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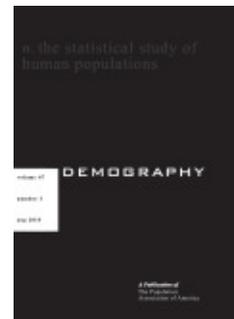
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Case, Anne, 1958-
Ardington, Cally.

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THE IMPACT OF PARENTAL DEATH ON SCHOOL OUTCOMES: LONGITUDINAL EVIDENCE FROM SOUTH AFRICA*

ANNE CASE AND CALLY ARDINGTON

We analyze longitudinal data from a demographic surveillance area (DSA) in KwaZulu-Natal to examine the impact of parental death on children's outcomes. The results show significant differences in the impact of mothers' and fathers' deaths. The loss of a child's mother is a strong predictor of poor schooling outcomes. Maternal orphans are significantly less likely to be enrolled in school and have completed significantly fewer years of schooling, conditional on age, than children whose mothers are alive. Less money is spent on maternal orphans' educations, on average, conditional on enrollment. Moreover, children whose mothers have died appear to be at an educational disadvantage when compared with non-orphaned children with whom they live. We use the timing of mothers' deaths relative to children's educational shortfalls to argue that mothers' deaths have a causal effect on children's educations. The loss of a child's father is a significant correlate of poor household socioeconomic status. However, the death of a father between waves of the survey has no significant effect on subsequent asset ownership. Evidence from the South African 2001 Census suggests that the estimated effects of maternal deaths on children's outcomes in the Africa Centre DSA reflect the reality for orphans throughout South Africa.

The HIV/AIDS pandemic is leaving in its wake a generation of children who have lost parents, caregivers, and other loved ones to illness and death. Since 1990, rates of orphanhood have increased by more than a third in sub-Saharan Africa, the region with the highest prevalence of HIV/AIDS. UNAIDS (2004) estimates that 43 million children under age 18 in the region are orphans, more than 12 million as a result of HIV/AIDS. In South Africa, an estimated 2.3 million children under age 18 have lost one or both of their parents, representing 13.3% of all South African children (South African Census 2001).

Orphans may be vulnerable in many dimensions. That children who have lost parents are at risk for worse schooling outcomes has been suggested by recent work in sub-Saharan Africa (Bicego, Rutstein, and Johnson 2003; Case, Paxson, and Ableidinger 2004; Evans and Miguel 2004) and in areas less heavily afflicted by AIDS, such as Mexico and Indonesia (Gertler et al. 2003). In addition, children who have lost fathers have been found to live in significantly poorer households, on average (Case et al. 2004; Yamano and Jayne 2004).

*Anne Case, Research Program in Development Studies, Princeton University, and Visiting Scientist, Africa Centre for Health and Population Studies. Cally Ardington, Department of Statistical Sciences and Saldrú Research Associate, University of Cape Town, and Visiting Scientist, Africa Centre for Health and Population Studies. Address correspondence to Anne Case, 367 Wallace Hall, Princeton University, Princeton NJ 08544; E-mail:accase@princeton.edu. This work was supported by Wellcome Trust Grants 065377 and 067181 to the Africa Centre for Health and Population Studies. Case gratefully acknowledges funding from the MacArthur Foundation ("Research Network on Poverty and Inequality in Broader Perspective") and the National Institute of Aging (Grant R01 AG20275-01). Ardington acknowledges funding from the National Institute of Child Health and Development and the National Institute of Aging (Grant R01 HD045581-01). The analysis is based on data collected through the Africa Centre Demographic Information System. The authors are affiliated with the Population Studies Group of the Africa Centre for Health and Population Studies. They have benefited from the ACDIS field and data centre staff under the leadership of the principal investigator, Dr. Kobus Herbst. They wish to thank Angus Deaton, Frances Lund, John Strauss, two referees, and seminar participants at several universities for comments on an earlier version.

Although many researchers have shown an association between parental death and children's well-being, estimating whether the loss of a parent has a causal effect on children's outcomes is difficult. In many cross-sectional data sets, such as the Demographic and Health Surveys analyzed by Case et al. (2004), one cannot know the relative wealth of a child's household or the child's school attainment prior to the parent's death. Children who have lost a parent may themselves be ill and may be behind in school because of their own illnesses. Orphans' households may have been systematically poorer than other households prior to parents' deaths, leading to correlations between the death of a parent, household poverty, and school attainment. With cross-sectional data, it is generally not possible to rule out such explanations for orphans' poorer outcomes. Longitudinal data, in which the same children are followed through time, with parents' deaths recorded as they occur, allow us to move some distance in evaluating alternative explanations for children's outcomes following the death of a parent. However, large longitudinal data sets are relatively rare in developing countries struggling with the AIDS crisis.

An exception is the database established by the Africa Centre for Health and Population Studies, in northern KwaZulu-Natal, which has been following 100,000 people in 11,000 households since 2000. Data collected by the Africa Centre allow us to follow children through time and to examine the extent to which children's outcomes respond to parental death.

In this article, we analyze longitudinal data from the Africa Centre and document the association between parental death and children's educational attainment, enrollment, and the resources devoted to each child's education. Because all children in the field site have been followed through time, we are able to identify whether children were behind in school prior to a parent's death or fell behind only after a parent died. In addition, we can analyze the extent to which household poverty precedes parents' deaths or appears to be the result of this loss.

We find significant differences in the impact of mothers' and fathers' deaths. The loss of a child's *mother* is a strong predictor of poor schooling outcomes. Maternal orphans are significantly less likely to be enrolled in school and have completed significantly fewer years of schooling, conditional on age, than children whose mothers are alive. Less money is spent on their educations, on average, conditional on enrollment. We find no evidence that this simply reflects the fact that children are themselves ill or are poor students. Children whose mothers were alive when the first data on educational attainment were collected in 2001, but whose mothers subsequently died, did not lag behind other children in enrollment or educational attainment in 2001. However, they had completed significantly fewer years of education when observed after their mothers' deaths. Furthermore, children who were enrolled at the time of the first socioeconomic survey, but whose mothers died between the rounds of the socioeconomic survey, were significantly less likely than other children their age to be enrolled when observed after their mothers had died. Our evidence is consistent with mothers' deaths having a causal effect on children's educational outcomes.

The loss of a child's *father* is a significant predictor of household socioeconomic status. Children whose fathers have died live in significantly poorer households, measured on a number of dimensions. However, households in which fathers died were poor prior to fathers' deaths. The death of a father between waves of the survey has no significant effect on future asset ownership. Although the loss of a father is correlated with poorer educational outcomes, this correlation arises because the household is poor. Children whose fathers were alive when the first data were collected on educational attainment in 2001, but whose fathers subsequently died, do not fall behind when observed after their fathers' deaths. In addition, children who were enrolled at the time of the first socioeconomic survey, but whose fathers died between the rounds of the survey, were not significantly less likely than other children their age to be enrolled when observed after their fathers had died. The

correlation between fathers' deaths and children's schooling outcomes appears to be driven entirely by their common link to household economic status.

The Africa Centre database is rich both in the detail it offers on each child and in its ability to follow children through time, but it draws a picture only for Zulu children being raised in one province of South Africa. Results from the 2001 South African Census, however, suggest that the estimated effects of maternal deaths on children's school enrollment and attainment found for the Africa Centre data are also found for South Africa as a whole.

We proceed as follows. We first introduce the Africa Centre data and then document the relationship between orphanhood and educational attainment. Next, we discuss the timing of parental death relative to the timing of children falling behind in school and examine whether all maternal orphans are at equal risk. Specifically, we explore whether girls are at special disadvantage and whether the impact of being an orphan is lessened when orphans live with pensioners. Finally, we compare results from the Africa Centre to those of South Africa as a whole and then discuss policy options.

DATA

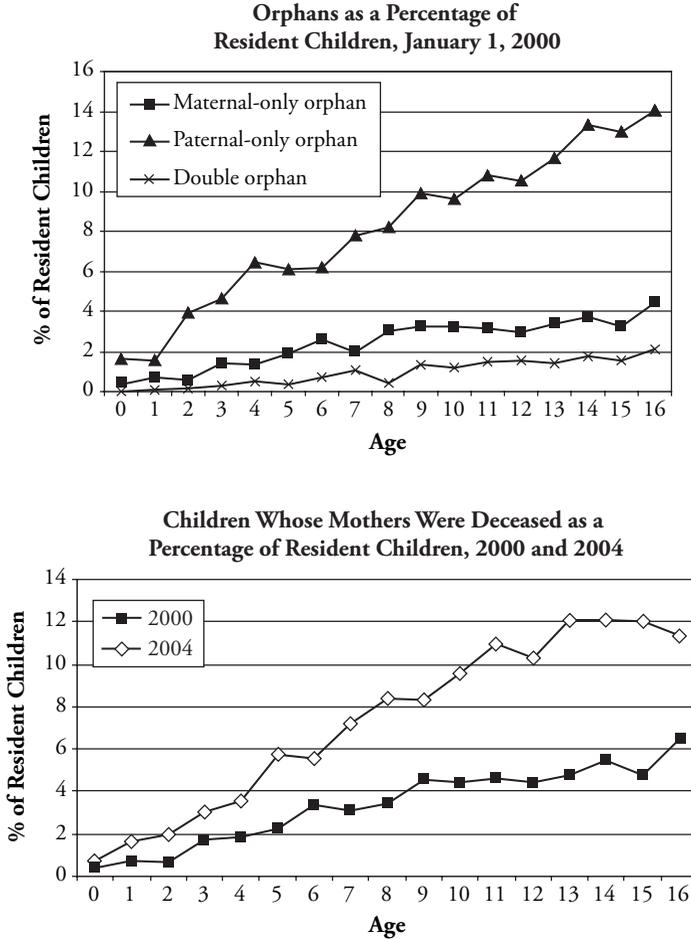
The Africa Centre maintains a database on all individuals who live in, or are members of households that reside in, a demographic surveillance site in the Umkhanyakude District of KwaZulu-Natal. Data on births, deaths, migration, and changes in marital status are collected twice annually for all household members in this demographic surveillance area (DSA). The district is relatively rural and poor when compared either with South Africa as a whole or with the rest of KwaZulu-Natal (Case and Ardington 2004). It is struggling with a heavy disease and death burden, the result of the HIV/AIDS pandemic.

Our analysis of children's education relies on information collected on children's living arrangements and on their parents' vital status. In addition, we use data on school enrollment and attainment and on household economic status, which have been collected in two rounds of the Africa Centre's Household Socio-Economic (HSE) survey. The first round (which we refer to as HSE1) collected data from all households in the DSA in the first half of 2001, and the second round (HSE2) collected socioeconomic data over the 18-month period from January 2003 through June 2004. The latter round contained a rich set of questions about household employment, income, and expenditures, with detailed questions about educational expenditures for each child. We begin by analyzing the data collected in HSE2 and then return to HSE1 data in order to better understand the timing of parents' deaths relative to the point at which children fall behind in school.

The DSA is experiencing high rates of death among adults in middle age, largely a result of the AIDS crisis. Death in early and middle adulthood has led to a large and growing number of orphans in the DSA. Figure 1 presents the fraction of children who were orphans in the DSA when the first individuals were registered (January 1, 2000) and shows changes in the percentage of children who had lost a mother between 2000 and 2004. The top panel of Figure 1 presents the percentages in 2000 of resident children at each age who had lost their mothers but whose fathers were alive, children who had lost fathers but whose mothers were alive, and children who had lost both parents. We find the risk of all three types of orphanhood increase with age. By age 10, for example, over 3% of children had lost their mothers (their fathers were alive), 10% had lost their fathers (their mothers were alive), and 1.2% had lost both parents. That the crisis is deepening can be seen in the bottom panel of Figure 1, which presents the percentage of resident children whose mothers were dead (both maternal-only orphans and double orphans) at two points in time: January 1, 2000, and January 1, 2004. This percentage increased at every age from 1 to 16 between 2000 and 2004, with rates among 10-years-olds more than doubling, from 4.4% to 9.6%, in this four-year period.

Table 1 presents information on the living arrangements of orphans and all other children aged 6 to 16 who were resident in the DSA at the time that data were collected for

Figure 1. Rates of Orphanhood in the DSA



HSE2. In total, information is available for 19,978 such children. To reflect the living arrangements observed in South Africa, the Africa Centre Demographic Information System (ACDIS) distinguishes between an individual’s membership in a household and his or her residency at a homestead. An individual can be resident at only one place at one time. However, he or she may be a member of several households simultaneously. In every round of ACDIS, a knowledgeable household member names all individuals currently recognized as “household members.” Membership does not depend on the number of nights a person sleeps at a homestead or how often he or she eats from the household pot. Membership is a social construct, and a household is free to name all individuals it recognizes as members (see Hosegood and Timæus 2003 for details). A child, for example, may be identified as a member of both his father’s household and his grandmother’s household. If the child lived with his father, we recorded the father as a “household member, resident

Table 1. Parental Status of Resident Children Aged 6–16 in the DSA at HSE2

| Mother's Status | Father's Status | | | | | | Row Totals (% of mothers) |
|---|---------------------------------------|---|---------------------------------------|-----------------------|-----------------|----------------|------------------------------|
| | Household Member, Resident With Child | Household Member, Not Resident With Child | Not Household Member, Resident in DSA | Not Followed by ACDIS | Dead | Status Unknown | |
| Household Member, Resident With Child | 3,928 | 3,030 | 48 | 2,918 | 1,656 | 268 | 11,908 (59.6) |
| Household Member, Not Resident With Child | 173 | 222 | 23 | 1,682 | 320 | 98 | 2,538 (12.7) |
| Not Household Member, Resident in DSA | 67 | 75 | 60 | 224 | 81 | 30 | 578 (2.9) |
| Not Followed by ACDIS | 274 | 414 | 16 | 1,016 | 287 | 79 | 2,111 (10.6) |
| Dead | 209 | 177 | 19 | 696 | 546 | 199 | 1,859 (9.3) |
| Status Unknown | 63 | 67 | 9 | 173 | 93 | 110 | 525 (2.6) |
| Column Totals | 4,797 (24.0) | 4,069 (20.4) | 183 (0.9) | 6,875 (34.4) | 3,057 (15.3) | 803 (4.0) | 19,978 |

Notes: Included in the analysis and in the column and row totals, but not shown in Table 1, are children whose mothers or fathers are known to be alive but whose membership and residency status are unknown, and children whose mothers or fathers were followed by ACDIS but were not household members and not resident in the DSA. In total, these categories account for 628 children not shown.

with child.” Alternatively, if the child lived with his grandmother at the time of HSE2, and not with his father, we recorded the father as a “household member, not resident with child.” If, instead, the child’s father was never a household member and never resided in the DSA after surveillance began, he would be reported as “not followed by ACDIS.” (At the time of HSE2, 4% of resident children aged 6 to 16 had multiple household memberships. We assign these children the characteristics of the household in which they were resident at HSE2.)

The first three rows and columns of Table 1 report the number of children for whom mothers and fathers were resident members of households in which their child was resident, were nonresident members of their child’s households, and were resident in the DSA but not claimed as members of their child’s households. Children in the DSA were substantially more likely to be living with their mothers (60%) than with their fathers (24%).

For all but a handful of cases, ACDIS was able to ascertain whether a child’s parents were dead or alive, even for those cases in which the parent was not followed by ACDIS. Table 1 shows that, by the time of the second socioeconomic data collection, 9% of children aged 6 to 16 had lost their mothers, and 15% had lost their fathers. Thirty-four percent of children’s fathers have never lived in the DSA and have never been identified as a member of any household followed in the DSA. Combining fathers who were absent and fathers who were dead at the time of HSE2 reveals that more than half of all children could not claim their fathers as household members. Moreover, of the 1,859 children whose mothers were dead, only 11% were living with their fathers, a point we will return to later when comparing results of maternal-only orphans and double orphans.

Table 2. Sample Characteristics for Children Aged 6–16 Who Were Resident in the DSA at HSE2

| Variable | Mother Was Alive at HSE2 | Mother Died Between January 2000 and HSE2 | Mother Died Before January 2000 | Father Was Alive at HSE2 | Father Died Between January 2000 and HSE2 | Father Died Before January 2000 |
|--|--------------------------|---|---------------------------------|--------------------------|---|---------------------------------|
| Child Characteristics | | | | | | |
| Age at HSE2 | 10.9 | 11.1* | 12.1* | 10.8 | 11.2* | 11.9* |
| Child Schooling Outcomes | | | | | | |
| Years of completed education | 4.18 | 4.08 | 4.71* | 4.12 | 4.24 | 4.83* |
| Enrolled at HSE2 | 0.96 | 0.93* | 0.93* | 0.96 | 0.96 | 0.94* |
| Monthly expenditure on child's schooling | 64.8 | 43.4* | 49.4 [†] | 62.8 | 63.3 | 61.7 |
| Household Characteristics | | | | | | |
| Number of resident members | 8.11 | 8.11 | 8.15 | 8.13 | 7.85 [†] | 8.22 |
| Indicator: Child lives with a female pensioner | 0.30 | 0.42* | 0.43* | 0.31 | 0.29 | 0.32 |
| Indicator: Child lives with a male pensioner | 0.09 | 0.09 | 0.14* | 0.10 | 0.06* | 0.08 [†] |
| Log(expenditure per member) | 4.71 | 4.66 | 4.76 | 4.72 | 4.65 [†] | 4.65 [†] |
| Household assets | 4.74 | 4.66 | 4.76 | 4.77 | 4.61 | 4.49* |
| Number of Observations | 17,594 | 1,139 | 644 | 16,118 | 1,275 | 1,648 |

Notes: The notation in columns 2 and 3 denote that the differences between the results in these columns and those in column 1 are significant at the 5% (*) or 10% ([†]) level. The notation in columns 5 and 6 denote that the differences between results in these columns and those in column 4 are significant. Monthly spending on a child's schooling is conditional on enrollment. All spending is reported in Rands.

Among all resident children aged 6 to 16, the vital status of parents is missing for 4% of fathers and 2.6% of mothers.¹ In all regression analyses in this article, to avoid sample selection bias, we include all children in our analysis, regardless of whether they are missing vital status information on a parent. We include indicator variables that a child's parent's vital status is unknown. (No results reported below would be changed in any meaningful way if we limited our analysis to those children with complete information on parents' vital status.)

Table 2 provides information on child and household characteristics for all resident children in the DSA for whom vital status of mothers (columns 1 through 3) or of fathers (columns 4 through 6) is known. The first three columns divide children according to whether their mothers were alive at HSE2 (column 1), their mothers died after the start of surveillance (January 2000) but before HSE2, or their mothers were dead at the start of surveillance. The last three columns provide the same information for children but stratified by the vital status of their fathers.

1. Children with missing information on parental vital status are not significantly different than other children in the sizes of their households, the number of assets their households own, or their sex distribution. However, these children have completed significantly less education (0.3 to 0.4 fewer years) and are significantly older (0.3 years), on average.

Consistent with the results presented in Figure 1, we find that children whose parents have died are significantly older, on average. In all that follows, we control for children's ages in order to separate the differences in outcomes that are (potentially) attributable to orphanhood from general differences between children that are due to age. Table 2 shows, for example, that orphans who lost a parent prior to the beginning of surveillance completed significantly more years of education at the time of HSE2 than non-orphans. It will become clear below that this difference is attributable to the fact that orphans are older, on average.

Data collected by the Africa Centre allow us to focus on three education variables: highest grade of education completed, school enrollment, and school-related expenses reported for each child. Children in South Africa begin school at age 6. If all children were enrolled at age 6 and all advanced one grade every year, we would expect to find the average grade of completed schooling to be 5 years for this sample of children (whose ages are distributed roughly uniformly from 6 to 16). Instead, we find that children have completed just over 4 years of schooling, on average. This is consistent with recent work that found that black South African children gain only between 0.7 and 0.8 of a grade for each year of age (see Case and Deaton 1999). This is due in part to children not being enrolled in school and in part to grade repetition. Enrollment rates are high in South Africa but are significantly lower for children who have lost their mothers (93%) than for other children (96%).

Sending a child to school generally entails expenses for fees, books, and a school uniform. For a smaller fraction of children, families also pay for transportation and a school-related allowance. The household socioeconomic module asks a knowledgeable household member to report each of these expenditures (fees, books, uniforms, transportation, school allowance) separately, using whatever reporting period is most natural (annual, monthly, or weekly). We have translated these to a monthly figure for each scholar. Conditional on school enrollment, school-related expenses (including zeros), on average, amount to 30% of mean spending per person in the child's household. Table 2 shows that significantly less is spent on children's schooling when their mothers are dead. This is true whether a mother died recently or before surveillance began. In contrast, we find no significant difference in school-related spending after a child's father dies.

The household socioeconomic survey provides information on variables that may affect children's educations, including the household's prosperity—here represented by total spending per household member and the number of assets owned by the household. As Table 2 makes clear, there is no significant difference (at the 10% level) in socioeconomic status between children whose mothers are alive and those whose mothers have died, measured using either household expenditure per person or household asset ownership. In contrast, children whose fathers are dead live in households with a significantly lower expenditure per member, which is true whether the fathers died recently or before surveillance began. Children who lost a father also live in households with fewer assets. The difference in asset ownership is significant for children whose fathers were dead when surveillance began.

Children in the DSA live in households containing slightly more than eight resident members, on average. Although household size is not significantly different for children who have lost a parent, household composition is. Specifically, children whose mothers have died are 12 percentage points more likely to live with a woman receiving an old-age pension than are children whose mothers are alive at HSE2. Recent research has suggested that the presence of women pensioners has positive externalities for grandchildren in South Africa (Duflo 2003). In what follows, we investigate the extent to which coresidence with pensioners is associated with children's schooling outcomes.

The economic well-being of children in the DSA is highly correlated with their fathers' vital status. We investigate this in results presented in Table 3, in which each row presents results from two regressions, both of which pertain to the same measure of economic

Table 3. Asset Ownership and Parental Death: Cross-Sectional and Panel Estimates

| Variable | Dependent Variable: Measure of Household Socioeconomic Status at HSE2 | | Dependent Variable: Change in Household Asset Ownership Between HSE1 and HSE2 | | Number of Observations for Regressions in the Row |
|--|---|------------------------------------|---|--|---|
| | Indicator: Mother Was Dead at HSE2 | Indicator: Father Was Dead at HSE2 | Indicator: Mother Died Between HSE1 and HSE2 | Indicator: Father Died Between HSE1 and HSE2 | |
| Log(expenditure per resident household member) | 0.010 (0.034) | -0.083* (0.032) | — ^a | — ^a | 15,892 |
| Total Assets Owned | -0.079 (0.103) | -0.293* (0.082) | 0.081 (0.121) | -0.162 (0.121) | 16,089 |

Notes: The left two columns report estimates from ordinary least squares regressions of household expenditure or asset ownership at HSE2 on indicators that mother and father are dead at HSE2. If vital status is missing for a parent, the relevant vital status indicator is assigned a value of zero, and an additional indicator variable is included to denote that a parent's vital status is missing. Estimates in columns 3 and 4 are from first-difference regressions of change in asset ownership on change in parent's vital status. Again, if change in parent's vital status is missing, it is assigned a value of zero, and an indicator is included to denote that the change in status has been assigned. Observations for the log expenditure equation (row 1) are restricted to individuals who have asset information at HSE1 and HSE2 in order to make results comparable with the asset results in row 2. Robust standard errors are presented, where correlation has been allowed between unobservable variables for children who live in the same household.

* $p < .05$

^aExpenditure per member was not collected at HSE1, and first-difference estimates for expenditure are not available.

status (log expenditure per member in row 1 and total assets owned in row 2). The left two columns report estimates from ordinary least squares (OLS) regressions of household expenditure or asset ownership at HSE2 on indicators that mother and father are dead at HSE2. Estimates in columns 3 and 4 are from first-difference regressions of change in asset ownership on change in parent's vital status between HSE1 and HSE2. Specifically, we include indicator variables that a child's mother (or father) died between the rounds of the household socioeconomic survey. Robust standard errors are presented, where correlation has been allowed between unobservables for children who live in the same household.

Both log expenditure per member and total assets owned are negatively and significantly associated with fathers' deaths. Children whose fathers were dead at HSE2 lived in households in which spending per person was 8% lower and that owned 0.29 fewer assets, on average. We find no significant association between assets owned or household expenditures and mothers' deaths. These results echo those of Case et al. (2004), who found, using 19 Demographic and Health Surveys from sub-Saharan Africa, that paternal orphans, on average, lived in significantly poorer households, while maternal orphans did not.

Without more information, we would not be able to tell whether households in which fathers have died are poorer because the households lost important contributors to household economic well-being or whether the correlation exists because household poverty contributed to the men's deaths or is correlated with something that did. We can address this question by using data available through the Africa Centre, which includes measures of household asset holdings at two points in time. The ability to follow changes in asset holdings is an important contribution of these data. Demographic and Health Surveys rely on asset holding as their measure of socioeconomic status, but because these are cross-sectional surveys, they do not allow researchers to look at changes in assets for a given household over time.

Columns 3 and 4 of Table 3 present results on change in asset ownership between HSE1 and HSE2, given change in parents' vital status between the survey rounds. (Household expenditure was not collected at HSE1, and for that reason, we cannot look at change in expenditure over this period.) In the cross section, fathers' deaths are negatively and significantly associated with total assets owned and with the ownership of several household goods. However, when we examine change in asset ownership, we find no significant association between a father's death between survey rounds and change in total assets owned or the ownership of individual assets (results not shown).

In summary, we find that children whose fathers have died live in poorer households, which is not true of children whose mothers have died. However, in first-difference estimates, we find no evidence that a parent's death causes households to become poorer: the death of either parent between rounds of the survey is not associated with lower asset holding when observed at HSE2.

In the following sections, as we examine the extent to which the loss of a parent lowers educational investment and attainment, we control for household socioeconomic status in order not to attribute to parents' deaths poorer outcomes that are attributable to lower household economic well-being. This issue never arises when examining mothers' deaths: we find no significant relationship between mothers' deaths and expenditure per member, total asset ownership, or change in total assets owned. However, when analyzing fathers' deaths, it is important to include socioeconomic status measures to separate children's schooling outcomes that can be attributed to socioeconomic status from those that can be attributed to orphanhood.

PARENTS' VITAL STATUS AND CHILDREN'S EDUCATIONAL OUTCOMES

Table 4 presents a first look at the relationship between parents' vital status and children's educational outcomes. Each column of the table reports results from a separate regression, with robust standard errors presented in parentheses. Included in all regressions are a complete set of age indicators, an indicator that the child is female, and indicators that mother's vital status, father's vital status, or that of both parents is missing.² Household characteristics that may affect educational investments and attainment are included in the second column for each outcome. These include the log of total expenditure per resident member, total number of assets owned at HSE2, the log of the number of resident members, the fraction of resident members under age 14, and indicators that the household has at least one female pensioner (age 60 and above) and at least one male pensioner (age 65 and above).

Table 4 shows that paternal-only orphans are disadvantaged in school attainment and school-related expenditures but that this disadvantage is accounted for by their household socioeconomic status, discussed earlier. After we control for total expenditure per member and household assets, we find no significant association between fathers' deaths and children's schooling outcomes. Results on asset ownership in Table 3 show that households in which fathers died were poorer prior to the men's deaths. Those results, together with estimates presented in Table 4, suggest that fathers' deaths are associated with worse schooling outcomes because the event of a father's death is a marker that the household is poor.

Table 4, in contrast, shows a large and significant association between schooling outcomes and mothers' deaths. Maternal-only and double orphans are at significant disadvantage with respect to their schooling, with or without controls for household characteristics. Specifically, children who have lost mothers have completed a quarter of a year less school-

2. The period between waves of the HSE survey may be as short as 1.5 years—for a child whose household was interviewed in June 2001 for HSE1 and in January 2003 for HSE2—or it may be as long as 3.5 years—for a child whose household was interviewed in January 2001 and again in June 2004. In all the regressions that follow, we include indicators for a child's month of birth, interactions between month of birth and survey round, and interactions between a child's age and survey round to control for differences in the time of year a household was interviewed. Results are very similar when these controls are not included.

Table 4. Parents' Vital Status and Educational Outcomes for Children Aged 6–16 Who Were Resident in the DSA at HSE2

| Variable | Years of Completed Education | | Indicator: Child Is Currently Enrolled | | Log(monthly educational expenses) | |
|--|--------------------------------|--------------------|--|--------------------------------|-----------------------------------|--------------------|
| | No | Yes | No | Yes | No | Yes |
| Controls for Household Characteristics? | | | | | | |
| Maternal-Only Orphan | -0.258* (0.056) | -0.241* (0.055) | -0.019* (0.008) | -0.017* (0.008) | -0.191* (0.048) | -0.117* (0.041) |
| Paternal-Only Orphan | -0.074 [†] (0.040) | -0.043 (0.039) | -0.007 (0.005) | -0.005 (0.005) | -0.076* (0.038) | -0.002 (0.030) |
| Double Orphan | -0.267* (0.079) | -0.282* (0.078) | -0.026 [†] (0.012) | -0.027 [†] (0.012) | -0.189* (0.066) | -0.221* (0.060) |
| <i>F</i> Test: Maternal Orphan = Double Orphan (<i>p</i> value) | 0.01 (.918) | 0.19 (.660) | 0.34 (.560) | 0.60 (.439) | 0.00 (.975) | 2.31 (.129) |
| <i>F</i> Test: Paternal Orphan = Double Orphan (<i>p</i> value) | 4.98 (.026) | 7.94 (.005) | 2.42 (.120) | 3.16 (.075) | 2.38 (.123) | 11.50 (.001) |
| Number of Observations | 18,568 | 18,568 | 18,670 | 18,670 | 17,431 | 17,431 |

Notes: Ordinary least squares regression coefficients are presented. Standard errors that allow for correlation between unobservable variables from the same household are shown in parentheses. The sample includes all resident children for whom household socioeconomic information is available at HSE2. A complete set of age indicators, an indicator that the child is female, and indicators that mother's vital status, father's vital status, and the vital status of both parents are missing are included in all regressions. Indicators for a child's month of birth, interactions between month of birth and survey round, and interactions between a child's age and survey round are also included in all regressions to control for differences in the time of year a household was interviewed. Household characteristics included in columns 2, 4, and 6 are the log of total expenditure per resident member, total number of assets owned by the household, the log of the number of resident members, the fraction of resident members under age 14, and indicators for the presence of at least one female pensioner (aged 60 or older) and at least one male pensioner (aged 65 or older) in the household.

[†]*p* < .10; **p* < .05

ing than have other children their age, on average. They are 2 percentage points less likely to be enrolled in school, and have 15% to 20% less spent on their education-related expenses, relative to other children. Unlike the results for fathers, we find no evidence that the poorer educational results of maternal orphans are attributable to their economic status.

For each regression, we test whether the associations between schooling outcomes and the loss of one's mother when one's father is known to be alive (maternal-only orphans) and those between schooling outcomes and the loss of one's father when one's mother is known to be alive (paternal-only orphans) are significantly different from those found when both parents have died (double orphans). While losing one's mother is significantly related to all three outcomes—attainment, enrollment, and school-related expenditures—we find no significant difference between losing one's mother alone and losing both parents. In contrast, controlling for household socioeconomic status, double orphans fare significantly worse than paternal-only orphans with respect to years of schooling completed, school enrollment, and monthly expenditure on schooling.

As can be calculated from the numbers presented in Table 1, 54% of children whose fathers have died live with their mothers, but only 11% of children whose mothers have died live with their fathers, rendering maternal-only orphans in the DSA virtual double orphans. This is similar to what is found in other parts of Southern Africa that rely heavily on migrant work (see Case et al. 2004), although male absence may be even greater in South Africa as a long-lasting consequence of apartheid policy.

Sixty-four percent of children in the DSA who have lost their mothers live with school-aged children whose mothers are alive, and a large percentage (50%) of children who have lost fathers live with children who have not. Table 5 compares educational outcomes for orphans and non-orphans living in the same household. The latter provide a natural comparison group for many reasons: the number of adults present, the wealth of the household, the distance to town, and (often) the distance to school and school fees will be identical for these children.

The top panel of Table 5 presents results in which schooling outcomes are regressed on indicators that the child's mother is dead and that the child's father is dead, controlling for age, sex, timing of the survey, and missing vital status information for parents, as discussed earlier. The first column for each outcome presents results from OLS regressions that include household-level socioeconomic variables. These results are indistinguishable from those in Table 4: when mothers are dead, children are 0.24 of a year behind in school, on average; they are 2 percentage points less likely to be enrolled; and they have almost 15% less spent on their schooling.

To compare orphans' outcomes with those of children with whom they live, we add to these regressions indicators for each household and present these fixed-effect results in the second column of the upper panel. In these fixed-effect estimates, the identification of the coefficients on mothers being dead comes solely from comparing children whose mothers have died with children in the same household whose mothers are alive, with similar identification for the coefficient on fathers being dead. Relative to the non-orphans with whom they live, children whose mothers have died are, on average, 0.12 of a year behind in their schooling and have 7% less spent on their educations. We find no significant difference in school enrollment between orphans and the non-orphaned children with whom they live. The OLS and fixed-effect results for fathers are small and, with the exception of years of completed schooling in the OLS specification, are not significantly different from zero.

For maternal deaths, the fixed-effect point estimates for all three educational outcomes are substantially lower than are the OLS estimates in the first column for each outcome. This may be true for at least two reasons. Living in blended families (that is, with children whose mothers are alive) may protect orphans' schooling. Alternatively, non-orphaned children living with orphans may themselves be educationally disadvantaged.

We examine this systematically in the lower panel of Table 5, where we present results from OLS regressions in which we include a set of indicators that a child is a maternal orphan living in a "blended" household (that is, with children whose mothers are alive); that a child is a maternal orphan who is not living with children whose mothers are alive; and that a child has not lost his or her mother, but is living with at least one child who has. The omitted (benchmark) category is children whose mothers are alive who are not living with children whose mothers have died. In these regressions, we include a complete set of indicators for age, sex, timing of survey, fathers' vital status, missing parental vital status, and household characteristics, as discussed earlier. The educational shortfall, measured in terms of grades completed and educational enrollment, for orphans in nonblended households is 50% larger than that for orphans in blended households, although the differences in outcomes between orphans in blended and nonblended households are not statistically significant. At the same time, we find that non-orphaned children living with maternal orphans are significantly disadvantaged in terms of school spending. On average, almost 8% less is spent on their schooling than on the schooling of non-orphans living in nonblended households, suggesting that the burden of kin dying and caring for orphans may affect outcomes for other household members.

In summary, we find that children whose mothers have died are behind in school, relative both to children in the DSA at large and to non-orphans with whom they live. They are less likely to be enrolled than other children in the DSA, and spending on their school-related expenses is significantly lower.

Table 5. Educational Outcomes of Orphans Relative to Non-Orphans With Whom They Live: Children Aged 6–16 Who Were Resident in the DSA at HSE2

| Variable | Years of Completed Education | | Indicator: Child Is Currently Enrolled | | Log(monthly educational expenses) | |
|--|------------------------------|--------------------|--|-------------------|-----------------------------------|--------------------|
| | Yes | No | Yes | No | Yes | No |
| A. OLS and Fixed-Effect Regressions | | | | | | |
| Controls for household characteristics? | Yes | No | Yes | No | Yes | No |
| Household fixed effects included? | No | Yes | No | Yes | No | Yes |
| Indicator: Mother is dead | -0.236* (0.046) | -0.120* (0.053) | -0.015* (0.006) | -0.009 (0.008) | -0.142* (0.034) | -0.073* (0.031) |
| Indicator: Father is dead | -0.060† (0.035) | -0.046 (0.047) | -0.007 (0.005) | 0.001 (0.007) | -0.023 (0.028) | -0.038 (0.028) |
| B. OLS Regressions | | | | | | |
| Controls for household characteristics? | Yes | | Yes | | Yes | |
| Mother is dead, child lives with at least one child whose mother is alive (blended household) | -0.202* (0.055) | | -0.013 (0.008) | | -0.185* (0.045) | |
| Mother is dead, child lives only with other children whose mothers are dead (nonblended household) | -0.289* (0.082) | | -0.018† (0.010) | | -0.090 (0.057) | |
| Mother is alive, child lives in blended household | -0.053 (0.045) | | -0.001 (0.006) | | -0.075† (0.043) | |
| <i>F</i> test: Mother is dead, blended = Mother is dead, nonblended (<i>p</i> value) | 0.81 (.370) | | 0.20 (.653) | | 1.89 (.169) | |
| <i>F</i> test: Mother is dead, blended = Mother is not dead, blended (<i>p</i> value) | 6.06 (.014) | | 1.69 (.194) | | 7.60 (.006) | |
| Number of Observations | 18,568 | 18,568 | 18,670 | 18,670 | 17,431 | 17,431 |

Notes: Ordinary least squares (OLS) regression coefficients are presented are presented in columns 1, 3 and 5. Household-level fixed-effect estimates are presented in columns 2, 4, and 6. Standard errors are shown in parentheses. Those for OLS regressions allow for correlation between unobservable variables from the same households. (Estimated variance-covariance matrices for the fixed-effect estimates were not positive definite when robust standard errors were estimated with clustering at the household level.) The sample includes all resident children for whom household socioeconomic information was available at HSE2. A complete set of age indicators, an indicator that the child is female, and indicators that mother's vital status, father's vital status, and the vital status of both parents are missing are included in all regressions. Indicators for a child's month of birth, interactions between month of birth and survey round, and interactions between a child's age and survey round are also included in all regressions to control for differences in the time of year a household was interviewed. Household characteristics included in columns 1, 3, and 5 are the log of total expenditure per resident member, total number of assets owned by this household, the log of the number of resident members, the fraction of resident members under the age of 14, and indicators for the presence of at least one female pensioner (aged 60 or older) and at least one male pensioner (aged 65 or older) in the household.

† $p < .10$; * $p < .05$

The next section focuses on whether mothers' deaths cause children to fall behind in school. In all regression analyses that follow, we include indicators that fathers are dead and that father's vital status is not known. With the exception of tests for causality, we generally do not highlight fathers' results because the relationships between fathers' deaths and children's education outcomes tend to be small and insignificant.

Table 6. The Causal Effect of Parental Death on Educational Attainment

| Variable | Years of Completed Education at HSE1 | |
|------------------------------------|--------------------------------------|--------------------|
| Indicator: Mother Was Dead at HSE1 | -0.234* (0.063) | -0.166† (0.091) |
| Indicator: Mother Was Dead at HSE2 | | -0.074 (0.069) |
| Indicator: Father Was Dead at HSE1 | -0.037 (0.041) | -0.044 (0.075) |
| Indicator: Father Was Dead at HSE2 | | 0.007 (0.067) |
| Number of Observations | 17,074 | 17,074 |

Notes: Standard errors, shown in parentheses, allow for correlation between unobservable variables for children in the same household at HSE1. The sample includes all children aged 6–16 at HSE1 who were resident in the DSA and for whom information on educational attainment as of HSE1 was collected. All regressions include indicators for age and sex, indicators for month of birth, and indicators for the timing of the surveys and asset holdings at HSE1.

† $p < .10$; * $p < .05$

ESTIMATING THE CAUSAL EFFECTS OF MOTHERS' DEATHS

Many explanations exist for the schooling deficit we observe for maternal orphans. Some of these suggest that mothers' deaths have a causal effect on children's education. Orphans may have fallen behind in school because they were caring for their mothers and their families after their mothers fell ill. Children may have been scarred by the death of their mothers, causing them to be less "school ready" than they had been previously. A non-competing explanation is that mothers are the gatekeepers for their children's educations, and when mothers are gone, no other caregiver is as vigilant in ensuring that children get to school or that money for school fees and uniforms is found.

Other explanations suggest that the correlation we find between mothers' deaths and children's schooling is spurious. There may be any number of omitted family characteristics that make a child less likely to go to school and his or her mother more likely to die. Mothers' deaths may simply be a signal that children themselves are ill.³ Children whose mothers die may be those who would have found it difficult to learn under any circumstances. Such children may have always been less prepared for school and may have lagged behind in school even if their mothers had not died.

We can rule out some of these hypotheses by looking at school enrollment and attainment of children who were not orphans when the first socioeconomic data were collected in 2001 but who subsequently lost a mother before the second round of data were collected in 2003–2004. Results for this analysis are presented in Table 6, in which we regress completed education at HSE1 on an indicator that mother is dead at HSE1 and on an indicator that mother will be dead before data are collected at HSE2. These regressions include controls for the child's age, sex, and household socioeconomic status. Similar to

3. We find no evidence that maternal orphans fall behind because the orphans themselves are ill with HIV or AIDS. For very young children (ages 0 to 4), mothers' deaths predict children's deaths from AIDS. However, by the time children reach school age (6 and above), deaths from AIDS are rare. Less than 0.2% of all children aged 6 to 16 resident on January 1, 2001, died in that year (26 children), and less than a third of those died of AIDS (8 children). Of the 1,527 school-aged children whose mothers were dead on January 1, 2001, three died that year from AIDS.

Table 7. The Causal Effect of Parental Death on Educational Attainment and School Enrollment

| Variable | Change in Years of Completed Education HSE2–HSE1 | | Change in Enrollment Between HSE1 and HSE2 Conditional on Enrollment at HSE1 | |
|--|---|---|--|---|
| | All Children Observed at HSE1 and HSE2 | Mother Is Alive or Had Died Before January 1, 2000 | All Children Observed at HSE1 and HSE2 | Mother Is Alive or Had Died Before January 1, 2000 |
| Indicator: Mother Died Between HSE1 and HSE2 | –0.056 [†] (0.034) | | –0.017* (0.009) | |
| Indicator: Father Died Between HSE1 and HSE2 | –0.027 (0.034) | | –0.003 (0.008) | |
| Indicator: Mother Died Before January 1, 2000 | | –0.138* (0.034) | | –0.032* (0.009) |
| Number of Observations | 17,951 | 16,327 | 17,223 | 15,693 |

Notes: Standard errors are shown in parentheses, with correlation between unobservable variables from the same households. The sample in column 1 includes all children resident at HSE1 and HSE2, aged 6–16 at HSE1, with valid educational attainment data for both HSE1 and HSE2. The sample in column 2 is restricted to the subsample of children in column 1 whose mothers were either alive at HSE2 or had died before January 1, 2000. Results in columns 3 and 4 are from probit regressions. Reported are changes in the probability of staying in school between HSE1 and HSE2, given the death of each parent between HSE1 and HSE2. The sample includes all children aged 6–16 at HSE1 who were enrolled in school at HSE1. The sample in column 4 is restricted to the subsample of children in column 3 whose mothers were either alive at HSE2 or had died before January 1, 2000. All regressions include a complete set of indicators for the child's age, the change in the child's age, and the change in household asset holdings between HSE1 and HSE2, and indicators for month of birth and for the timing of the surveys.

[†] $p < .10$; * $p < .05$

the results we discussed earlier, we find that mother's death before HSE1 is associated with 0.23 fewer years of completed education. However, mother's *future* death has no significant effect on a child's schooling at HSE1. We find no evidence that a mother's death is simply a signal that a child has always been less prepared for school or was living in a worse environment for education and would have lagged behind in school even if his or her mother had not died. If this were the explanation, we would expect mother's future death to predict the child lagging in school when school data were first recorded at HSE1.

Further evidence on a causal link between mothers' deaths and children's outcomes is provided in Table 7, in which we examine the impact of parental death between the survey rounds on the change observed in years of completed schooling (columns 1 and 2) and on the change observed in children's enrollment between the survey rounds (columns 3 and 4). Because we are interested in the change in schooling outcomes between HSE1 and HSE2, we restrict the sample to children who were old enough to be enrolled in school at HSE1. In particular, we restrict attention to children aged 6 to 16 at HSE1 (although the results are robust to other age cutoffs.)

Results in column 1 of Table 7 show that children whose mothers died between rounds of the survey had significantly lower increases in their educational attainment over this period than did other children of the same age. Results in column 1 also make clear that the change in educational attainment for children whose fathers died between the rounds is not significantly different from that of other children of the same age.

Although children whose mothers have died in the recent past may fall behind in school, it is possible that this phenomenon is short-lived and that these orphans' educational

outcomes improve with time.⁴ To test this, we took the subsample of children in column 1 whose mothers were either alive at HSE2 or whose mothers had died prior to January 2000 and compared changes in school attainment between HSE1 (2001) and HSE2 (2003–2004). The change in attainment is measured starting at a point when the orphans' mothers had been dead for at least one year and, in many cases, for substantially longer. Column 2 shows that the change in these children's educational attainment between HSE1 and HSE2 is significantly lower than that of children whose mothers were alive at HSE2. With respect to schooling, these children are not showing signs of "bouncing back" from their loss.

The second set of columns in Table 7 examines school enrollment. Analyzing changes in enrollment in these data is more difficult than analyzing changes in attainment because of the way school enrollment questions were asked in HSE1. In the first socioeconomic survey, the household respondent was first asked how many grades of education a child had completed. If the answer was "none," then questions on enrollment were skipped. The data show that enrollment information is missing for half of all 6-year-olds and almost a quarter of all 7-year-olds, many of whom may have been enrolled at HSE1 but may not yet have completed any years of schooling. For this reason, we focus our attention on those children who were reported to be enrolled at HSE1 (for whom measurement error in enrollment at HSE1 will be lower) and analyze which of these children continued to be enrolled when they were observed at HSE2. This may be a select sample of children—those whose families care more about education, for example. If this is the case, it may bias us against finding any effect of becoming an orphan on being enrolled in school. We find instead that among children enrolled at HSE1, those whose mothers died between survey rounds were significantly less likely to be enrolled at HSE2 than were other children their age. We find no similar effect for children whose fathers had died. In addition, children whose mothers have been dead for some time (for example, those whose mothers were dead when surveillance began) were 3 percentage points less likely to stay enrolled than were children their age whose mothers were alive at HSE2. We find no evidence that children's schooling recovers with length of time since orphanhood.

With these data, we cannot rule out that children's enrollment and attainment suffer because of the scarring caused by mother's death. Children may have been on track in school until their mothers died, and the trauma of mothers' deaths may have made the children less ready for school. However, we take the evidence in Table 7 to rule out explanations based on innate child "quality." Regardless of whether we find that the mechanism at work is scarring, or is instead the loss of mother as gatekeeper, or both, our results are consistent with mother's death having a causal effect on children's schooling outcomes.

INTERACTION EFFECTS

The two previous sections make clear that when mothers die, children fall behind in school and have fewer resources devoted to their schooling. To better understand the risks these children face, we examine whether outcomes for orphans vary according to their characteristics and those of the households in which they reside.

Table 8 examines whether educational outcomes depend on how long a child's mother has been dead. We add to our analysis, which already includes an indicator that a mother is dead at HSE2, an indicator that a child's mother died before January 1, 2000. The coefficients for these two indicators track differences in outcomes based on the time since the mother's death. We find that mothers' deaths appear to have a cumulative effect on years of completed education. For children whose mothers have been dead since 2000, the cumulative effect of her death is the sum of the coefficient on the indicator that mother was dead in

4. Ainsworth, Beegle, and Koda (2005), for example, reported that conditional on attending school, hours of attendance declined in the months prior to an adult's death in northwestern Tanzania, but improved over time after the death.

Table 8. Interaction Effects: Children Aged 6–16 Who Were Resident in the DSA at HSE2

| Variable | Years of Completed Education | | Indicator: Child Is Currently Enrolled | | Log(monthly educational expenses) | |
|--|------------------------------|----------------|--|----------------|-----------------------------------|----------------|
| | Coefficient | Standard Error | Coefficient | Standard Error | Coefficient | Standard Error |
| Indicator: Mother Was Dead at HSE2 | -0.154* | (0.055) | -0.016* | (0.008) | -0.124* | (0.042) |
| Indicator: Mother Was Dead on January 1, 2000 | -0.224* | (0.922) | -0.001 | (0.013) | -0.033 | (0.067) |
| Interaction: Mother Is Dead × Orphan Is Female | 0.015 | (0.079) | 0.004 | (0.012) | 0.011 | (0.056) |
| Interaction: Mother Is Dead × Female Pensioner Household | 0.289* | (0.091) | 0.033* | (0.013) | 0.058 | (0.067) |
| Interaction: Mother Is Dead × Male Pensioner Household | -0.235† | (0.137) | -0.015 | (0.019) | -0.067 | (0.112) |
| F test: Mother Coefficients (p value) | 14.89 | (.0000) | 3.08 | (.0459) | 7.79 | (.0004) |
| Number of Observations | 18,432 | 18,568 | 18,670 | 18,670 | 17,303 | 17,431 |

Notes: Ordinary least square regression coefficients are presented. Standard errors that allow for correlation between unobservable variables from the same household are shown in parentheses. The sample includes all resident children for whom household socioeconomic information is available at HSE2. A complete set of age indicators, an indicator that the child is female, and indicators that mother's vital status, father's vital status, and the vital status of both parents are missing are included in all regressions. Indicators for a child's month of birth, interactions between month of birth and survey round, and interactions between a child's age and survey round are also included in all regressions to control for differences in the time of year a household was interviewed. Household characteristics described in Table 4 are included in all regressions.

† p < .10; * p < .05

2000 (-0.224) and the coefficient on the indicator that mother was dead at HSE2 (-0.154), for a total education deficit of -0.378 (because she is still dead at HSE2). In sum, children whose mothers died prior to 2000 have fallen significantly further behind in school relative to children whose mothers died between 2000 and the HSE2 survey.

In contrast, although an indicator that mother is dead affects enrollment and spending on schooling, an indicator that the child's mother has been dead since 2000 has no significant effect on enrollment or spending. These results suggest that the length of time a child has been an orphan has different effects on a child's educational "stock" (years of completed education) and educational "flow" (enrollment and current spending on children's schooling). These findings are consistent with a model in which, over time, the reduced probability of being enrolled cumulates as an ever larger deficit in educational attainment.

When we divide our sample into younger children (ages 6 to 10) and older children (ages 11 to 16), we find that both older and younger children have completed fewer years of schooling, are less likely to be enrolled in school, and that less is spent on their school expenses when their mothers are dead. Although the differences between older and younger children are not statistically significant, the magnitude of the completed years of schooling deficit is larger for the older group (0.20 versus 0.30 of a year).

Researchers and some international agencies have warned that girls who have lost their mothers may be especially vulnerable with respect to schooling (Giese et al. 2003; UNAIDS 2002; World Bank 2002). If children become caregivers for parents who are ill, one might expect girls would be disproportionately burdened. We also examine this phenomenon in Table 8 by including an interaction term between the indicator of mother's death and the indicator that the child is female. These interaction terms are small and insignificantly different from zero for enrollment, attainment, and school spending, providing no evidence that female orphans are at particular risk.

In South Africa, a generous old-age pension is paid to all men and women who reach pension age (60 for women, 65 for men) without a private pension. Almost all African (black) South Africans qualify for this pension. The last column for each outcome in Table 8 examines whether proximity to a pensioner protects the schooling of orphans. We include separate interaction terms for orphans living with at least one woman of pensionable age and with at least one man of pensionable age. (Main effects of living with female and male pensioners are included in all regressions. Their coefficients are not shown in Table 8.) We find that living with a female pensioner offsets the negative effect of being an orphan with respect to both educational attainment and school enrollment, but has no effect on school spending for orphans. Living with a male pensioner is not associated with better schooling outcomes. Indeed the association between living with a male pensioner and educational attainment is negative and significant, and the signs for enrollment and expenditures are negative as well. More work on this important topic is needed. With the longitudinal data available through the Africa Centre, it should be possible to more fully understand the dynamics of living arrangements and children's schooling. However, this analysis is beyond the scope of our article.

Orphans may lag behind in educational attainment because they are sent to schools of lesser quality with lower fees. Case and Deaton (1999) showed a strong association in South Africa between school quality and children's progression through school. To investigate whether orphans' relative disadvantage is primarily driven by school choice, we examined how orphans fare relative to other children in the same school. In results estimated but not shown, we added school fixed effects to our analysis. In this way, we identified the impact of being an orphan by comparing outcomes for orphans relative to other children of the same age in the same school. Maternal orphans fall behind in school, in part, because they are less likely to be enrolled. However, of orphans who are enrolled in school, school choice explains some of the deficit in their schooling: the gap in educational attainment falls from -0.27 to -0.19 years, and the estimated shortfall in school spending falls from

Table 9. Parental Death and Children's Schooling: South Africa and KwaZulu-Natal, African Children Aged 6–16 in the 2001 South African Census

| Variable | Years of Completed Education | | | | Indicator: Child Is Currently Attending School | | | |
|---------------------------------------|------------------------------|---------|---------------|---------|--|---------|---------------|---------|
| | All South Africa | | KwaZulu-Natal | | All South Africa | | KwaZulu-Natal | |
| Indicator: Mother Is Dead | -0.188* | -0.192* | -0.164* | -0.218* | -0.026* | -0.024* | -0.030* | -0.027* |
| | (0.012) | (0.016) | (0.022) | (0.029) | (0.002) | (0.003) | (0.004) | (0.005) |
| Indicator: Father Is Dead | -0.038* | -0.049* | -0.049* | -0.056* | -0.008* | -0.012* | -0.011* | -0.010* |
| | (0.007) | (0.012) | (0.014) | (0.021) | (0.001) | (0.002) | (0.002) | (0.004) |
| Controls for Household Fixed Effects? | No | Yes | No | Yes | No | Yes | No | Yes |
| Number of Observations | 605,458 | 605,458 | 136,160 | 136,160 | 667,511 | 667,511 | 148,936 | 148,936 |

Notes: Ordinary least square regression coefficients are presented, with standard errors shown in parentheses. In regressions that do not include household fixed effects, correlation is allowed between unobservable variables for children observed in the same household. The sample is restricted to children for whom mother's and father's status is known. Included in all regressions is a complete set of indicators for child's age and sex. Household characteristics included are the log of the number of resident members, the number of assets owned by the household, indicators for whether the household has access to any toilet facilities and to piped water, and indicators for 12 household income categories and nine provinces.

† $p < .10$; * $p < .05$

15% to 12%. The differences between maternal orphans and other children continue to be significant; even relative to other children in the same school, orphans are disadvantaged.

SOUTH AFRICAN ORPHANS: ADDITIONAL EVIDENCE FROM THE CENSUS

The results shown in the previous sections illustrate the impact of parental loss on education for those children living in one demographic surveillance site in northern KwaZulu-Natal. To estimate the extent to which these results might generalize, we examine the impact of mothers' and fathers' deaths on children's enrollment and attainment for African (black) children in the province of KwaZulu-Natal and in South Africa as a whole, using data from the 10% sample of the 2001 South African Census.⁵

Results in Table 9 are markedly similar to those presented earlier. As was true in the Africa Centre data, census results show that mothers' deaths are associated with schooling deficits that are four to five times larger than those observed for fathers' deaths. In both the Africa Centre data and the South African Census, whether we compare orphans to all other children their age or to non-orphaned children with whom they live (i.e., without or with household fixed effects), the loss of a child's mother is associated with two-tenths of a year less completed schooling, and with a 2- to 3-percentage-point reduction in the probability of enrollment.

We can also compare our results for the DSA with those for other parts of sub-Saharan Africa. Case et al. (2004) examined the association between orphanhood and school enrollment in 19 Demographic and Health Surveys run in 10 other sub-Saharan African countries from 1990 to 2000. They estimated negative effects of maternal orphanhood on enrollment in 18 of 19 surveys, with significant effects in Kenya (1993, 1998), Malawi (1992, 2000), Niger (1992), Zambia (1992), and Zimbabwe (1994, 1999).

The results in Table 4 show that maternal orphans and double orphans in the DSA are at equal risk with respect to educational attainment and enrollment. In contrast, the

5. For additional information, see www.statssa.gov.za.

Demographic and Health Surveys analyzed by Case et al. (2004) generally show larger effects for double orphans than for maternal orphans. Only 1 in 10 maternal orphans in the Africa Centre Demographic Surveillance Area is living with a father, which is a lower rate of paternal presence than is reported for any country studied by Case et al. Father absence may help to explain the differences in relative outcomes for maternal orphans in the DSA and those in other parts of Africa. If father absence turns maternal orphans into virtual double orphans, then we would expect to find maternal orphans with outcomes similar to those for double orphans.

POLICY CHALLENGES

One of the lasting effects of the HIV/AIDS crisis will be the impact it has on the education of the generation of children now of school age. Throughout sub-Saharan Africa, the crisis is reducing educational attainment, a result that can be expected, in turn, to dampen economic growth and the health and general well-being of Africans.

Policy makers are currently grappling with policies to deal with the crisis, and disagreement abounds. Some policy makers are currently arguing for free universal state education as the fairest way of dealing with the gathering storm (Giese et al. 2003). Although this is a laudable goal, it seems unlikely to become reality any time soon. Some researchers-cum-policy-makers in South Africa argue that it would be unfair to provide special services to orphans (Meintjes et al. 2003). They note that there are many poor children in South Africa whose parents are alive and who are also at risk for poor schooling outcomes. Meintjes et al. asked “why, in the context of widespread poverty, [should] children in the care of relatives require special grants different from children living with biological parents?” (p. 22). The evidence provided here speaks directly to this question, showing that in both poor and wealthy households, children who have lost mothers are at risk of poor outcomes relative to the children with whom they live.

Documenting that orphans are vulnerable, however, does not provide sufficient grounds for recommending policies that target orphans. Targeted policies bring with them a host of problems. It is often difficult to find an effective screening device that does not screen out the very people one is trying to target. In South Africa, a foster care grant is currently available (at least in theory) to help caregivers provide for orphans. In the DSA, only 9% of double orphans receive grants of any kind, and less than 2% receive a foster care grant. It is thought that barriers to grant receipt (such as providing death certificates) raise the bar to the point that caregivers don't even apply for such grants. Moreover, we remain unconvinced that special grants are the best policy response to the risks orphans face with respect to their schooling. Our results suggest that cash transfers to orphans' caregivers are unlikely to close the gap in school attainment. Orphans suffer relative to the non-orphaned children with whom they live, and orphans in wealthy households are also at risk for education deficits.

In-kind educational transfers to orphans (such as waiving school fees and subsidizing school uniforms) merit consideration. To date, such transfers have not been evaluated for their effectiveness (Subbarao and Coury 2004), and in South Africa, in-kind transfers targeted at poor children's educations have not proved to be successful for children in the DSA. There is on the books a fee exemption for poor children. However, school fees collected are used directly by the schools that collect them—for maintenance, equipment, and school supplies—so that it works against the schools' interests to waive fees. Indeed, in the DSA, only 1% of resident children aged 6 to 16 who were enrolled in school were reported to have paid no school fees in HSE2. To be effective, in-kind transfers to orphans would need to be provided through a central fund that did not deplete local school resources.

Whether these policies are to be recommended will depend on the extent to which orphans are behind because they lost their education champion when their mothers died and the extent to which orphans are behind because they were scarred through the process

of losing a mother. We could identify the scarring effects by following a cohort of children through time, assessing (perhaps annually) their cognitive, physical, and emotional development. This would allow us to describe changes in children's functioning when they become orphans and differences in their development paths relative to non-orphans. Demographic surveillance sites would provide ideal settings for such research.

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