vary in some systematic way across households, our estimates of the effect of being an orphan on the probability of attending school will be biased.

To address these potential biases, we pose our second question: Among families with their own children and orphans, are orphans more or less likely to attend school than a family's own children? Along with addressing the biases in what types of households take in orphans, we are also able to address the extent of favoritism parents have for their own children over children taken in as orphans (Bishai, 2003; Case et al, 2004; Ntozi, 1997).

Our final question is: Is the enrollment of orphans a function of their previous investments in education? One possible reason for why orphans have differential enrollment rates is because their schooling was interrupted due to caring, providing, or both for their dying

parents. If their schooling was interrupted, the returns to a year of education (conditional on age) may also be diminished. To test whether school interruption matters for the enrollment of orphans, we restrict our sample to children who attended school the previous year. By restricting our sample in this way, this also allows us to consider in greater detail the possible favoritism shown by parents towards their own children versus orphans.

We begin this paper with a review of how the HIV/AIDS crisis has influenced the education system in Sub-Saharan Africa and then place this in the broader literature of the determinants of education. We then turn to a description of our data, a nationally-representative survey done by Catholic Relief Services with the support of U.S. Agency for International Development, followed by the methods we use to estimate our primary model and the two extensions to this model. After some summary statistics, we answer the three primary questions posed in this paper. We find, controlling for other factors including economic status (employment status, current consumption, and assets), characteristics of the household and child, and place-of-residence, that orphans are less likely to attend school than non-orphans. This holds for both the full sample and for the sample restricted to households with own children and orphans. The effect of being an orphan is especially large for older children. We find, however, some evidence that after controlling for previous education, orphans and non-orphans within the same household are equally likely to attend school.

BACKGROUND

HIV/AIDS and Education

HIV/AIDS is eroding the ability of education systems to provide quality education. Its impact is felt through its effect on the supply, demand and quality of education.

Supply: The education system is built on its human resources – the teachers and administrators necessary to deliver quality education – and it is here that HIV/AIDS has its most devastating impact on the supply of education. Increased morbidity and mortality are reported throughout the region, and schools in rural areas are especially hard hit. The heavy loss of educators in key age cohort of 30-39, who are just beginning their most productive years after accumulating experience and training, is especially damaging (UNICEF, 2003). Even for educators not infected, there is an increase in absenteeism among teachers due to the increased burden of caring for sick relatives and orphaned children.

If teacher mortality parallels that of the general adult population, Zimbabwe stands to lose around 2% of its educators in the decade through 2010 (World Bank, 2000).¹ This estimate may well underestimate the true loss of human capital because teachers are at an even greater risk of infection for various reasons, including teacher mobility and status in communities, relative affluence, separation from families, and customary expectations of transactional sex in some areas (Coombe, 2001).

Quality: The absence of teachers has obvious implication for the quality of teaching insofar as there is less time for training and instruction and teacher/pupil ratios increase. Specific impacts include the omission of parts of curriculum to make up for lost time (Kelly, 2000a), and the movement toward multi-grade teaching in rural schools with declining enrollments.²

Similarly, higher rates of absenteeism for nominally enrolled students, who are under pressure to shift their time allocation toward more household and market labor and less study, will also effect the quality of the classroom experience. Less discussed, but perhaps even more important is the emotional pain that confronts many children. The psychological effects of

having to cope with pervasive illness and death, and the debilitating impact of the stigmatization associated with HIV/AIDS is a detriment to learning (Gachuhi, 1999).

Demand: In absolute terms, there are likely to be fewer children needing education in the next few decades. In areas of high prevalence, rising deaths among adults of reproductive age and lower fertility rates mean that fewer children are being born. Combined with increased mortality of children infected around time of birth, this implies that there will be fewer potential school goers than there would be in the absence of the pandemic (Coombe, 2002). There is already some evidence of a decline in absolute enrolments in Zimbabwe (Kelly, 2000a), and it is estimated that the country will experience over a 20% reduction in primary school age population by 2010 (World Bank, 2000). Over time, these declining enrolments in primary school will translate into fewer qualified candidates for secondary and tertiary education.

There are strong reasons to expect that rate of attendance in this reduced cohort will also be smaller. Households affected by HIV/AIDS face the initial costs of treatment and later the direct loss of income as productive family members are lost; and as household income declines and expenses increase young children may drop out because they can no longer afford the fees (Williamson and Hunter, 1998). In addition, although the funds to meet educational expenses might be available, the opportunity cost of the children's time may be too high because their labor is needed to replace lost adult earnings, or to assume more household duties, including caring for sick household members and taking over household duties the sick can no longer perform (Gachuhi, 1999).

It is this possibility – that households will reduce their demand for education – that this paper explores in the context of orphanhood. In the following section, we review a number of factors that are expected to influence the household's decision making process.

Determinants of the Demand for Education

Within the literature on the demand for education there is a wide variety of views on how to understand how the household makes its resource allocation decisions. The views range from formulations in which parents and children in the household share a single unified utility function, to over-lapping generations model in which the household is merely the nexus for transactions, with the old lending resources to the young who repay them by caring for them in their old age.

Regardless of how the decision making calculus is modeled, some of the basic inputs into the decision is the same. The household faces a number of direct costs – user fees, transport, school supplies – that are not expected to be affected by HIV/AIDS. The household also faces indirect costs, the most important of which is the opportunity cost of the time a child spends in school. These costs must be compared with the expected benefits of education as either a consumption or investment good, or some combination of the two.

Orphan Status: The implications of being an orphan on the school enrollment decision of a household are not immediately clear. On the one hand, the presence of an orphan in a family constitutes a serious financial burden (Baylies, 2002). Since most schools in Zimbabwe require fees and related expenses to cover school maintenance, utilities and school activity fees³, these costs alongside the opportunity cost of having a child in school, may lead to non-enrollment. These costs are particularly relevant if a caregiver does not reap pecuniary and non-pecuniary benefits from an orphan's education. The orphan's own status will also affect the enrollment decision. As this pertains to orphans, they often have faced interruptions in schooling if they needed to care for their parents, if they worked to replace a parent's lost income and for

funeral expenses, or if they increased household production, (or some combination of these). These interruptions in schooling may lead caregivers to perceive a lower return to an orphan's education. Additionally, when the expected bereavement occurs due to a parent's death the children are often mentally, physically, and emotionally unprepared to deal with its consequences. The cultural taboo of talking about death in many African settings means that children tend to be unprepared for a parent's death, despite the long period of illness usually associated with HIV/AIDS (UNAIDS and UNICEF, 2003). This lack of preparedness heightens their distress, and combined with a lack of emotional support and guidance from adults, compounds their uncertainty about their future and often contributes to children dropping out of school.

On the other hand, there is some evidence that orphans may be as likely to attend school as non-orphans. Orphans may come from better-off families which had the financial wherewithal to send their children to school (World Bank, 1999; Ainsworth and Semali, 1998). If the orphaned children have more years of schooling due to being in a wealthier family, the returns to the family taking in an orphan may be higher than for other children. This is especially relevant if the extended family structure allows the other members of the household to reap some of these returns. The impact of becoming an orphan due to HIV/AIDS may also be diminished because of the long time between the onset of HIV/AIDS and the death of a parent; this delay allows families to respond to this crisis in ways that are not possible with a more sudden death (World Bank, 1999; chapter 4). Programs specifically designed for the benefit of orphans may also lead to higher enrollment rates among orphans. Finally, orphans may have been sent to live with caregivers who have greater financial resources. Alongside all these

possible reasons for similar school enrollment rates for orphans and non-orphans, there is a long tradition of child fostering in Sub-Saharan Africa (e.g., Foster et al, 1995; Kamali et al, 1996).

Wealth

Regardless of whether education is considered a consumption or investment good, there are good reasons to expect household wealth or income to be a key determinant of enrollment. If education is considered as a normal consumption good, then the demand for education should rise with household income. In principle, if education is considered to be strictly an investment good, and if households could borrow freely, then only the expected return to education should matter to the household's decision; the household's wealth or income would be irrelevant. But because credit markets function poorly, most investment in education must be funded by households. This makes it very likely that credit-constrained and risk averse lower income households will invest less in education.

The results from a large body of empirical work using different data sets and different measures of both schooling and economic well-being support this hypothesis. For instance, in a study based on the Demographic and Health Surveys (DHS) for seven Sub-Saharan African countries (not including Zimbabwe), Lloyd and Blanc (1996) find a strong positive correlation between wealth and enrollment. In a much larger study, using DHS data from 35 countries across Africa, Latin America, and Asia, Filmer and Pritchett (1998) also concluded that wealth matters for educational attainment, but that the extent to which it matters varies a great deal. The "wealth gap" between the richest 20% and poorest 40% of households ranges from just two years to as many as ten years of average schooling. Glewwe and Jacoby (2004) demonstrate the same relation with an inter-temporal – as opposed to cross-sectional – approach.

Location: The household's calculation of the expected returns to education is also a function of the household's location within local and broader labor markets. Returns to schooling may vary in different areas. For example, the relatively low returns to agricultural activity may help to explain the lower rates of investment in education in rural areas (Connelly and Zheng, 2003). Location also appears to play a role in households' demand for education through its impact on community standards and expectations (Binder, 1999).

Quality of Schooling: Although it is much more difficult to measure the perceived quality of the available education is also a factor in the expected return to education. In general, poor quality schools tend not only reduce achievement, but also deter enrollment and attainment, especially among poor children (Filmer, 2003).

Household Characteristics: Parental education has been found to have a strong inter-generational effect on education, though the magnitude of the effect and the relative importance of maternal and paternal education varies a great deal across countries (Filmer, 2000; Al-Qudsi, 2003). The gender of the household head can also have a significant effect on the demand for education. In many areas, households headed by women tend to devote a larger percentage of the household budget to children, resulting in higher levels of school enrollment (Lloyd and Blanc, 1996; Fuller and Liang, 1999.) The number of children in a household is also important. The presence of a large number of children may lead to "resource dissolution" (Parish and Willis, 1993). Lloyd and Blanc (1996) observed this sibling effect for their sample of Sub-Saharan countries, finding that the presence of small children (under five years old) tends to be associated with lower enrollment rates of older siblings.

Characteristics of Children: The age and gender of the children are likely to be relevant in the school enrollment decisions of caregivers, as is a central concern of this study: the

relationship of the child to the head of household. Younger children are enrolled at much higher levels (Al-Qudsi, 2003), though the pattern of cohort attrition varies a great deal by country (Filmer and Pritchett, 1998).

There are several reasons to expect that the gender of the child might affect the probability of enrollment.⁴ Returns to education might be greater for males than females in labor markets that reward male and female labor differently. If the household head reaps at least a portion of the benefits from education this may lead to decisions to favor the education of boys. Even in countries where the benefits to education are perceived to be low, girls are less likely to be enrolled in school (Anderson et al, 2003). In general, the effect of gender is likely to be stronger in cultures with significant resource flows from children to parents and in cultures where a wife's family affiliation becomes her husband's when she marries (Shapiro and Tambeshe, 2001). This effect is also likely to be stronger in countries like Zimbabwe where property is transferred to the son(s) in a family. The evidence for differences in enrollment by gender is starkest for the least developed countries. For the lowest ranked countries in the United Nation's Human Development Index, the average female/male ratio for net primary school enrollment is just 0.86. The situation is even worse for older girls, as the average ratio for net secondary enrollment declines to 0.73 (UNDP, 2004).⁵

DATA AND METHODS

Data description

The data used in this paper comes from a survey conducted by Catholic Relief Services, with funding from the U.S. Agency for International Development. The collection of this new data

was necessitated by the rapid deterioration of conditions in Zimbabwe since 1999 when the DHS was conducted.

The survey was constructed from the sampling frame of the 2002 Zimbabwe census. From this frame, the following provinces were selected to represent both urban and rural areas: Manicaland, Midlands, Masvingo, Matabeleland South, Bulawayo, and Mashonaland West. Within the districts in these provinces, a sample of households with children under the age of 18 was selected through the following steps: a) sampling of wards within these districts; b) sampling of villages within each ward; c) sampling of Enumeration Areas (EAs) within each village; and d) sampling of households in each selected EA. (Wards, villages, and EAs were selected with probability proportional to size.) For each household, a credible adult member of the household provided information on the socio-demographic characteristics (age, sex, illness status of parents and/or parental survival, orphan status, education, food security status) of all household members.

We conclude this section with three comments about the sample as it pertains to orphans. First, the sampling strategy excludes children who are living on their own or in orphanages since they were not part of the sampling frame. Presumably, these children are worse-off than orphans in households. Second, some children in our sample may be living with other relatives to accrue the advantages of, say, superior schools and they would live with other relatives even if both their parents were living. (See Lloyd and Blanc (1996) for more on the reasons why children live away from their parents.) We are unable to identify these orphans in our data and these orphans are presumably different from children who are in households solely due to a parent's or parents' deaths. Finally, in the data we do not observe if an orphan is orphaned due to his or her parent dying from AIDS or from some other cause. This information was not gathered due to the

stigma attached with HIV/AIDS. (See, e.g., Gilborn et al, 2001 for more on the reasons for a reluctance to reveal HIV/AIDS status.) In Zimbabwe the overwhelming majority of parents died from AIDS so the lack of inquiry about the cause of death is not as relevant as it would be in countries with more numerous causes of orphanhood.

Model description

In order to answer our first question – Are orphans more or less likely than non-orphans to attend school? - we estimate the following probit MLE model:

$$\text{ATTEND}_i = 1 \text{ if } \text{ATTEND}_i^* > 0; \text{ ATTEND}_i = 0 \text{ otherwise} \quad (1)$$

$$\text{ATTEND}_i^* = \beta \mathbf{X}_i + \alpha \text{ORPHAN}_i + \gamma \text{REGION}_i + u_i$$

where i denotes a child; \mathbf{X} is a vector of covariates; $\text{ORPHAN}=1$ if the child is an orphan, 0 otherwise; REGION is a vector of fixed effects for location of the household; and u is an error term. In this model, we are primarily concerned with the sign, magnitude, and statistical significance of α .

There is reason to believe, however, that the estimate of α might be biased due to the correlation between ORPHANCHILD and u . If, say, orphans are more likely to be in families with (unobserved) resources which lead to higher probabilities of attending school, the estimate will be biased upwards. Conversely, if, say, there are unobserved resource constraints affecting families taking in orphans, this would lead to a downward bias.

We control for these unobserved factors by re-estimating equation (1) with a sample restricted to households with their own children and with orphans. In other words, households with only orphans or only their own children are removed from the sample. By restricting our sample in this manner, we eliminate the unobserved factors influencing a household's decisions.

This sample restriction allows us to address our second question - Among families with their own children and orphans, are orphans more or less likely to attend school than a family's own children?

There is also reason to believe that the coefficient α (in either the model with all children or the one with children in households with own children and orphans) is influenced by the previous educational attainment of orphans. This motivates our third question - Is the enrollment of orphans a function of their previous investments in education? For example, if orphans were not enrolled in school previously because they had dropped out of school to assist their parents, caregivers may decide to not enroll the orphan children in school. In this context, the caregiver's decision may be due to factors unrelated to any preferential treatment caregivers give to their own children – that is, unrelated to the child being an orphan.

To make this possibility more concrete, consider a caregiver with enough resources to enroll either her own child or an orphan in school. Suppose further that she considers education to be an investment good, and that her share in the future return to the investment will be the same for either child – i.e. she believes both children will “repay” her in similar portions out of their future income. If the children are the same age and the orphan was forced to miss school for some time due to the type of interruptions detailed above, he would have to repeat grades, making him enter the labor market at a later date than the other child. This would delay the caregiver's receipt of the return to education. Thus, even without any favoritism of her own child, this calculus would lead to enrolling her own child rather than the orphan. To test the effect of past schooling attainment on school enrollment, we estimate equation (1) on samples restricted to children who attended school the previous year.

RESULTS

Descriptive statistics

In Table 1 we display the school enrollment rates for orphans and non-orphans.⁶ We limit the sample to children between the ages of 6 and 16 since these are the ages children are most likely to attend school in Zimbabwe. We define an orphan as a child whose parents are both deceased or as a child with one deceased parent if the child does not live with the surviving parent. In virtually all cases, the orphans in our sample live with a relative who is the head of household.

For all children of school-going age, orphans are less likely to attend school and the gap is large – 77.0 percent of orphans attend school versus 86.7 percent of non-orphans.⁷ The enrollment rates of orphans are lower than those reported in earlier studies on Zimbabwe which also used nationally representative data (Ainsworth et al, 2000; Figure 2). The increased impact of the HIV/AIDS crisis in Zimbabwe combined with deteriorating economic conditions and political unrest discussed above are primarily responsible for this decline.

We further break our sample into two age groups – children ages 6-10 and children ages 11 to 16. We do so to reflect the drop-off in school enrollment which often occurs as the opportunity cost of remaining in school increases (Filmer and Pritchett, 1998). Among orphans, the school enrollment rates fall from 81.7 percent to 73.9 percent as children age. Among non-orphans, however, there is not a similar drop-off. This decline in school enrollment among older orphans is consistent with orphans not attending school due to gaps in their previous school enrollments while caring for their parents. In Figure 1, the difference in school enrollment for orphans and non-orphans as children age is broken down in more detail. As seen, the gap generally widens beginning at age 11 with an especially large increase at ages 15 and 16.

As discussed above, there is evidence that girls whose parents suffer from HIV/AIDS are especially likely to drop out of school to assume household and market duties. However, we find that within the categories of orphans and non-orphans, boys and girls, independent of their age are about as likely to attend school (Table 1).

We now consider whether differences in the economic well-being of households is a possible explanation for differences in school enrollment rates of orphans and non-orphans (Table 2). In our data, we have numerous variables reflecting the economic status of households. The primary categories reflecting the employment status of the household head are no formal employment, employment as a general worker, a subsistence farmer, an informal trader, and a skilled worker. As seen in column (1) of Table 2, the majority of the sample has no formal employment with the second most prevalent category being subsistence farmer. (As in Table 1, the sample is restricted to children between the ages of 6 and 16). The type of dwelling is a measure of a household's assets and, in order of wealth, these can be categorized as brick and corrugated roof; brick and thatch roof; and pole and dagga. We have three measures of current consumption – the usual number of meals eaten per day; whether the household head perceives the household's food intake as always, sometimes, rarely, or never adequate; and whether members of the household always, sometimes, rarely, or never have eat anything between meals. The average household in each of these categories eats two meals a day, never has an adequate amount of food, and never eats anything between meals. The inclusion of information about employment, assets, and current consumption is an advantage over other data sets which do not have information on all three of these dimensions of economic status.⁸

In our sample orphans are much more likely to live in households whose head has no formal employment (Table 2, column 2). They are also less food secure insofar as they are less

likely to always have an adequate amount of food and are less likely to always or sometimes have something to eat between meals. These results suggest that on average orphans are living in households that are not as well off as households with no orphans. This contrasts with earlier work that speculated that better-off households are more likely to foster orphans (Barnett and Blaikie, 1992). Our findings are consistent, however, with more recent work by Ainsworth and Filmer (2002, Figures 11 and 12) which found orphans in Zimbabwe to be concentrated among households in the lower end of the wealth distribution.

We have three measures of household characteristics akin to those used in these other analyses – household size, the age of the household head, and whether the household head is female. As seen in column (1), the average household has five-to-eight persons, has a head who is 47 years old, and is about equally likely to have a female or male head. The comparison in columns (2) and (3) indicates that orphans are much more likely to be in households headed by a male and by an older person. The effect of these on school enrollment is not immediately clear although some evidence suggests that older caregivers are likely to have less education than younger caregivers which, due to the intergenerational transmission of educational attainment, may lead to lower probabilities of attending school (National AIDS Council, 2004). Table 2 also displays whether a child is female, the age of the child, and the province of residence.

Model results

The descriptive statistics found in Tables 1 and 2 indicate that orphans are less likely to attend school and that orphans tend to be in less affluent families in comparison to non-orphans. Using the model in equation (1) and the subsequent restrictions on the sample, we now consider whether the more limited resources of households with orphans is responsible for the lower

school enrollment rates of orphans or if being an orphan still has explanatory power after controlling for other factors. The results are found in Table 3. Because our interest in this paper is the school enrollment of orphans, we concentrate on the relative influence of being an orphan on the probability of attending school.

Estimates of the Effect of Orphan Status – All Children: For the results in the first column of Table 3, our sample includes all children from 6 to 16 years of age.⁹ Our results indicate that the effect of being an orphan on school enrollment is both statistically significant and important. All else equal, an orphan has a 9.1 percent lower probability of school enrollment than a non-orphan.

In order to determine whether the determinants of schooling differ systematically by age, we next divided our sample in two. The results in columns (2) and (3) of Table 3 are for the subsamples of children with ages from 6 to 10 and from 11 to 16. For older children, the effect of being an orphan on school enrollment is particularly large; *ceteris paribus*, older orphans are 13.8 percent less likely than older non-orphans to attend school. For younger children, being an orphan has no effect on school enrollment. The effect of being an orphan appears to be largely associated with older children.

Of the variables with information on the characteristics of the household, only the age of the head of household is significant, and this, only for older children. From the variables with information on the children themselves, we find that as is true in other countries throughout the region (World Bank, 2001), older children – both orphans and non-orphans – are less likely to attend school in Zimbabwe. The effect of age appears to be primarily relevant for older children (columns 2 and 3, Table 3). In addition to the usual reasons for the strong effect of age on school attendance among older children – *viz.*, leaving school to increase time spent in household

production or the labor market – the possibility of greater exposure to HIV/AIDS in a school setting might deter some parents or caregivers from sending their children to school (Kelly, 2000b). While of the expected negative sign, the effect of being a girl on school enrollment is insignificant at usual confidence levels. We find no effect of having a household headed by a female on school enrollment; here the effect is also statistically insignificant at usual confidence levels.

Our measure of current consumption, whether a household sometimes or always has adequate food, is positive and statistically significant. This is one indication that the opportunity cost of keeping children in school for these households is lower than for other households. While not completely offsetting the effect of being an orphan, orphans in better-off households (as measured by food adequacy) are almost as likely as non-orphans in worse-off households to attend school. This is consistent with the findings of Ainsworth et al (2000) for Tanzania where orphans in better-off families do not see delayed enrollment.

The effect of this measure of current consumption should be contrasted with our finding regarding a more permanent measure of consumption, whether a household lives in a dwelling with a brick and corrugated roof or in a dwelling with a brick and thatch roof (two superior structures than a household with a pole and dagga). The effect of these (admittedly imperfect) measures of assets has no statistically significant effect on school enrollment.

Estimates of the Effect of Orphan Status – Children in Households with both Orphans and Own Children: In Table 3, our sample consists of households with their own children and orphans; with only orphans; and only own children. When we interpret the coefficient on orphan status in these tables, it is not immediately clear, therefore, whether the coefficient is reflecting the orphan status of a child or if it reflecting unobserved (within our data set) factors that

influence the decision to take in an orphan. To correct for this possible selection bias associated with the decision to take in an orphan, we now limit our sample to households with both own children and orphans.¹⁰ The results are in Table 4.

The importance of being an orphan is diminished once we correct for this selection bias (Table 4). While still statistically significant, orphans are now just 6.1 percent less likely to attend school, a drop from 9.1 percent for the full sample. Despite the reduction, the effect of being an orphan remains large. This is important. We see that even after controlling for the possibility that unobserved factors influencing the decision to adopt an orphan are influencing the decision to enroll an orphan, these children are still disadvantaged by being an orphan in someone else's home. As seen in column (2) of Table 4, the effect of being an orphan is now insignificant for the sample of young children. For older children, the effect is diminished only slightly, from a 13.8 percent probability of school enrollment for the full sample to 11.7 percent. It appears that, insofar as our restricted sample allows us to portray caregiver favoritism for own children, this effect is present for older but not younger children.

Estimates of the Effect of Orphan Status – The Impact of Previous Enrollment: In our final set of estimates, we isolate one additional factor that might influence a caregiver's decision about whether to send an orphan to school: the child's enrollment history. We do this by estimating equation (1) on a sample of children who attended school the previous year.¹¹ In the first panel of Table 4 the sample includes all children and in the second panel the sample is for children in families with own children and orphans.¹² (The coefficients on the other variables in the model are suppressed but are available from the authors upon request.) Columns (1) through (3) mirror the samples from tables 2 and 3.

For the sample of all children between the ages of 7 and 16, the effect of being an orphan declines somewhat. When our model is estimated for the sub-sample of households with orphans and own children, we find that orphan status is no longer a statistically significant predictor of attendance. The effect of orphan status is also statistically insignificant for the sample of older children (column (3)) where the effect of orphan status in our previous estimates was particularly strong. So, as long as a child was enrolled last year, it makes no difference to their probability of enrollment in the current year if the child is an orphan or not. While this is only one measure of a child's propensity to continue in school, our result is consistent with caregivers not giving preferential treatment to their own children.

This conclusion should be tempered somewhat by a consideration of the timing of when someone becomes an orphan. When we restrict our sample to children who did not attend school the previous year, we include (a) orphans who were not orphans the previous year and (b) orphans who were orphans the previous year. To test our conjectures about the role of previous enrollment, we would like to only include orphans who became orphans in the year of the survey but we are unable to identify the timing of when a child becomes an orphan in our data. If the majority of orphans in our samples became orphans in the year of this survey, our conclusions about the lessened influence of preferential treatment for own children. The rapid increase in HIV/AIDS cases in Zimbabwe in recent years implies that a large portion of our sample may have become orphans in the past year. Moreover, even for orphans who have been orphaned for more than one year, a subset of these may have been with caregivers who made their decisions about past enrollment decisions of the child rather than preferential treatment for their own children. Future research may wish to examine whether our results about the diminished effect of orphan status among households with own children and orphans still holds when the timing or

orphaning is available. In addition, future research may wish to see if this result still holds after controlling for other factors which would influence a caregiver's decision to keep children in school.

CONCLUSION

In comparison with most developing countries, the absolute levels of school enrollment in Zimbabwe are high. However, our results suggests reasons for concern about the future. Across several specifications, we find that orphans are less likely to enroll in school than non-orphans. This, coupled with the fact that the percentage of children who are orphans is growing rapidly, suggests that high average enrollments may not continue in the future.

Of further concern is that this rapid growth in orphans can be traced to the HIV/AIDS pandemic. Attendance in school has been shown to among the most successful and cost effective means of preventing HIV/AIDS infection (Meyer, 2003). If children at risk are failing to attend to school, an opportunity to break the cycle of infection is being missed. Interventions to increase enrollment among orphans are therefore critical not only for the educational benefits that accrue to the child and the externalities that benefit the broader society, but because they are a critical tool in controlling the pandemic. Given Zimbabwe's relatively extensive system of school facilities, supply is not the key constraint to providing quality universal education. Rather, interventions designed to maintain and improve enrollment should be focused primarily on ensuring orphans and other vulnerable children have the resources to enroll in school.

In the Zimbabwean context, we find that current consumption is an important determinant of demand. As such, school subsidies or loans may be expected to help to increase

enrollment. However, the economic crisis in Zimbabwe makes the adoption of new internally-funded large scale blanket subsidies extremely unlikely - interventions must instead be targeted.

Two of our results should help to inform targeting strategies. First, while orphans are less likely to enroll overall, young orphans do not seem to be particularly disadvantaged. It is among the eleven to sixteen age group, where orphans can be shown to fare worse than other children, even in households with both orphans and non-orphans. Second, previous enrollment matters critically for keeping orphans in school. Among children in families with their own children and orphans who were enrolled in school the previous year, orphans are no less likely than non-orphans to be currently enrolled. The policy implication is clear: the key to getting orphans in school is keeping all children affected by HIV/AIDS in school, i.e. providing them the support necessary so that they never drop out to begin with.

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REFERENCES

- Ainsworth, M., & Filmer, D. (2002). *Poverty, AIDS and children schooling: A targeting dilemma*. World Bank Policy Research, (Working Paper No. 2885). Washington, DC: World Bank.
- Ainsworth, M., & Semali, I. (1998). Who is most likely to die of AIDS? Socioeconomic correlates of adult deaths in Kagera Region, Tanzania. In M. Ainsworth, L. Fransen, & M. Over (Eds.), *Confronting AIDS: Evidence from the developing world*. Brussels: European Union.
- Ainsworth, M., Beegle, K., & Koda, G. (2000). *The impact of adult mortality on primary school enrollment in northwestern Tanzania*. World Bank Policy Research, (Working Paper). Washington, DC: World Bank.
- Anderson, K., King, E., & Wang Y. (2003). Market returns, transfers and demand for schooling in Malaysia, 1976-1989. *Journal of Development Studies*, 39, 1-28.
- Al-Qudsi, S. (2003). Family background, school enrollments, and wastage: Evidence from Arab countries. *Economics of Education Review*, 22, 567-580.
- Barnett, T., & Blaikie, P. (1992). *AIDS in Africa: Its present and future impact*. New York: The Guilford Press.
- Baylies, C. (2002). The impact of AIDS on rural households in Africa: A shock like any other? *Development and Change*, 33(4), 611-632.
- Bennell, P., Hyde, K., & Swainson, N. (2002). *The impact of the HIV/AIDS epidemic on the education sector in sub-saharan Africa*. Centre for International Education, University of Sussex Institute of Education.
- Binder, M. (1999). Community effects and desired schooling of parents and siblings in Mexico.”

- Economics of Education Review*, 18(3), 311-325.
- Bishai, D., et al. (2003). Does biological relatedness affect survival? *Demographic Research*, 8(9), 261-278.
- Buchmann, C. (2002). Getting ahead in Kenya: Social capital, shadow education, and achievement. *Research in Sociology of Education: Schooling and Social Capital in Diverse Cultures*, 13, 133-159.
- Case, A., Paxson, C., & Ableidinger, J. (2004). Orphans in Africa: Parental death, poverty and school enrollment. *Demography* 41(3), 483-508.
- Catholic Relief Services. (2004). *Annual Public Summary of Activities – Zimbabwe*.
Forthcoming.
- Connelly, R., & Zheng, Z. (2003). Determinants of school enrollment and completion of 10 to 18 year-olds in China. *Economics of Education Review*, 22, 379-388.
- Coombe, C. (2002). Mitigating the impact of HIV/AIDS on education supply, demand and quality. In G. Cornia (Ed.), *AIDS, public policy and child well-being*. UNICEF.
- Deininger, K., Garcia, M., & Subbarao, K. (2003). AIDS-induced orphanhood as a systemic shock: Magnitude, impact, and program interventions in Africa. *World Development*, 31(7), 1201-1220.
- Dixon, S., McDonald, S., & Roberts, J. (2001). AIDS and economic growth in Africa: A panel data analysis. *Journal of International Development*, 13, 411-426.
- Filmer, D. (2000). The structure of social disparities in education: Gender and wealth. World Bank Policy Research, (Working Paper No.2268). Washington, DC: World Bank.
- Filmer, D. (2003). *Determinants of health and education outcomes: Background note for world*

- development report 2004: Making services work for poor people*. Washington, DC: World Bank.
- Filmer, D., & Pritchett, L. (1998). *The effect of household wealth on educational attainment around the world: Demographic and health survey evidence*. Washington, DC: World Bank.
- Foster, G., Shakespeare, R., Chinemana, F., Jackson, H., Gregson, S., Marange, C., & Mashumba, S. (1995). Orphan prevalence and extended family care in a peri-urban community in Zimbabwe. *AIDS Care*, 7, 3-17.
- Fuller, B. & Liang, X. (1999). Which girls stay in school? The influence of family economy, social demands, and ethnicity in South Africa. In C. H. Bladsoe, J. Casterline, J. Johnson-Kuhn, & J. Haaga (Eds.), *Critical perspectives on schooling and fertility in the developing world* (pp. 181-215). Washington, DC: National Academy Press.
- Gachuhi, D. (1999). *The impact of HIV/AIDS on education systems in the eastern and southern Africa regions and the response of education systems to HIV/AIDS: Life skills programmes*. UNICEF.
- Gilborn, L., Nyonyintono, R., Kabumbuli, R., & Jagwe-Wadda, G. (2001). *Making a difference for children affected by AIDS: Baseline findings from operations research in Uganda*. Horizons Program, (Working Paper).
- Glewwe, P., & Jacoby, H. (2004). Economic growth and the demand for education: Is there a wealth effect? *Journal of Development Economics*, 74, 33-51.
- Gundersen, C. & Oliveira, V. (2001). The Food Stamp Program and Food Insufficiency. *American Journal of Agricultural Economics*, 83, 875-887.

- Gundersen, C., & Ziliak, J. (2003). The Role of Food Stamps in Consumption Stabilization. *Journal of Human Resources*, 38, 1051-1079.
- Kamali, A., Seeley, J., Nunn, J., Kengeya-Kayondo, A., Ruberantwari, A., & Mulder, D. (1996). The orphan problem: Experience of a sub-Saharan Africa rural population in the AIDS epidemic. *AIDS Care*, 8, 509-515.
- Kelly, M. (2000a). *HIV/AIDS and education in eastern and southern Africa: The leadership challenge and the way forward*. Addis Ababa: UNECA.
- Kelly, M. (2000b). Standing education on its head: Aspects of schooling in a world with HIV/AIDS. *Current Issues in Comparative Education*, 3(1).
- Lloyd, C., & Blanc, A. (1996). Children's schooling in sub-saharan Africa: The role of fathers, mothers, and others. *Population and Development Review*, 22(2), 265-298.
- Meyer, D. (2003). *HIV/AIDS and education in Africa*. Rand Afrikaans University, ASWE.
- National AIDS Council. (2004). *The HIV/AIDS epidemic in Zimbabwe: Where are we now? Where are we going?* Ministry of Health and Child Welfare.
- Ntozi, J. (1997). Effects of AIDS on children: The problem of orphans in Uganda. *Health Transition Review*, 7, 23-40.
- Parish, W., & Willis, R. (1993). Daughters, education, and family budgets: Taiwan experiences. *Journal of Human Resources* 28(4), 863-898.
- Shapiro, D., & Tambashe, O. (2001). Gender, poverty, family structure and investments in children's education in Kinshasa, Congo. *Economics of Education Review*, 20, 359-373.
- UNAIDS. (2004). *Children on the brink 2004: A joint report of new orphan estimates and a framework for action*. New York: United Nation's Children Fund.

- UNAIDS and UNICEF. (2003). *Report on the technical consultation on indicators development for children orphaned and made vulnerable by HIV/AIDS*. New York: UNICEF.
- UNDP. (2004). *Human Development Report*. New York: UNDP.
- UNICEF (2003) *Hope never dries up: Facing the challenges. A situational assessment and analysis of children in Zimbabwe: 2002 update*. Harare, Zimbabwe: United Nation's Children Fund.
- Williamson, J., & Hunter, S. (1998). *Responding to the needs of children orphaned by HIV/AIDS*. (US AID Report No. 7.). Washington, DC.
- World Bank. (1999). *Confronting AIDS: Public priorities in a global epidemic*. New York: Oxford University Press.
- World Bank. (2000). *Exploring the implications of the HIV/AIDS epidemic for educational planning in selected African countries: The demographic question*. Paper presented to workshop on impact of HIV/AIDS on education, Paris.
- World Bank. (2001). *World development indicators*. (CD-ROM).

Table 1: School Enrollment Status of Orphans and Non-Orphans

	Orphan	Non-Orphan
Attending school, ages 6-16 (%)	77.05	86.73
Attending school, ages 6-10 (%)	81.67	86.00
Attending school, ages 11-16 (%)	73.85	87.27
Girls attending school, ages 6-16 (%)	76.81	86.87
Girls attending school, ages 6-10 (%)	80.80	87.08
Girls attending school, ages 11-16 (%)	74.06	86.73
Boys attending school, ages 6-16 (%)	77.92	86.56
Boys attending school, ages 6-10 (%)	82.69	85.01
Boys attending school, ages 11-16 (%)	74.60	87.76

Table 2: Comparisons of Children by Orphan Status

	All Children	Orphans	Non-Orphans
<i>Employment</i>			
No formal employment	0.578	0.653	0.535
General worker	0.058	0.049	0.063
Subsistence farmer	0.154	0.133	0.166
Informal trader	0.062	0.049	0.070
Skilled worker	0.070	0.032	0.092
<i>Type of Land use</i>			
Communal	0.565	0.540	0.580
Small holder farmer	0.020	0.023	0.018
Urban	0.355	0.369	0.347
Peri-urban area	0.020	0.031	0.014
Resettlement	0.025	0.028	0.023
<i>Type of Dwelling</i>			
Brick and corrugated roof	0.568	0.591	0.554
Pole and dagga	0.303	0.282	0.315
Brick and thatch roof	0.119	0.116	0.120
<i>Number of meals per day</i>			
Three	0.261	0.237	0.275
Two	0.554	0.586	0.535
One	0.184	0.176	0.188
<i>Adequate amount of food</i>			
Always	0.101	0.052	0.129
Sometimes	0.321	0.338	0.312
Rarely	0.168	0.157	0.175
Never	0.408	0.452	0.383
<i>Eat anything between meals</i>			
Always	0.020	0.006	0.028
Sometimes	0.102	0.075	0.118
Rarely	0.053	0.061	0.048
Never	0.748	0.777	0.731
<i>Household Social Capital</i>			
Household Size			
Two to four persons	0.210	0.246	0.190
Five to eight persons	0.449	0.405	0.475
Nine or more persons	0.166	0.181	0.158
Age of household head	47.304	51.600	44.832
Head of household is female	0.483	0.428	0.577
<i>Characteristics of Child</i>			
Child is female	0.509	0.517	0.505
Age of child	11.253	11.204	11.339
<i>Province</i>			
Bulawayo	0.323	0.347	0.309
Manicaland	0.244	0.239	0.247
Mashonaland West	0.235	0.253	0.224
Masvingo	0.052	0.052	0.052
Midlands	0.094	0.073	0.106
Matebeleland South	0.050	0.033	0.059

Notes: Sample is restricted to children between the ages of 6 and 16.

Table 3: Estimates of the Impact of Orphan Status and Other Variables on School Enrollment

	Children from 6 to 16 Years	Children from 6 to 10 Years	Children from 11 to 16 Years
Orphan	-0.284** (0.063)	-0.097 (0.097)	-0.446** (0.081)
Age of child	-0.018** (0.009)	0.309** (0.032)	-0.205** (0.020)
Child is female	-0.029 (0.052)	-0.003 (0.084)	-0.049 (0.070)
Head of household is female	-0.085 (0.066)	-0.092 (0.099)	-0.129 (0.084)
Age of household head	0.003 (0.002)	-0.003 (0.004)	0.006** (0.003)
Household size	-0.012 (0.018)	0.004 (0.025)	-0.024 (0.022)
Sometimes or always adequate food	0.194** (0.069)	0.200** (0.099)	0.226** (0.092)
No formal employment	-0.004 (0.065)	-0.026 (0.095)	-0.007 (0.085)
Brick and corrugated roof	0.077 (0.082)	0.133 (0.113)	0.025 (0.108)
Brick and thatch roof	-0.029 (0.111)	0.006 (0.166)	-0.049 (0.145)
Lives on land used for farming	-0.115 (0.093)	-0.065 (0.203)	-0.065 (0.111)
Bulawayo	-0.092 (0.166)	-0.427 (0.285)	0.039 (0.199)
Mashonland West	-0.363** (0.154)	-0.656** (0.269)	-0.243 (0.186)
Masvingo	0.224 (0.213)	0.296 (0.331)	0.170 (0.272)
Manicaland	-0.165 (0.157)	-0.383 (0.269)	-0.124 (0.186)
Midlands	0.012 (0.178)	-0.316 (0.297)	0.196 (0.218)
Number of observations	3645	1525	2120

Notes: Standard errors in parentheses. The sample in the first column is restricted to all children between the ages of 6 and 16. Superscripts of * or ** are used if the p-value of the difference among the variables is less than 0.1 or 0.05, respectively.

Table 4: Estimates of the Impact of Orphan Status and Other Variables on School Enrollment – Households with Orphans and Non-Orphans

	Children from 6 to 16 Years	Children from 6 to 10 Years	Children from 11 to 16 Years
Orphan	-0.188** (0.082)	0.011 (0.123)	-0.381** (0.115)
Age of child	-0.036** (0.013)	0.283** (0.045)	-0.237** (0.028)
Child is female	-0.025 (0.077)	-0.050 (0.119)	-0.028 (0.102)
Head of household is female	-0.069 (0.093)	-0.140 (0.133)	-0.065 (0.122)
Age of household head	0.003 (0.003)	-0.008 (0.005)	0.009** (0.004)
Household Size	-0.019 (0.029)	0.007 (0.038)	-0.036 (0.033)
Sometimes or always adequate food	0.157* (0.091)	0.053 (0.134)	0.261** (0.123)
No formal employment	-0.021 (0.090)	-0.055 (0.129)	-0.031 (0.121)
Brick and corrugated roof	0.036 (0.118)	0.047 (0.155)	0.049 (0.167)
Brick and thatch roof	-0.187 (0.149)	0.105 (0.210)	-0.326* (0.198)
Lives on land used for farming	-0.044 (0.156)	0.036 (0.339)	-0.202 (0.190)
Bulawayo	-0.095 (0.257)	-0.293 (0.478)	-0.063 (0.335)
Mashonland West	-0.289 (0.251)	-0.462 (0.474)	-0.225 (0.329)
Masvingo	0.299 (0.296)	0.027 (0.515)	0.422 (0.388)
Manicaland	-0.067 (0.264)	-0.168 (0.476)	-0.082 (0.345)
Midlands	0.035 (0.280)	-0.140 (0.489)	0.295 (0.363)
Number of Observations	1725	733	992

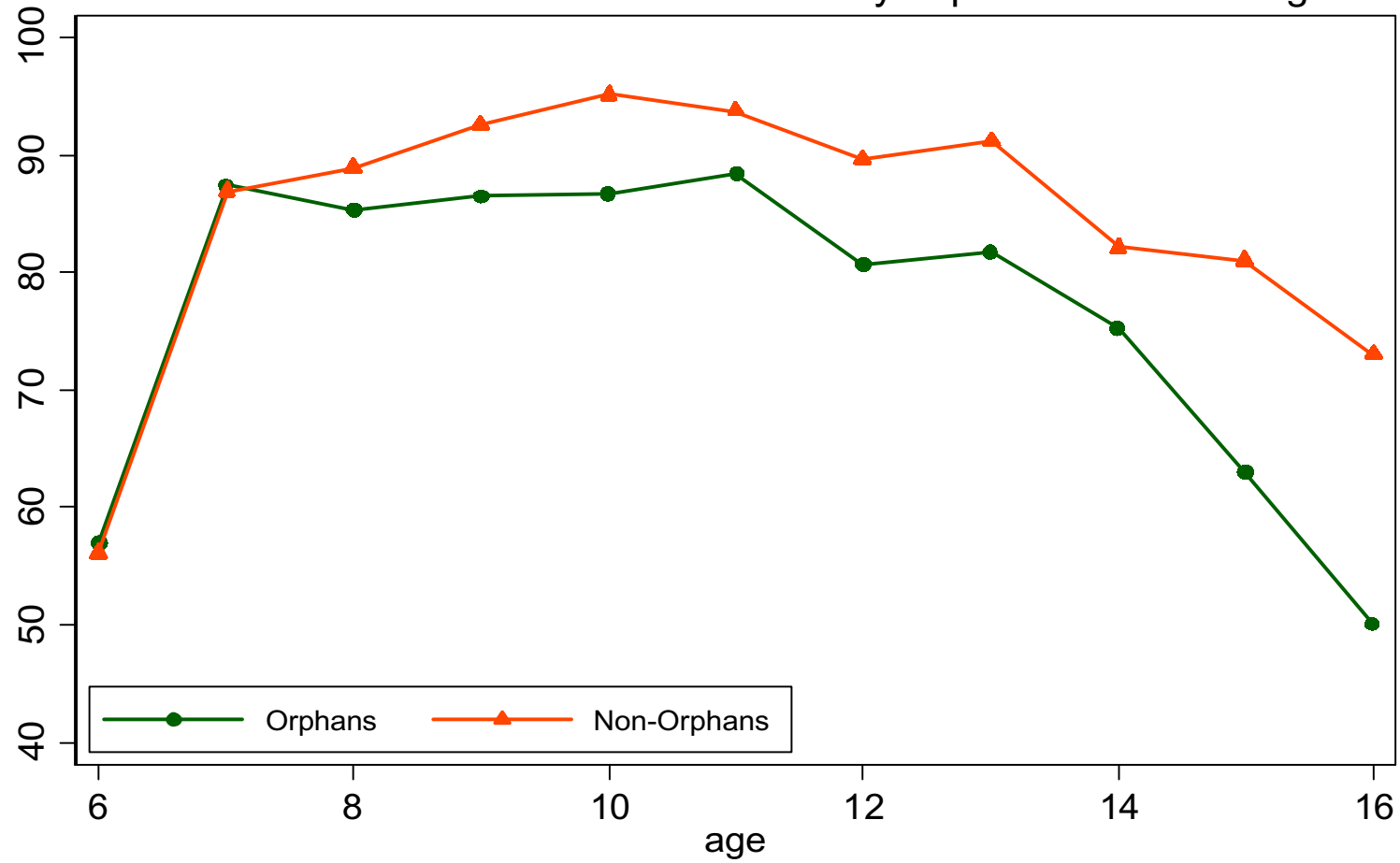
Notes: Standard errors in parentheses. The sample in all three columns is restricted to children living in households with orphans and non-orphaned children. The sample in the first column is restricted to all children between the ages of 6 and 16. Superscripts of * or ** are used if the p-value of the difference among the variables is less than 0.1 or 0.05, respectively.

Table 5: Estimates of the Impact of Orphan Status and Other Variables on School Enrollment – Children who Attended School the Previous Year

	Children from 7 to 16 Years	Children from 7 to 10 Years	Children from 11 to 16 Years
	All Children		
Orphan	-0.229** (0.100)	0.010 (0.191)	-0.309** (0.112)
	Children in Households with Orphans and Non-Orphans		
Orphan	-0.163 (0.142)	-0.103 (0.249)	-0.246 (0.161)

Notes: Standard errors in parentheses. The other covariates in the model (not displayed) are for the same variables as in Tables 3 and 4. Superscripts of * or ** are used if the p-value of the difference among the variables is less than 0.1 or 0.05, respectively.

Figure 1:
School Attendance Rates in Zimbabwe by Orphan Status and Age



NOTES

¹ This and many of the other demographic predictions cited for the region that follow should be treated with some caution. Data limitations and changing circumstances – like rapidly increasing access to anti-retrovirals under PEPFAR and other programs on the one hand, and declining economic conditions on the other – may significantly change the demographic impacts over the medium term. See Coombe (2002) for a discussion of the robustness of such estimates.

² An alternative way of viewing the quality issue is that the costs of providing a given quality of education have risen due to the HIV/AIDS epidemic. The increases in direct costs include employee benefits, hiring of temporary staff, costs of recruitment and training. The indirect costs include loss of productivity due to increased absenteeism, declining morale and poor performance of teachers in poor health. As Meyer (2003) points out, the loss of productivity and blows to human capital leading to increased costs are not associated with any improvement in outcomes. On the contrary, these increased costs are occurring in a context of deteriorating outcomes. These costs are unlikely to be of a magnitude to generate a disaster in any given year, but will be a constant drain on resources and are likely to imply a gradual decline in quality (Coombe, 2001).

³ There are two general fees that are paid for school: the School development Association levy (SDA) (public school) or School development Association Committee Levy (private school) and a general purpose fund (GPF) fee. The former covers general school maintenance and utilities and the latter covers things such as sports, field trips, and other school activities

⁴ Along with affecting enrollment, gender has also been shown to affect other outcomes including, e.g., grade repetition (Buchmann, 2002),

⁵ The HDI ranks countries according to their income per capita, life expectancy, literacy and enrollment rates. Countries are categorized into high, medium and low human development groups according to their ranking. The averages above are for the low human development countries for which data are available, the great majority of which are Sub-Saharan African countries.

⁶ There are some obvious limitations to the use of enrollment as our measure of educational attainment. For example, our results do not indicate the number of years of schooling, or the grade level completed by the students. Less obviously, our results do not permit any inferences to be drawn about the quality of education received – either from the side of institution (how good the school is), or the student (our data include information only on whether a child attends school, not how frequently or with what diligence or enthusiasm). Our data does not include other indicators of educational attainment. Given the likely impact of HIV/AIDS on both institutional quality and the lives of nominally enrolled students, future research using other measures of education would be useful.

⁷ Overall, school enrollment rates are higher than in many other developing countries. This is due, in part, to the rhetoric in the war for independence in Zimbabwe about the need for free education for all. After independence one of the government's top resolutions was to ensure free quality education.

⁸ We use this food insecurity measure as a measure of current consumption insofar as food consumption is closely tied to food insecurity (e.g., Gundersen and Oliveira, 2001) and food consumption is often used as a measure of current consumption (e.g., Gundersen and Ziliak, 2003).

⁹ Our samples is defined at the child rather than the household level. As a consequence, our samples contain children who live in the same household. In the estimates found in Tables 3 through 5, we correct the standard errors for this clustering at the household level.

¹⁰ In comparison to the full sample, which includes all children and was used to address the previous question, our sample restriction results in a 46.7 percent reduction due to the exclusion of households with only their own children and a 11.0 percent reduction due to the exclusion of households with only orphans.

¹¹ To be consistent with our previous results, we limit our sample to children between the ages of 7 and 16. In other words, our sample consists of children who would have been in school between the ages of 6 and 16 in the previous year.

¹² When we restrict our sample to children who attended school the previous year, there is a 15.1 percent drop in the number of children for the sample of all children and a 16.4 percent drop in the number of children for the sample of households with own children and orphans.