The impact of parental death on schooling and subjective wellbeing: Evidence from Ethiopia using longitudinal data

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Abstract

This paper investigates whether the death of a parent during middle childhood affects child schooling and subjective well-being (SWB) in Ethiopia. The data comes from two rounds of the Young Lives survey, conducted in 2002 and 2006, of an initial sample of 1000 children across 20 sentinel sites in Ethiopia. The children were 7 to 8 years of age in 2002 and 11 to 12 years of age in 2006, with around 80 losing a parent between rounds. The research finds that the mother dying reduces school enrolment significantly by around 20 per cent. It also increases the chance that a child cannot write at all (even with difficulty) by around 21 per cent, and cannot read at all or can read only letters (rather than words or sentences) by around 27 per cent, compared to if the mother had not died. In contrast, the father dying seems to negatively affect a child's sense of optimism about the future, even though they feel they are treated with greater fairness and respect than had their father not died. A child's gender does not affect the results. A change in caregiver between rounds seems to explain only a part of the lower outcomes. These findings have significant policy implications for Ethiopia where parental death has become a very potent shock that children are likely to face in middle childhood.

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1. Introduction

Losing a parent as a child can often lead to significant negative impacts on a child's short and long-term welfare. The channels through which this can happen are many, but the empirical literature suggests reduced human capital accumulation often proxied by school enrolment (World Bank 1999; Ainsworth, Beegle and Koda 2005; Case, Paxson and Ableidinger 2002; Yamano and Jayne 2005). Some of these studies also argue that the death of the mother has more of an impact on welfare outcomes than that of the father. For example, Beegle et al. (2008) show that a mother's death in particular can have a significant negative impact on health and education outcomes in the long run in north western Tanzania. They also argue that children who lost their mother before the age of 15 also reported lower consumption expenditure as adults, indicating that death of the mother in childhood may have important implications for future welfare outcomes. In some cases it is argued that the gender of the child affects the outcomes. The literature also looks at living arrangements and the impact different types of caregivers may have on outcomes. Case, Paxson and Ableidinger (2004) argue that outcomes for orphans depend on how close their biological ties are to the caregiver, with lower enrolment of orphans explained largely by their tendency to live with unrelated caregivers or distant relatives, based on data for ten sub-Saharan countries. In a similar vein, Ksoll (2007) looks at how the careful selection of the caregivers might mitigate the negative impacts of orphanhood in Tanzania. Thus parental death, in particular perhaps the death of the mother, may lead to increased risk of poverty in adulthood.

Parental death and orphanhood is quite a significant risk faced by children in Ethiopia, comparable to much of Africa in recent times, especially due to the HIV/AIDS pandemic and the risk of associated, opportunistic infections such as tuberculosis. A study by the Central Statistical Agency (Ethiopia) and ORC Macro (2006) shows, for instance, that 1.4 per cent of Ethiopians age 15–49 are HIV positive. Around 80 per cent of those with tuberculosis test positive for HIV. National data indicates that roughly 10 per cent of the children (around 4.6 million) are orphaned. In the Young Lives sample,[1] a little over 10 per cent of children lost at least one parent between rounds (but had had both parents during Round 1), while a little over 10 per cent had already lost a parent when the survey started in 2002. Thus by the time the children reached 12 years of age, one in five had lost one or both parents.

This paper looks at the impact parental death can have on children in middle childhood between ages 7 and 12 in the short and medium term in Ethiopia. It focuses on children's educational outcomes (school enrolment, ability to read and write, and mathematical achievement) in Round 2 and, uniquely, child subjective well-being (SWB), broadly defined as a child's own evaluation of his or her life. By using measures of educational outcome beyond simply school enrolment, the paper attempts to address an important shortcoming in most of the existing empirical literature. Most papers use school enrolment as a measure of outcome without addressing the issue that enrolment hardly measures quality of schooling. Enrolment is also a weak proxy for educational achievement or human capital, especially in

1 Young Lives is an innovative research project that combines quantitative and qualitative research to inform policy, based at the University of Oxford. The quantitative part of the project tracks 12,000 children over 15 years in four countries (Ethiopia, Peru, Vietnam and India – Andhra Pradesh) starting in 2002. The project has so far completed two rounds of data collection. The surveys focus on two cohorts of children: the older cohort born in 1994 (a sample of 1000 children) and the younger cohort born in 2000 (a sample of 2000 children). This paper focuses only on the older cohort, since they were the group that were eligible to have started schooling in both rounds.

the African context where it is fairly common to postpone schooling, start school late or even to interrupt it. This paper is unique because it looks not just at school enrolment but also the quality of education by considering reading, writing and mathematical achievement in Round 2, while controlling, as far as possible, for a child's achievement in these areas in Round 1, along with other observables using matching techniques. The paper also makes an important contribution to the literature by looking at the impact of parental death on child subjective well-being, a hitherto unexplored area in the empirical literature. Subjective well-being is measured by indicators that proxy a child's optimism (derived from a question that is an adapted version on Cantril's ladder, see Cantril 1965) about the present and future, and an indicator of whether he or she feels that they are being treated with fairness and respect.

The paper uses data from the Young Lives survey. The data set is rich with various other child, household and community-level details. It was collected in 2002 and 2006 when the children were between 7 to 8 and 11 to 12 years of age respectively across 20 sentinel sites in Ethiopia. The initial sample consisted of 1000 children. The empirical analysis used propensity score matching (PSM) to investigate the impact of parental death on schooling and SWB. The analysis attempts to find out what the schooling and SWB outcomes for children who lost a parent would have been had they *not* lost the parent. Given that parental death is not likely to be a random occurrence but closely associated with behavioural choices that affect both the incidence of death and schooling outcomes, the challenge in the empirical analysis is to find a control group for those children who lost a parent with as many observable characteristics as possible at the individual, household and community levels, making the comparison between the groups convincing. The very rich child, household and community questionnaires available in the Young Lives data set include information on child, household and community characteristics, as well as detailed information on risks and shocks the households and communities faced during the two rounds. This is useful in constructing a plausible control group for those children who lost a parent between the two rounds but had both parents in Round 1. The data also enables us to test the results for robustness against various specifications. It should be noted that child gender differences are not significant in any of the analyses in this paper and are therefore not discussed.

The paper is organised as follows. The next section focuses on the empirical strategy used. Section 3 looks at the data and descriptive statistics, while section 4 looks at the results, supported by several checks for robustness. This includes a detailed consideration of living arrangements after the parent died, caregiver perceptions of child schooling, and the impact changing caregivers at a critical time in a child's schooling career has on outcomes. Section 5 concludes.

2. Empirical strategy

This study used propensity score matching (PSM) to evaluate the impact parental death has on child well-being outcomes. The use of matching methods has been popular in recent studies of policy impact evaluation. The method aims to 'select sufficient observable factors that any two individuals with the same value of these factors will display non-systematic differences in their reaction to the policy reform' (Blundell and Dias 2002: 4). Adapting it to our problem means that we attempt to 'match' a child whose parent died with a child whose parent did not die, with the exact same observable characteristics but for the death of a parent between rounds, to isolate the impact of parental death on schooling and aspects of

SWB. The counterfactual effect will be measured correctly only if the correct observable characteristics are chosen (Heckman et al. 1997).

The key identifying assumption for PSM is that the outcomes are independent of parental death, given a set of observables (i.e. conditional independence, see Heckman and Robb 1985) is met. This can be expressed as $Y_0 \perp D \mid P(X)$ where Y_0 is the outcome of interest in the untreated state, D is a dummy indicating whether a parent died or not, X is a set of observable characteristics and P(X) is the propensity score. Apart from the independence condition, the common support of overlap condition also needs to be satisfied. It rules out the perfect predictability of D given X: $0 < p(D=1|X) < 1$ (overlap). It also ensures that children with the same X values have a positive probability of a parent dying or not (Heckman et al. 1998).

If both the above conditions hold, the treatment parameter can be identified using a weaker condition of conditional mean dependence: $E(Y_0 \mid D=1, p(X)) = E(Y_0 \mid D=0, P(X))$. The effect of the treatment (i.e. death of parent) on the treated (i.e. those who lost a parent) (TT) can be calculated as follows:

(1) $TT(X) = E(Y_1 \mid D=1, P(X)) - E(Y_0 \mid D=1, P(X))$

Thus the PSM estimator is the mean difference in outcomes over the common support, appropriately weighted by the propensity score distribution of those who lost the mother or father.

In implementing PSM, propensity scores on the covariates using probit analysis were estimated. Then, each child who lost a mother or father ('treated' child) was paired with a child from a comparable group of children who did not lose either parent. Finally, the counterfactual outcome of the child whose parent died was calculated as a weighted outcome of the neighbours in the comparison group. The baseline results reported, use nearest-neighbour matching, where each child *i* who lost a parent is matched with child *j* who did not lose a parent with the closest propensity score. See Essama-Nssah (2006: 12–4) for more details. As robustness checks two other matching algorithms are used: caliper and local linear matching. Caliper matching imposes a tolerance level on the maximum propensity score distance of a neighbour. This improves matching quality by avoiding the risk of bad matches that nearest-neighbour matching faces if the closest neighbour is far away. A drawback, however, is that the choice of tolerance level is arbitrary (Smith and Todd 2005). Another algorithm used is local linear matching where a weighted average of all individuals in the control group is used to construct the counterfactual outcomes. The use of more information means that the variance is lower but on the down side some of the observations used may be bad matches. This means that the proper imposition of the common support condition is important (see Heckman et al. 1997, 1998).

If the match is of good quality, then the matching procedure will have balanced the distribution of the relevant variables in both the orphaned and control groups. Checking the quality of the match is important because we condition on the propensity score and not on all covariates. There are several ways to assess match quality. The standardised bias (SB) suggested by Rosenbaum and Rubin (1983) looks at the distance in marginal distributions of the X variables. For each covariate X, it is defined as the difference of sample means in the orphaned and matched control sub-samples as a percentage of the square root of the average sample variance in both groups. Thus:

$$SB_{before} = 100.\frac{(\overline{X}_1 - \overline{X}_0)}{\sqrt{0.5.(V_1(X) + V_0(X))}}$$

And SB after matching is:

$$SB_{after} = 100.\frac{(\overline{X_{1M}} - \overline{X}_{0M})}{\sqrt{0.5.(V_{1M}(X) + V_{0M}(X))}}$$

Where $X_1(V_1)$ is the mean (variance) in the orphaned group before matching and $X_0(V_0)$ are the corresponding values for the control group. $X_{1M}(V_{1M})$ and $X_{0M}(V_{0M})$ are corresponding values for the matched sample. This measure is used in studies such as Lechner (1999) and Sianesi (2004). Unfortunately, it is not clear how much of a bias reduction is actually indicative of a good match.

A similar approach is the use of a two sample t-test to check that the means of the covariates are not significantly different between the treatment and control groups after matching, even though such differences are expected before matching (Rosenbaum and Rubin 1983). Apart from this, Sianesi (2004) suggests the use of pseudo-R^2. This is computed by re-estimating propensity scores on the matched sample and comparing the pseudo-R^2 before and after matching and will indicate how well X explains the participation probability. After matching it should be quite low as there should be no systematic differences in the distribution of covariates between the matched and control groups.

3. Data and descriptive statistics

The data comes from two rounds of the quantitative survey of children from the older cohort carried out in 2002 and 2006 by the Young Lives project, when the index children were 7–8 years old and 11–12 years old respectively.[2] The survey was conducted across 20 sentinel sites in five regions.[3] The selection of sentinel sites followed a purposive strategy with districts, with food deficiency status over-sampled. Household selection within the sentinel site was random. However, it was attempted, as far as possible, to select districts and sites that reflected Ethiopia's diversity across regions and ethnicities in both rural and urban areas. Overall, therefore, the sample is pro-poor. However, a careful analysis of the distribution of child characteristics included in the sample suggests that the data covers a wide variety of children in terms of wealth, consumption, health, nutrition, education and access to education, similar to nationally representative data sets. Therefore, while not suited for simple monitoring of child outcome indicators (as the mean characteristics will be different), the Young Lives sample is an appropriate and valuable instrument for analysing correlates and causal relations, and for modelling child welfare and its longitudinal dynamics in Ethiopia.

Round 1 started with 1000 children, but by Round 2 the sample had reduced to 975 due to attrition. However, attrition bias is insignificant (Outes-Leon and Dercon forthcoming). Of these children, 120 had already lost one or both parents by Round 1 while four others had lost both parents between rounds. Since our aim is to compare those children who lost one parent between rounds (but had both in Round 1) with those who had both parents in

2 See http://www.younglives.org.uk for further details of the project.

3 The five regions were Addis Ababa, Amhara, Tigray, Oromia and Southern Nations Nationalities and People Region. These five regions, selected out of 11, account for 96 per cent of Ethiopia's population.

Rounds 1 and 2, these 124 children were excluded from the analysis. Of the children who had both parents in Round 1, 57 had lost their father and 19 had lost their mother by Round 2. This leaves us with 782 children, who had both parents in Rounds 1 and 2, as the control group from which we will draw in the analysis to come, subject to availability of data.

Table 1 (see Appendix) compares education and SWB outcomes of children who lost a parent between the two rounds and those who did not. In Ethiopia, cycle 1 of formal schooling starts around age 7–8 (around the time of Round 1) and lasts four years with no grade retention until after cycle 2 commences, usually around age 12. Of course, later enrolment is possible, but our sample suggests that the average age of starting school is around 8 years old.

It is immediately obvious from Table 1 that school enrolment in Round 2 is quite high at 95 per cent for children with both parents but significantly lower at just 78 per cent for those who had lost their mother. Moreover, those who lost their mother between rounds also miss school more than the group that lost their father or did not lose either parent. There is no significant difference in the years of completed education or the years completed if the child dropped out. However, drop-out rates are again significantly high for those who lost their mother (11 per cent), as well as for the percentage that never attended school (10 per cent). The data set also contains information regarding a child's reading and writing ability at Round 2. In order to assess quality of education received (both formal and informal if children do not attend school), all children were asked to read and write two simple sentences.[4] The level of reading is coded from 1 to 4, as cannot read anything, reads only letters, reads only words and reads only sentences respectively. Quite strikingly, the proportion of children who lost their mother who cannot read anything or only letters rather than words or sentences at age 11–12 is a high 42 per cent. This is significantly more than the 23 per cent and 25 per cent reported by those who did not lose a parent or lost their father. In a similar vein, the proportion of children who cannot write at all, even with errors, is a high 26 per cent compared to around 10 per cent in the other groups. Even in terms of quantitative ability, derived from a mathematics achievement test formulated for the children, those who lost their mother performed significantly worse than those who did not lose a parent, scoring an average of 3.94 on a test where scores ranged from 0 to 9, compared to the 4.91 and 4.87 of the groups who did not lose parents or lost just their father. The data also shows that 80 per cent of the children who lost their mother attribute their absence from school to illness (compared to 55 per cent in the other two groups).[5] However, there is no statistically significant difference in anthropometric outcomes such as Body Mass Index or height-for-age z-scores in Round 2 between the groups. It is possible that the impact supposed 'illness' has on long-term health will not take its toll on child accumulated investments in health (such as

4 Verbal and mathematic skills and achievement were measured using tests we developed or adapted from standardised international tests, such as the Peabody Picture Vocabulary Test (PPVT). We acknowledge that bias may arise when testing children with different languages and cultures using the same instruments, although measures were taken to adapt them to local contexts and languages and in no case were original standard scores used. Bias is an especially important consideration in testing children who speak minority languages. Reliability and validity results for our test administrations and concerns are presented and discussed in Young Lives Technical Note 15. In particular, the authors of this document recommend that results should not be compared across countries, or across groups with different maternal languages within countries.

5 The remaining 20 per cent of maternal orphans claim they had missed school for more than a week in the past year because they were needed for work at home. This matches what non-orphaned children say. However, of the children who lost their father, nearly 30 per cent claim they did not go to school because they had to work at home. Of those who did not lose a parent, 55 per cent missed school due to illness and 7 per cent claim ill-treatment from teachers. Of those who lost their father, apart from illness (57 per cent) and work at home (30 per cent), family member's illness was the other reason cited by 14 per cent.

height-for-age) right away, and does not come out clearly as a short or medium-term consequence. It is also possible that 'illness' is more psychological or relates to a sense of unhappiness that affects school attendance or performance. Our indicators on subjective well-being may shed some light on this issue, which we turn to next.

Subjective well-being, which can be defined broadly as a child's own evaluation of his or her life, will be measured by a proxy for the sense of optimism about the future and by whether he or she feels that they are treated with fairness and respect. The proxy for optimism can be measured only in Round 2 due to data availability, and is derived from a set of questions that are adapted from Cantril's (1965) ladder. The 'ladder' question seeks to capture a child's view on where she places herself on a ladder ranging from 1 to 9 reflecting worst to best possible life. A picture of the ladder is shown by the enumerator as the question is asked. This question is then followed by where the child expects to be in four years' time. In the empirical analysis, a child's optimism about the future is captured by the difference in a child's expected and current positions in life on the ladder. This variable is termed 'gap'. Data for sense of respect ('respect') is available for both rounds, based on similar questions asked in Rounds 1 and 2.[6]

The data does not show any significant differences in the current position on the ladder between groups. However, in terms of expected position, children who lost a father tended to place themselves on a lower rung than others. Thus they seem to be less optimistic about the future. Quite interestingly, when asked what would help them move up the ladder, only 9 per cent of those who lost their mother thought education and better grades would help, in contrast to over 20 per cent of other groups who thought education would help. Maternal orphans cited good luck and God's blessings (23 per cent) as the most important aid to moving up the ladder, followed closely by making more money (22.7 per cent) and working harder (18 per cent). For the group that did not lose parents and paternal orphans, education was the key perceived contributor to moving up the ladder (21 per cent) followed by working harder (20 per cent).

In terms of feeling that they are treated with fairness and respect, a significantly high proportion (92 per cent) of those who lost their father felt they are treated with fairness and respect compared to 82 per cent for those children who had both parents. Only 73 per cent of the maternal orphans agreed that they felt they were being treated with fairness and respect. Paternal orphans also note a significant positive change in their perception of being treated with fairness and respect between rounds. This hints that paternal orphans may be treated with more sympathy than maternal orphans.

Table 2 (see Appendix) presents Round 1 characteristics for child, household and community variables that may have a significant impact on schooling and SWB in Round 2, grouped by whether both parents were alive in Rounds 1 and 2, the mother died between rounds, or the father died between rounds – several variables that are significantly different between the groups. At the child level, reading ability is significantly poorer for those who went on to lose their mother and significantly higher for those who went on to lose their father, compared to those who do not lose a parent. There are no other significant differences in terms of gender, anthropometric scores, birth order or reading ability. In terms of household characteristics,

6 In Round 1 the question was 'when I am at shops/market I am usually treated by others with fairness and respect'. And in Round 2, 'do you think people in this area treat you well or badly?' Responses have been coded as 1 if children agreed and 0 if they disagreed. The change in respect was coded as 0 if there was no change between rounds, 1 if there was a positive change (i.e. disagreed in Round 1 but agreed in Round 2) and - 1 if vice versa.

household size is significantly smaller in households where parents die between rounds. This may possibly be because the prevalence of HIV/AIDS or other long-term illnesses among parents have a negative impact on family size preferences (see Baylies 2000 for an example from Zambia), or possibly because some of the to-be orphans are already living with a grandparent, as in the case of 21 per cent of our maternal orphans. The latter issue will be discussed later on. In terms of household demographic composition, there are significantly fewer children aged 0 to 7 and more older members (possibly grandparents) in households where a parent dies compared to households where a parent does not die. A father's death seems to occur less in rural households and less in Tigray. At the community level, rural residence, living in Tigray compared to living in Addis Ababa, the household having suffered a natural disaster in the three years prior to Round 1, and prostitution being flagged as an issue in the community were significant for those children whose father died between rounds.[7]

None of the other characteristics seem to be significantly different between the groups. In order to see if households with maternal and paternal deaths were significantly more vulnerable to shocks than others, I include the number of shocks a household claims to have faced between rounds under various categories: theft (of tools, production inputs, cash, crops, livestock, housing, goods); affected by regulation change (resettlement, land redistribution, restrictions on migration, eviction, forces taxes); shocks to productive capacity (large increase in input prices, reduction in output prices, livestock death, job loss, place of employment shut down, contract disputes, strikes, credit source disbanded, asset confiscation, disputes, etc.); affected by natural disasters. These results are displayed towards the end of Table 2. Note that 88, 95, 46 and 51 per cent of the households had never experienced any of the above shocks, respectively. Of those who had, there are no significant differences among the groups. I take this to suggest it is likely that there are no obvious differences (especially in unobservable factors such as vulnerability to shocks or attitudes to risk) between these groups of households that may have affected adult mortality between rounds. The lack of differences may be due to the fact that our sample is pro-poor and the fact that Round 1 was carried out at a time when Ethiopia was going through one of its worst droughts in recent history.

4. Results

Tables 3.1 and 3.2 (see Appendix) present the key results of this paper: the ATT (average treatment on the treated) effect of the death of a mother or father on child schooling and subjective well-being outcomes. The specification used to find a control group matching the treatment group ('Specification 1') includes the following Round 1 characteristics: sex, height-for-age z-score, birth order of the child, household wealth,[8] household size, household demographic composition (males and females aged 0 to 7, 25 to 59 and over 60, all as a proportion of household size), religion of the mother (dummies for Muslim and Protestant, with other groups omitted), a dummy indicating rural residence, and ethnicity of the mother (Amhara, Oromo, Tigray, with other groups omitted). Additionally, the specification included Round 1 reading and writing ability to control, as far as possible, for child's initial ability when

7 Note that this question was asked only in Round 2. I assume that the issue was the same in Round 1, with little change.

8 Household wealth is proxied by a wealth index based on four housing quality indicators (number of rooms per person, wall, roof and floor durability), possession of 11 consumer durables (radio, fridge, bicycle, TV, motorbike/scooter, motor vehicle, mobile phone, landline phone, bed, table or chair and sofa) and four items reflecting access to services (electricity, water, sanitation, cooking fuel).

estimating the ATT on Round 2 reading and writing levels respectively. In all cases the balancing properties are satisfied, common support is imposed and the percentage of treated observations outside the region of common support is less than 0.3 per cent.[9] Moreover, the pseudo-R^2 after matching is quite low, indicating that there are no systematic differences in the distribution of covariates between the matched and control groups.

With respect to school enrolment, a mother dying reduces school enrolment by around 20 to 23 per cent, as seen by all found matching algorithms used. No significant effects are observed when a father dies.

With respect to a child's writing ability, we find again that the mother dying has significant negative impacts compared to had she not died. The outcome variable refers to children who cannot write at all, even with difficulty and errors. The ATT effect of the mother dying on children not being able to write at all at age 12 ranges between 19 and 23 per cent. Note that 80 per cent of those maternal orphans who cannot write are not currently enrolled in school. No such impact is found for when the father dies.

The ATT for the percentage of children significantly affected in terms of reading (cannot read at all or can read only letters rather than words or sentences) is quite high with estimates ranging from 21 to 31 per cent using the four different algorithms. These high estimates, and the fact that nearly half the maternal orphans who cannot read are enrolled in school in Round 2, suggest that not being able to read is not simply a reflection of the fact that the children are not currently at school, at least in our sample.

None of the adverse educational outcomes are evident for the group that lost their father compared to those who had not.

With subjective well-being, the story is interestingly different. It seems that a father dying between rounds reduces a child's sense of optimism by around 0.7 points – nearly a rung on the ladder of 1 to 9 – compared to had he not died. This is possibly because children are now in poorer households, have to work significantly more, as well as taking more responsibility in terms of looking after those members of the family who might be ill (borne out by their reasons for missing school). Such a significant reduction in optimism is not evident where the mother died.

However, paternal orphans also feel that they are treated with more fairness and respect than had their father not died, based on Round 2 levels as well as their change in sense of being treated with fairness and respect between rounds. Apart from the nearest neighbour algorithm, the other three corroborate the latter point in Table 3.2, by showing that there is a significant 14 per cent increase in the paternal orphans feeling that they are being treated with more respect between rounds. Could paternal orphans feel better treated because they are now more involved in paid work, and thus feel more respected within their household? Our data does not support this hypothesis. As Table 4 (see Appendix) indicates, in terms of daily time use, children who lost their father are not engaging in paid work more than non-orphans. In fact, they report to be spending significantly more time playing and less in non-paid work than children who have both parents. In contrast, children who lost their mother seem to be engaging in household chores for significantly more hours (nearly an hour more a day) than those not orphaned, and spend significantly fewer hours on school work or studying.

9 The probits used to calculate the propensity score for mother dying indicate that household size and females aged 0 to 7 are significantly negative, while wealth and having older females in the households are positive. For father dying household size, male adults aged 25 to 59 and the mother's ethnicity being Tigrian (compared to coming from other groups) are negatively significant.

The results were tested for robustness using alternative specifications. First, Specification 1 was expanded to include caregiver's education and alternatively mother's education or the education level of the most educated household member in Round 1. These variables were not significant in the probits estimating the propensity score, nor did they influence any of the results discussed above.

Second, two alternative specifications were used. Tables 5.1 and 5.2 (see Appendix) report results based on Specification 2;[10] and for two extra variables indicating whether the household suffered significantly from an exogenous physical shock during the three years prior to Round 1. Column 2 also includes the square of household size in order to satisfy balancing properties. Common support has been imposed and the balancing property is satisfied for all estimations. The percentage of treated observations outside the region of common support is less than 0.2 in all cases. The results closely match the baseline results. The death of the mother has a significant negative impact on school enrolment ranging from 19 to 25 per cent, not being able to read by 17 to 25 per cent, and not being able to write by 31 to 37 per cent. All four algorithms confirm the significance of the ATT effect. These results do not hold for the death of the father. A father's death has an impact on child subjective well-being. In particular, it contributes to a positive change between rounds in a child's sense of being treated with greater fairness and respect. The baseline result on the impact on optimism is not evident under the estimations using Specification 2. I re-estimate – including a dummy for whether or not a member of the household suffered a serious illness or injury during the three years prior to Round 1 (which has a low correlation of 0.09 with parental death, so I assume multicolinearity is not an issue) – to find that there is no marked change in the results.

Tables 6.1. and 6.2 (see Appendix) report results based on Specification 3.[11] Estimations also control for writing and reading ability respectively in Round 1. Common support has been imposed and the balancing property is satisfied for all estimations. The percentage of treated observations outside the region of common support is less than 0.5 in all cases. The results indicate that a mother's death has a negative impact ranging from 18–20 per cent for school enrolment, a 15–26 per cent impact on a child being unable to write, and a 21–23 per cent impact on a child being unable to read, compared to if the mother had not died. The size of the impact estimated is smaller than that under Specification 1 for the 'cannot read' outcome, and is not supported by the nearest neighbour algorithm. Confirming baseline results, child SWB is not significantly affected by mother's death. However, father's death has a significant impact very close to baseline estimations of around 13 per cent for the change in a child's sense of being treated with fairness and respect between rounds. The negative impact on child's sense of optimism following father's death is not supported in this specification.

Overall, therefore, the results indicate that the death of the mother in middle childhood (between ages 7 and 12) has a significant negative impact on child short and medium term educational outcomes. It is unlikely - based on estimates which have been controlled for

10 This includes sex, height-for-age z-score of child in Round 1, birth order of the child, household wealth in Round 1, household size, demographic composition, religion of the mother (dummies for Muslim and Protestant, with orthodox and other groups omitted), a dummy indicating rural residence, and dummies for region of residence (Amhara, Oromo, Tigray, SNNPR, with Addis Ababa omitted) rather than mother's ethnicity, as was used for the previous specification.

11 This includes Round 1 characteristics such as sex, height-for-age z-score, birth order of the child, household wealth, household size, religion of the mother (dummies for Muslim and Protestant, with orthodox and other groups omitted), a dummy indicating rural residence, dummies for region of residence (Amhara, Oromo, Tigray, SNNPR, with Addis Ababa omitted), and household demographic composition in Round 1. Three community-level variables are also included, being the existence of education programmes in the community, the existence of health programmes in the community (both at Round 1), and a dummy indicating whether prostitution is considered an issue in the community.

selection through using propensity score matching and initial reading/writing ability by using individual and household-level panel data - that the inability to read and write at 12 will later be reversed for all these children. This means that the mother dying may well have lasting impacts. Father's death seems to impact a child's sense of being treated fairly and sense of optimism. However, the latter finding is not robust to alternative specifications.

It is likely that the impact of mother's death on educational outcomes is due in part to the fact that living arrangements for the orphans have changed, rather than the death *per se*. This is explored below.

Case, Paxson and Ableidinger (2002) argue that living arrangements were behind the poor schooling outcome for orphans in their study. In particular, being with a non-relative or distant relative exerted a negative impact. In our case, because we have individual level panel data and we follow the child, not the household, we can estimate, with reasonable precision, whether this contention holds for the children in our sample.

Table 7 (see Appendix) shows that in Round 1, when all the children we include in our analysis had both parents, the biological mother was the main caregiver. For those who were not orphaned, the mother was the main caregiver in nearly 90 per cent of the cases in both rounds, followed by the grandmother for 3 per cent of cases. For the group that lost their father, the mother was the caregiver for nearly 89 per cent of the children in Round 1 and 86 per cent in Round 2, and the grandmother for around 8 per cent of the children. After the death of the father, some children have also been looked after by others such as uncles, cousins, etc., but this applies to about four of the paternal orphans. Even though the biological mother was the main caregiver in Round 1 for 68 per cent of the children who went on to lose their mother, this rather low rate (compared to around 90 per cent for the other groups) suggests that a long-term illness may have been the most common cause of the mother's death. In Round 1 the grandmother was the caregiver for 21 per cent of these children and the father for 10 per cent. After the death of the mother, those in their grandmother's care has increased to 26 per cent, while brothers, sisters and half siblings seem to have taken over the role of caregiver for 32 per cent of the children, and others (i.e. uncles, aunts, cousins, non-family members) seem to be the main caregivers for a substantial 42 per cent of the children. Thus those children who lost their mother have been affected the most, in terms of having 'new' caregivers who were not close relatives, at a critical stage of their education. In Ethiopia, cycle 1 of formal schooling starts around age 7–8 (around the time of Round 1) and lasts for about four years. It seems that disruptions to living arrangements at this time may have had an impact on starting school and educational outcomes.

Does a change in caregiver between rounds (and thereby living arrangements) *per se* affect outcomes in Round 2? Roughly 10 per cent of the children in our sample experienced such a 'disruption' moving from being cared for by their mother, in particular, to being cared for by their grandmother, siblings or others. Of all the children in our sample that experienced a change in caregiver, maternal orphans comprised 20 per cent. I use propensity score matching based on Round 1 characteristics, and use Specification 1. Table 8 (see Appendix) shows the results. It is evident that while changing caregiver and living arrangements between rounds has had a negative impact on school enrolment of 6 per cent (which is far less than the 23 per cent impact mother's death showed in the tables above), it has no significant impact on any of the other outcomes. Thus, while a change in living arrangements may explain part of the negative outcomes, it does not seem to explain fully why maternal orphans' schooling outcomes are affected so badly.

It is possible of course that the change in caregiver between rounds for non-orphans may be more a strategic decision on the part of families, such as access to better educational facilities. This means that in our sample, maternal orphans are systematically placed in households that seem to be less supportive of their educational outcomes, not because they are less wealthy but due to other unobservable factors. To elaborate, in terms of household wealth, the maternal orphans live in richer households in Round 2, compared to the other groups (Table 9, see Appendix). Thus better-off relatives seem to be taking over the responsibility of caring for maternal orphans, while paternal orphans continue to live with their mother often in difficult economic circumstances. Households' own perceptions of economic circumstance support this contention. In Round 1, the average perception of all groups was that household finances were in between being a struggle and being able to get by comfortably. While this perception remained at this level to a large extent for the households where neither parent had died, more households where the father had died claim that finances have become a struggle.

However, caregivers of maternal orphans who are not close relatives (i.e. not the father, sibling or grandmother but a distant relative or non-relative) in Round 2 seem to have fewer education-oriented aspirations for the orphans in their care. For example, their ideal level of formal schooling for the orphan is an average of just seven years, which is significantly lower than the 12 years expected by caregivers who are close relatives, and expectations for children who have not been orphaned. Obviously, therefore, maternal orphans living with non-close relatives seem to be affected the most by their caregiver's aspirations for them. This probably also affects their own perception that schooling can do little to move them up the ladder (i.e. make life better), discussed earlier. The caregivers of the children who lost their mother (both close relatives and others) also expect the child in their care to get married significantly earlier and have children significantly earlier (at ages 24 and 25 respectively) than do caregivers of other groups (who on average want the child to be married at around 26.5 years of age and have a child around 28 years of age). Caregivers' perceptions of other aspects such as professional ambitions for the child, expectations that the child will look after them in old age or financially support them later in life, expectations about when the child should be financially independent, etc., are not statistically significant between the groups.

Thus a key unobservable factor that seems to influence a child's educational outcome is the caregiver's attitudes and expectations about the child's human capital development. When the caregiver is the mother, the motivation to educate the child seems to come out very strongly. When the caregiver is not the mother, and in particular if not a close relative, motivation seems to be reduced and probably affects educational outcomes. The group most affected is those who changed caregiver because they lost their mother. This is evident not just in their schooling outcomes but also in terms of how they spend their day, with maternal orphans spending over an hour more a day on household chores and non-paid work, and much less time than non-orphans at school or studying.

5. Conclusions

This paper shows that losing a mother in middle childhood (between ages 7–12) has a significant negative impact on school enrolment and other educational outcomes, such as reading and writing, compared to if the mother had not died. To elaborate, the mother dying between rounds reduces school enrolment by around 21 per cent; increases the percentage of children who cannot write at all, even with difficulty and with mistakes, by around 20 per cent; and increases the number who cannot read at all or read only letters rather than words or sentences by around 30 per cent. These effects are not seen when a father dies. However, the death of a father seems to significantly negatively affect the sense of optimism a child feels about the immediate future (four years from now). Paternal orphans also seem to feel that they are treated with more fairness and respect than they would have been had their father not died. The results are checked for robustness against various specifications.

The paper also discusses briefly why maternal death, unlike paternal death, seems to affect schooling outcomes so negatively. One of the reasons may be that the majority of children who lose a mother experience a change in their caregiver. In 42 per cent of cases the caregiver is someone who is not an immediate relative, such as a father, grandparent or sibling (even step or half sibling), but a cousin, uncle or aunt or someone who is not a relative. In contrast, over 90 per cent of paternal orphans continue to have their mother as the main caregiver. Maternal orphans also seem to be in households that are wealthier than others in Round 2, suggesting also the possibility that they may not necessarily be adopted but sent for work in some cases. The caregivers of maternal orphans in Round 2 expect them to reach a significantly lower grade at school, get married earlier and have children earlier than the non-orphans or paternal orphans. This probably influences a child's perception of the value of education as well, for only 9 per cent of maternal orphans think education and better grades will make life better. Maternal orphans also tend to miss school more than others, which probably influences their reading and writing ability. The most common reason cited for missing school is illness. However, this, if true, is not yet reflected in significant shortfalls in anthropometric indicators such as height-for-age and Body Mass Index.

It will be interesting to see whether these medium-term outcomes persist when further rounds of Young Lives data become available in 2010 and later, right up to 2015 when the children will be around 22 years of age. Future rounds of data will also enable us to see if parental death does indeed put children at a higher risk of poverty in adulthood and whether it has lasting impacts on human capital development and health.

Regardless of potential future analysis, the findings in this paper suggest that timely and urgent policy interventions might be needed to address the issue of maternal orphans falling significantly behind in educational outcomes. This is partly due to the substantial changes in living arrangements they face at a critical period in life – the time of starting school – which in turn has serious implications for future school enrolment, dropping out early, missing school and their ability to read and write. But all of the poor results cannot be attributed to the caregiver now being someone other than a close relative. Children who are not maternal orphans fare better than children who are, even if in the care of a distant relative, following their father's death, or because they have been sent to live with relatives due to poor household income levels or in the hope they will receive a better education closer to schools. So the policy implication is that maternal orphans in particular need to be targeted with non-transferable subsidies encouraging school attendance and education.

The paper also suggests future research into the area of lower optimism seen among paternal orphans. Lower optimism may well be associated with the fact that these households are poorer in Round 2, and the children feel fewer assets are available for further education. Indeed, missing school is attributed to having to work at home by 30 per cent of these children. It is also likely that the chances the remaining parent will die are high (this was alluded to by around 15 per cent of children citing illness of a family member as the main reason they miss school). If this happens, as it most likely will for at least a quarter of the children who have already lost their father between rounds, it will be important to see what this means in terms of welfare outcomes and what policy can do to mitigate the effects of orphanhood.

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Appendix

Table 1. *Summary statistics: outcomes in Round 2*

	Both parents alive at R21	Mother died between R1 and R2 (but both parents alive at R1)2	Father died between R1 and R2 (but both parents alive at R1)2
Child schooling outcomes			
Enrolled at school R2	0.95	**0.78*** **	0.92
Missed school for at least a week over past year	0.13	**0.33** **	0.13
Years of completed education (if enrolled)	4.18	4.26	4.28
Years of completed education (if dropped out between R1 and R2)	2.23	1.5	4
Drop-out rate	0.02	**0.11** **	0.01
Never schooled	0.02	**0.10** **	0.05
Level read 1=nothing 2=letters 3=words 4=sentences	3.28	2.89	3.25
Proportion who cannot read anything or read only letters (not words or sentences)	0.23	**0.42***	0.25
Level write 1=letters 3=sentences	2.46	2.41	2.43
Cannot write	0.10	**0.26** **	0.09
Mathematics score (range 0-9)	4.91	**3.94** **	4.87
Child subjective well-being			
Current position on ladder ranging from 1 to 9	4.35	4.13	4.04
Expected position 4 years from now	6.22	5.57	**5.55** **
Gap (between current and future ladder positions)	1.87	1.47	1.56
Respect (Round 2)	0.82	0.73	**0.92** **
Change in sense of being treated with fairness and respect between rounds	-0.07	-0.05	**0.07** **
Number (Total)	782	19	57
Boys	51	11	28
Girls	48	8	29

* significant at the 10 per cent level

** significant at the 5 per cent level

*** significant at the 1 per cent level

Own calculations based on Young Lives Ethiopia Older Cohort data for Round 2 (2006).

Table 2. *Summary statistics: conditioning variables (Round 1)*

	Both parents alive at R21	Mother died between R1 and R2 (but both parents alive at R1)2	Father died between R1 and R2 (but both parents alive at R1)2
Child characteristics			
Sex (1=male)	0.51	0.58	0.49
Height-for-age z-score	-1.43	-1.33	-1.30
Birth order	3.00	2.77	3.01
Level read (at Round 1) 1=nothing, 2=letters 3=words 4=sentences	1.57	1.69	1.54
Proportion who cannot read anything or read only letters (not words or sentences)	0.73	0.73	0.82
Level write (at Round 1) 1=letters 3=sentences	1.60	**1.29****	**1.82****
Cannot write at all even with difficulty and errors (Round 1)	0.58	0.70	0.50
Numeracy (proportion that answered correctly how much 2 x 4 is)	0.42	0.30	0.45
Household characteristics			
Wealth	0.21	0.27	0.24
Household size	6.7	**5.31****	**5.75****
Males aged 0 to 7 as a proportion of household size	0.12	0.07	**0.06****
Females aged 0 to 7 as a proportion of household size	0.11	0.01**	0.12
Males aged 25 to 59 as a proportion of household size	0.16	0.15	**0.10****
Females aged 25 to 59 as a proportion of household size	0.20	**0.30****	**0.27****
Males over 60 as a proportion of household size	0.01	**0.07****	0.01
Females over 60 as a proportion of household size	0.01	0.01	0.02
Muslim	0.17	0.21	0.12
Protestant	0.12	0.05	0.10
Orthodox and other	0.70	0.73	0.77
Rural residence	0.68	0.63	**0.52***
Mother's ethnicity:			
Amhara	0.29	0.31	0.33
Oromo	0.17	0.31	0.26
Tigray	0.22	0.21	0.14
Other	0.30	0.15	0.26
Schooling of household head (=1 if completed primary)	0.32	0.29	0.30
Schooling level of the most educated in the household (years)	6.2	5.9	5.8

	Both parents alive at R21	**Mother died between R1 and R2 (but both parents alive at R1)2**	**Father died between R1 and R2 (but both parents alive at R1)2**
Regional dummies:			
Addis Ababa	0.13	0.21	0.14
Amhara	0.19	0.26	0.24
Oromo	0.19	0.21	0.22
Tigray	0.21	0.15	**0.10***
SNNPR	0.26	0.15	0.28
Physical shock (natural disaster)	0.34	**0.55***	0.32
Illness/injury to household member during the 3 years before Round 1	0.24	**0.44***	**0.37***
Community-level characteristics			
Number of education programmes in Round 1[1]	2.37	1.94	2.6
Number of health programmes in Round 1[2]	5.25	5.22	5.27
Prostitution is an issue in the community (=1, if yes)[3]	0.30	0.44	0.54**
Negative economic shocks between the rounds4			
Theft of tools, production inputs, cash, crops, livestock, housing, goods. Range: 0-3	0.13	0.0	0.14
Regulation change (resettlement, land redistribution, restrictions on migration, eviction, forced taxes). Range: 0-2	0.04	0.05	0.02
Shocks to productive capacity (large increase in input prices, reduction in output prices, livestock death, job loss, place of employment shut down, contract disputes, strikes, credit source disbanded, asset confiscation, disputes, etc.). Range: 0-5	0.83	0.63	0.73
Natural disasters. Range: 0-8	1.00	1.05	1.10
Number (Total)	782	23	61
Boys	51	12	29
Girls	48	11	32

* significant at the 10 per cent level

** significant at the 5 per cent level

1. No. of educational programmes prevalent in community ranges from 0-7 depending on how many of the following programmes were available at Round 1: literacy campaigns, alternative basic education programmes, equipping classrooms, construction or repair of school infrastructure, school feeding and breakfast, clothes/text book programmes that may have been prevalent in the communities at the time of Round 1.
2. No. of health programmes prevalent at Round 1 ranges from 0-8 depending on how many of the following programmes were available in the community: health insurance, family planning, tuberculosis control, malaria prevention, HIV/AIDS programme (general), mental health programme, health extension services, education on HIV, mother to child HIV/AIDS transmission protection.
3. Note that this variable is available only for Round 2. An assumption in using this variable as a control variable in matching is that the answer to the question would have been the same in Round 1 as well.
4. Note that 88%, 95%, 46% and 51% of the households had not experienced any theft, regulation change, productivity or natural disaster-related shock, respectively, between the two rounds.

Own calculations based on Young Lives Ethiopia Older Cohort data for Round 1 (2002).

Table 3.1. *The Average Treatment on the Treated effect (ATT) of mother's death on child schooling outcomes using propensity score matching (Specification 1)*

	School enrolment in Round 2[1]	**Cannot write at Round 2[2]**	**Cannot read at Round 2[3]**	**Maths score**	**Sense of optimism about the future[4]**	**Change in sense of being treated with fairness and respect[5]**
Nearest neighbour	**-0.23(2.13)****	**0.23(1.90)***	**0.31(2.18)****	-1.13(1.72)*	-0.29(0.45)	-0.11(0.63)
Caliper matching (radius=0.01)	**-0.21(1.88)***	**0.19(1.78)***	**0.21(1.64)***	-0.53(0.21)	-0.55(1.07)	-0.06(0.49)
Kernal (band width=0.06)	**-0.20(1.95)****	**0.23(2.30)***	**0.30(2.28)****	-1.13(1.65)*	-0.29(0.43)	-0.11(0.72)
Local linear (band width=0.06)	**-0.20(2.13)****	**0.20(1.98)***	**0.26(1.68)****	-0.79(0.94)	-0.45(1.37)	-0.11(1.03)
Observations Control	751	732	742	742	737	737
Treated	17	17	17	17	17	17

* significant at the 10 per cent level

** significant at the 5 per cent level

1. Control group for all estimations is children with both parents alive at R2. Specification for estimations (Specification 1) includes sex, height-for-age z-score of child in Round 1, birth order of the child, household wealth in Round 1, household size, household demographic composition (males and females separately aged 0 to 7, 25 to 59 and over 60, all as a proportion of household size), religion of the mother (dummies for Muslim and Protestant, with other groups omitted), a dummy indicating rural residence, ethnicity of the mother (Amhara, Oromo, Tigray with other groups omitted). In all cases the balancing properties are satisfied, common support is imposed and the percentage of treated observations outside the region of common support is less than 0.3%.
2. 'Cannot write' refers to children who cannot write at all, even with difficulty and errors in Round 2. Control group same as above. Specification same as above except that it also includes child's writing ability in Round 1 – a dummy equalling 1 if the child cannot write at all even with difficulty.
3. 'Cannot read' refers to children who cannot read at all or read only letters (rather than words or sentences) in Round 2. The specification is the same as for note 1, above, except that it includes reading ability in Round 1 which is a dummy equalling 1 if the child could not read at all or could read only letters.
4. Optimism is measured as the difference between where the child perceives herself on a ladder of 1 to 9 now and where she perceives she will be four years from now, based on Round 2 data.
5. Change in sense of being treated with fairness and respect is measured as 0 if there was no change in the answer to the question 'do you feel you are treated with fairness and respect in your community' in Round 1 and Round 2, 1 if the child noted an improvement, and -1 if the child noted a decrease.

Own calculations based on Young Lives Ethiopia Older Cohort data for Rounds 1 and 2.

Table 3.2. *The Average Treatment on the Treated effect (ATT) of father's death on child schooling outcomes using propensity score matching (Specification 1)*

	School enrolment in Round 2	**Cannot write at Round 2**	**Cannot read at Round 2**	**Maths score**	**Sense of optimism about the future**	**Change in sense of being treated with fairness and respect between rounds**
Nearest neighbour	-0.03(0.87)	-0.03(0.54)	0.03(0.39)	**0.23(0.45)**	**-0.66(1.95)****	**0.10(1.10)**
Caliper matching (radius=0.01)	-0.02(0.93)	-0.01(0.35)	0.05(0.87)	**0.45(0.22)**	**-0.51 (1.76)***	**0.14(1.81)***
Kernal (band width=0.06)	-0.03(0.75)	-0.01(1.22)	0.16(1.48)	**0.05(0.15)**	**-0.53 (1.83)***	**0.13(1.79)****
Local linear (band width=0.06)	-0.03(0.86)	-0.02(0.52)	0.05(0.82)	**0.13(0.36)**	**-0.55 (1.75)***	**0.12(1.87)***
Observations	751	732	742	742	737	737
Control						
Treated	53	51	52	52	53	53

* significant at the 10 per cent level

** significant at the 5 per cent level

1. Control group for all estimations is children with both parents alive at R2. Specification for estimations (Specification 1) includes sex, height-for-age z-score of child in Round 1, birth order of the child, household wealth in Round 1, household size, household demographic composition (males and females separately aged 0 to 7, 25 to 59 and over 60, all as a proportion of household size), religion of the mother (dummies for Muslim and Protestant, with other groups omitted), a dummy indicating rural residence, ethnicity of the mother (Amhara, Oromo, Tigray with other groups omitted). In all cases the balancing properties are satisfied, common support is imposed and the percentage of treated observations outside the region of common support is less than 0.3%.
2. 'Cannot write' refers to children who cannot write at all, even with difficulty and errors in Round 2. Control group same as above. Specification same as above except that it also includes child's writing ability in Round 1 – a dummy equalling 1 if the child cannot write at all even with difficulty.
3. 'Cannot read' refers to children who cannot read at all or read only letters (rather than words or sentences) in Round 2. The specification is the same as for note 1, above, except that it includes reading ability in Round 1 which is a dummy equalling 1 if the child could not read at all or could read only letters.
4. Optimism is measured as the difference between where the child perceives herself on a ladder of 1 to 9 now and where she perceives she will be four years from now, based on Round 2 data.
5. Change in sense of being treated with fairness and respect is measured as 0 if there was no change in the answer to the question 'do you feel you are treated with fairness and respect in your community' in Round 1 and Round 2, 1 if the child noted an improvement, and -1 if the child noted a decrease.

Own calculations based on Young Lives Ethiopia Older Cohort data for Rounds 1 and 2.

Table 4. *Time use on a typical day in hours (Round 2 data)*

	Both parents alive at R21	**Mother died between R1 and R2 (but both parents alive at R1)2**	**Father died between R1 and R2 (but both parents alive at R1)2**
Sleeping	9.03	9.02	9.03
Child care	0.64	0.36	0.73
Household chores	2.18	3.10**	2.32
Non-paid work	1.58	1.78	1.05**
Paid work	0.11	0.21	0.19
School	5.45	4.52**	5.15
Study	1.72	**1.27***	**1.89**
Play	2.71	2.93	3.2**

* significant at the 10 per cent level
** significant at the 5 per cent level

Table 5.1. *The Average Treatment on the Treated effect (ATT) of mother's death on child schooling outcomes using propensity score matching (Specification 2)*

	School enrolment in Round 2[1]	**Cannot write at Round 2**	**Cannot read at Round 2**	**Sense of optimism about the future**	**Sense of being treated with fairness and respect**
Nearest neighbour	**-0.25(2.00)****	**0.25(1.79)***	**0.37(1.81)***	-0.68(1.11)	-0.31(1.48)
Caliper matching (radius=0.01)	**-0.25(2.02)****	**0.19(1.68)***	**0.34(1.69)***	-0.37(0.69)	-0.18(1.17)
Kernal (band width=0.06)	**-0.19(1.64)***	**0.17(1.64)***	**0.31(1.94)***	-0.40(1.08)	-0.13(1.01)
Local linear (band width=0.06)	**-0.19(1.79)****	**0.18(1.79)***	**0.32(2.10)****	-0.38(0.86)	-0.14(1.36)
Observations Control	585	568	577	566	573
Treated	16	16	16	16	16

* significant at the 10 per cent level
** significant at the 5 per cent level

Specification for estimations (Specification 2) includes sex, height-for-age z-score of child in Round 1, birth order of the child, household wealth in Round 1, household size, religion of the mother (dummies for Muslim and Protestant, with orthodox and other groups omitted), a dummy indicating rural residence, dummies for region of residence (Amhara, Oromo, Tigray, SNNPR, with Addis Ababa omitted), and two extra variables indicating whether the household suffered significantly from an exogenous physical shock during the three years prior to Round 1. Column (2) also includes the square of household size in order to satisfy balancing properties. Common support has been imposed and the balancing property is satisfied for all estimations. The percentage of treated observations outside the region of common support is less than 0.5 in all cases. For definitions of outcomes please see notes for Table 3.1.

Table 5.2. *The Average Treatment on the Treated effect (ATT) of father's death on child schooling outcomes using propensity score matching (Specification 2)*

	School enrolment in Round 2	**Cannot write at Round 2**	**Cannot read at Round 2**	**Sense of optimism about the future**	**Sense of being treated with fairness and respect**
Nearest neighbour	-0.05 (0.67)	-0.05(0.64)	0.0(0.00)	-0.13(0.28)	**0.13(1.77)***
Caliper matching (radius=0.01)	-0.06(1.22)	-0.01(0.32)	0.02(0.23)	-0.13(0.35)	**0.13(3.09)****
Kernal (band width=0.06)	-0.06(1.08)	-0.04(0.84)	0.00(0.06)	-0.17(0.61)	**0.12(2.08)****
Local linear (band width=0.06)	-0.06(1.20)	-0.04(0.99)	0.01(0.25)	-0.18(0.69)	**0.12(1.80)****
Observations Control	585	568	577	566	573
Treated	37	35	36	37	37

* significant at the 10 per cent level

** significant at the 5 per cent level

Specification for estimations (Specification 2) includes sex, height-for-age z-score of child in Round 1, birth order of the child, household wealth in Round 1, household size, religion of the mother (dummies for Muslim and Protestant, with orthodox and other groups omitted), a dummy indicating rural residence, dummies for region of residence (Amhara, Oromo, Tigray, SNNPR, with Addis Ababa omitted), and two extra variables indicating whether the household suffered significantly from an exogenous physical shock during the three years prior to Round 1. Column (2) also includes the square of household size in order to satisfy balancing properties. Common support has been imposed and the balancing property is satisfied for all estimations. The percentage of treated observations outside the region of common support is less than 0.5 in all cases. For definitions of outcomes please see notes for Table 3.1.

Own calculations based on Young Lives Ethiopia Older Cohort data for Rounds 1 and 2.

Table 6.1. *The Average Treatment on the Treated effect (ATT) of mother's death on child schooling outcomes using propensity score matching (Specification 3)*

	School enrolment in Round 2	**Cannot write at Round 2**	**Cannot read at Round 2**	**Sense of optimism about the future**	**Sense of being treated with fairness and respect**
Nearest neighbour	**-0.18(1.64)***	**0.21(1.64)***	0.19(1.10)	-0.75(1.31)	-0.06(0.39)
Caliper matching (radius=0.01)	**0.19(2.03)****	0.18(1.52)	**0.21(1.64)***	-0.44(0.83)	-0.09(0.59)
Kernal (band width=0.06)	**0.19(1.64)***	**0.26(1.91)***	**0.22(1.85)***	-0.36(0.95)	-0.07(0.65)
Local linear (band width=0.06)	**0.20(1.86)***	**0.15(1.70)***	**0.23(2.22)***	-0.34(0.99)	0.05(0.38)
Observations	694	732			681
Control					
Treated	16	17			16

* significant at the 10 per cent level
** significant at the 5 per cent level

Specification 3 includes sex, height-for-age z-score of child in Round 1, birth order of the child, household wealth in Round 1, household size, religion of the mother (dummies for Muslim and Protestant, with orthodox and other groups omitted), a dummy indicating rural residence, dummies for region of residence (Amhara, Oromo, Tigray, SNNPR, with Addis Ababa omitted), household demographic composition in Round 1 and three community-level variables – the existence of education programmes in the community, the existence of health programmes in the community (both at Round 1), and a dummy indicating whether prostitution is considered an issue in the community. Estimations for (2) and (3) also control for writing and reading ability respectively in Round 1. Common support has been imposed and the balancing property is satisfied for all estimations. The percentage of treated observations outside the region of common support is less than 0.5 in all cases. For definitions of outcomes see notes for Table 3.2.

Own calculations based on Young Lives Ethiopia Older Cohort data for Rounds 1 and 2.

Table 6.2. *The Average Treatment on the Treated effect (ATT) of father's death on child schooling outcomes using propensity score matching (Specification 3)*

	School enrolment in Round 2 (1)	**Cannot write at Round 2 (2)**	**Cannot read at Round 2 (3)**	**Sense of optimism about the future (4)**	**Change in sense of being treated with fairness and respect between rounds (5)**
Nearest neighbour	-0.03 (0.94)	-0.01(0.22)	0.01(0.22)	-0.40(0.96)	0.12(0.86)
Caliper matching (radius=0.01)	-0.03(0.95)	0.05(0.76)	0.05(0.87)	**-0.47(1.77)***	**0.11(1.72)***
Kernal (band width=0.06)	-0.03(0.83)	0.03(0.43)	0.03(0.43)	**-0.39(2.08)***	**0.14(2.07)***
Local linear (band width=0.06)	-0.03(1.04)	0.03(0.69)	0.03(0.63)	**-0.46(1.94)***	**0.11(1.72)***
Observations Control	694				644
Treated	53				49

* significant at the 10 per cent level

1. Control group for all estimations is children with both parents alive at R2. Specification for estimations (Specification 1) includes sex, height-for-age z-score of child in Round 1, birth order of the child, household wealth in Round 1, household size, household demographic composition (males and females separately aged 0 to 7, 25 to 59 and over 60, all as a proportion of household size), religion of the mother (dummies for Muslim and Protestant, with other groups omitted), a dummy indicating rural residence, ethnicity of the mother (Amhara, Oromo, Tigray with other groups omitted). In all cases the balancing properties are satisfied, common support is imposed and the percentage of treated observations outside the region of common support is less than 0.3%.
2. 'Cannot write' refers to children who cannot write at all, even with difficulty and errors in Round 2. Control group same as above. Specification same as above except that it also includes child's writing ability in Round 1 – a dummy equalling 1 if the child cannot write at all even with difficulty.
3. 'Cannot read' refers to children who cannot read at all or read only letters (rather than words or sentences) in Round 2. The specification is the same as for note 1, above, except that it includes reading ability in Round 1 which is a dummy equalling 1 if the child could not read at all or could read only letters.
4. Optimism is measured as the difference between where the child perceives herself on a ladder of 1 to 9 now and where she perceives she will be four years from now, based on Round 2 data.
5. Change in sense of being treated with fairness and respect is measured as 0 if there was no change in the answer to the question 'do you feel you are treated with fairness and respect in your community' in Round 1 and Round 2, 1 if the child noted an improvement, and -1 if the child noted a decrease.

Own calculations based on Young Lives Ethiopia Older Cohort data for Rounds 1 and 2.

Table 7. *Main caregiver of the child in Rounds 1 and 2*

	Both parents alive at R21		**Mother died between R1 and R2 (but both parents alive at R1)2**		**Father died between R1 and R2 (but both parents alive at R1)2**	
	Round 1	*Round 2*	*Round 1*	*Round 2*	*Round 1*	*Round 2*
Biological mother	92.97	89.63	68.42	-	89.47	85.96
Grandmother	3.07	3.97	21.05	26.32	8.77	7.02
Sister/brother	0.51	-	-	31.58	-	-
Father	1.53	3.84	10.53	-	-	-
Other	1.92	2.56	-	42.11	1.75	7.02

Own calculations based on Young Lives Ethiopia Older Cohort data for Rounds 1 and 2.

Table 8. *The Average Treatment on the Treated effect (ATT) of the caregiver changing between rounds on schooling outcomes using propensity score matching (Specification 1)*

	School enrolment in Round 2[1]	**Cannot write at Round 2[2]**	**Cannot read at Round 2[3]**	**Sense of optimism about the future**	**Change in sense of being treated with fairness and respect between rounds**
Nearest neighbour	-0.03(0.90)	0.02(0.42)	-0.01(0.15)	-0.29(0.45)	-0.06(0.63)
Caliper matching (radius=0.01)	**-0.06(1.88)***	-0.00(0.05)	-0.00(0.07)	-0.55(1.07)	-0.00(0.01)
Kernal (band width=0.06)	**-0.06(2.12)****	0.01(0.28)	0.01(0.17)	-0.29(0.43)	-0.01(0.26)
Local linear (band width=0.06)	**-0.07(1.95)****	0.00(0.09)	0.02(0.47)	-0.45(1.37)	-0.01(0.11)
Observations Control	751	732	742	737	737
Treated	70	68	69	70	70

* significant at the 10 per cent level

** significant at the 5 per cent level

1. Control group for all estimations is children with both parents alive at R2. Specification for estimations (Specification 1) includes sex, height-for-age z-score of child in Round 1, birth order of the child, household wealth in Round 1, household size, household demographic composition (males and females separately aged 0 to 7, 25 to 59 and over 60, all as a proportion of household size), religion of the mother (dummies for Muslim and Protestant, with other groups omitted), a dummy indicating rural residence, ethnicity of the mother (Amhara, Oromo, Tigray with other groups omitted). In all cases the balancing properties are satisfied, common support is imposed and the percentage of treated observations outside the region of common support is less than 0.3%.
2. 'Cannot write' refers to children who cannot write at all, even with difficulty and errors in Round 2. Control group same as above. Specification same as above except that it also includes child's writing ability in Round 1 – a dummy equalling 1 if the child cannot write at all even with difficulty.
3. 'Cannot read' refers to children who cannot read at all or read only letters (rather than words or sentences) in Round 2. The specification is the same as for note 1, above, except that it includes reading ability in Round 1 which is a dummy equalling 1 if the child could not read at all or could read only letters.
4. Optimism is measured as the difference between where the child perceives herself on a ladder of 1 to 9 now and where she perceives she will be four years from now, based on Round 2 data.
5. Change in sense of being treated with fairness and respect is measured as 0 if there was no change in the answer to the question 'do you feel you are treated with fairness and respect in your community' in Round 1 and Round 2, 1 if the child noted an improvement, and -1 if the child noted a decrease.

Own calculations based on Young Lives Ethiopia Older Cohort data for Rounds 1 and 2.

Table 9. *Household characteristics and caregiver perceptions in Round 2*

	Both parents alive at R21	Mother died between R1 and R2 (but both parents alive at R1)2	Father died between R1 and R2 (but both parents alive at R1)2
Household characteristics in Round 2			
Wealth	0.32	**0.40***	0.33
Circumstances in Round 1 (1=very rich, 2=rich, 3=comfortable/manage to get by 4=struggle 5=poor 6=destitute)	3.45	3.37	3.42
Circumstances in Round 2 (1=very rich, 2=rich, 3=comfortable/manage to get by 4=struggle 5=poor 6=destitute)	3.38	3.57	**3.70****
Household size	7.6	7.4	**6.7****
Household demographic composition			
Males aged 25 to 59 as a proportion of household size	0.13	0.13	**0.10****
Females aged 25 to 59 as a proportion of household size	0.15	**0.19****	**0.19****
Males over 60 as a proportion of household size	0.01	**0.05****	0.01
Females over 60 as a proportion of household size	0.01	0.04	0.02
Caregiver perceptions			
What is the highest grade you would like the child to complete?			
Caregivers who are close relatives (parent/grandparent/sibling)	12	12.33	11.88
Other caregivers (non-relatives/distant relatives)	12	**7****	-
Age at which child is expected to leave house			
Caregivers who are close relatives (parent/grandparent/sibling)	23.97	24.19	**25.39***
Other caregivers (non-relatives/distant relatives)	26.22	**23.62****	27.75
I can do little to help the child at school, no matter how hard I try(1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree)	2.05	1.77	2.05
I expect the child to continue living close to me when she has grown up (1=not at all 2=a little 3=somewhat 4=quite a lot 5=a lot)	2.97	3.31	2.91
Age at which you expect child to get married	26.49	**24.11****	25.57
Age at which you expect child to have first child	28.38	**23.94***	28.87

* significant at the 10 per cent level

** significant at the 5 per cent level

Own calculations based on Young Lives Ethiopia Older Cohort data for Rounds 1 and 2.

Young Lives is an innovative long-term international research project investigating the changing nature of childhood poverty.

The project seeks to:

- improve understanding of the causes and consequences of childhood poverty and to examine how policies affect children's well-being
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Young Lives is coordinated by a small team based at the University of Oxford, led by Jo Boyden.

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Instituto de Investigación Nutricional (Institute for Nutritional Research), Peru

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Department of International Development University of Oxford, UK

Statistical Services Centre, University of Reading, UK

Save the Children UK (staff from the Rights and Economic Justice team in London as well as staff in India, Ethiopia and Vietnam).

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