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The timing of parental death in childhood and non-cognitive outcomes as a young adult.

Rozana Himaz (Oxford Brookes University)

(email: rhimaz@brookes.ac.uk)

Abstract

This paper looks at how non-cognitive outcomes as a young adult aged 22 could be very different between orphans and non-orphans depending on the point in a child's life-course a parent died. The data comes from five rounds of survey data for around 6000 children collected from Ethiopia and India from 2002-2016. The paper uses the potential outcome framework to estimate results. It finds that in both countries losing a father in middle childhood (between ages 7-12) correlates with significantly negative non-cognitive outcomes at age 22 compared to non-orphans. This is in contrast to those who lost a father in early adolescence (ages 12-15) whose outcomes suggest positive adaptive behaviour. Country context matters as the results for India show a father dying between ages 15-22 also has a significant negative impact on outcomes at age 22. This is not the case for Ethiopia. A mother's death has a negative impact on both schooling-related as well as non-cognitive outcomes at age 22. The findings have important implications relevant to reducing potential inequalities arising due to orphanhood especially in the context of achieving Sustainable Development Goals (SDG) target 10 of '... promoting the social, economic and political inclusion of all'.

Key words: Orphans; Non-cognitive outcomes, Africa; Ethiopia; Asia; India

1. Introduction

Nearly 140 million children under 18 years of age had lost one or both parents due to any cause of death in 2015 (UNICEF 2016) with around 43% of these children coming from Asia and 37% from Africa. Children who lose one parent ('single orphans') or lose both parents ('double orphans') are a vulnerable group with outcomes such as schooling and earnings when adults all potentially more negative compared with those for non-orphaned counterparts (Evans and Miguel, 2007; Beegle, De Weerdt and Dercon, 2009). Case and Ardington (2006) argue that the gender of the parent that dies matters to outcomes with the loss of a child's mother being a strong predictor of schooling outcomes in South Africa. Similar results are found by (Chen, Chen and Liu, 2009)) and (Gimenez et al., 2013) for Taiwan although (Ainsworth, Beegle and Koda, 2005) find no evidence of maternal death reducing primary school completion rates in North Western Tanzania. There is also evidence with respect to India that paternal death, particularly later in a child's teenage years, can have significant negative impact on various outcomes including education, income and high quality spouses, as the society's context means investments by fathers towards children are particularly important later in childhood (Shenk and Scelza, 2012)¹.

In spite of such investigations, little empirical evidence exists on the impact of becoming an orphan as a child on non-cognitive outcomes as a young adult. We define non-cognitive skills as the 'patterns of thoughts, feelings and behaviours' (Borghans et al., 2008) that are socially determined and can be developed throughout the lifetime to produce value. They include psychosocial skills such as self-esteem and self-efficacy, personality traits such as conscientiousness and motivation and more broadly soft skills particularly useful in the labour market such as teamwork and perseverance (Heckman and Kautz,

¹ With regard to fathers, a long tradition of sociological literature shows that paternal absence can have a significantly negative impact on outcomes as an adult. Many of these results do not control for potential issues of endogeneity of paternal absence but McLanahan, S., Tach, L. and Schneider, D. (2013) use results from 47 papers that do account for these issues to argue that the death of a father in childhood can have a particularly strong negative impact on schooling outcomes, socio-emotional adjustment and adult mental health. The data for these papers are mostly from high income countries such as the United States, UK, Canada, Germany, Sweden, Australia, and Norway although it also includes middle income countries such as Indonesia and South Africa.

2012). If orphans *do* step into adulthood with significantly poorer non-cognitive outcomes, particularly as these can be a conduit for success in the labour market (Heckman and Kautz, 2012), it is likely to perpetuate into persistent inequalities in other spheres as well, such as standard of living and overall wellbeing with negative effects spilling over to the next generation. The issue is particularly important in the context of a country's efforts to promote '... the social, economic and political inclusion of all' in the context of the United Nation's Sustainable Development Goals (SDG) target 10.

In terms of mitigating possible negative consequences of orphanhood and reducing potential inequalities, it is important to know how and who to target. This is where insights regarding whether the timing of parental death matters to outcomes becomes important. For example, are the longer term impacts on non-cognitive outcomes due to a parent's death worse if a child lost a parent in middle childhood (between ages 7-12) rather than during early adolescence (12-15) or later in adolescence (15 to 19)? What non-cognitive outcomes are affected the most? There is almost no empirical evidence as far as the author is aware that address these issues pertaining to developing countries.

Why might non-cognitive outcomes as an adult be very different depending on which point in a child's life course a parent died? The answer may lie in the different ways in which non-cognitive development is influenced in the life course. From a child's development perspective, middle childhood is a crucial stage where a child's roles and responsibilities evolve together with cognitive skills such as learning and reasoning and non-cognitive aspects including interpersonal negotiation and problem solving. A child's family, school, peers and overall context that are important to this development can be disrupted due to parental death. For example there could be a change in caregiver arrangement or extra stress placed on the remaining parent with increase perhaps in anxiety, depression and consequent changes to parental behaviour, or increase in chores and work a child has to carry out. There could be income effects too that affect adversely the acquiring of cognitive skills in particular if schooling is affected. The effects of changes to context may matter differently to development at different stages of life but an earlier disruption in middle childhood may possibly have more lasting consequences than a later disruption, particularly as middle childhood is still a phase in life when children are not seeking autonomy from parents.

Particularly from a neurological perspective, there seems to be reason to hypothesise that the *timing* of the ‘shock’ to a child’s life would matter for the development of personality traits in particular. Teenage years are a time of rapid change, presenting a ‘perfect storm’ with simultaneous and sudden increases in hormonal, neural and social changes as well as changes in personality development as one’s sensitivity to social signals in the environment are enhanced (Blakemore and Mills, 2014, Nelson, Jarcho and Guyer, 2016). It is also a phase in the life course where children seek more independence and autonomy from parents (Eccles et al., 1993; Steinberg and Morris, 2001) and tend to look for loyal, close friendships from peers ([Brown 2004](#); Nelson, Jarcho and Guyer, 2016; Nelson et al., 2005). This social reorientation supports the emergence of social competence and social functioning more generally (Capaldi et al., 2001). This could mean that parental death during adolescence causes less negative impacts on the development of personality traits and peer relationships and perhaps even be a source of resilience, facilitating positive adaptive behaviour. But adolescents are also inclined to engage in more risky behavior and parental death may encourage this even more especially if the quality of parenting offered by the remaining parent diminishes, increasing the likelihood of delinquency and/or substance use amongst the older children.

Finally, parental death later in adolescence between ages 15-19 maybe a time when a change in context may have a direct and perhaps immediate impact in influencing a teenager’s aspirations and goals (and those of her family’s regarding her future). Thus schooling maybe cut short abruptly to give way to joining the labour market full time (Cas et al., 2014). Decisions regarding marriage may be hastened (Beegle and Krutikova, 2008) or different in terms of ‘quality’ especially in societies where parental investment later in adolescence matters to finding a higher quality spouse for the child (Apostolou, 2010). The nature of support from extended family and networks may be different to that available to a child when he was younger. Parental death during this period therefore might have different consequences to when a child was younger.

The main aim of this paper is to investigate empirically whether becoming a single orphan in middle childhood has more persistent effects on outcomes at ages 15 and 22 compared to losing a parent during adolescence using data for Ethiopia and India. The data come from five rounds of the Young Lives longitudinal survey, conducted in 2002, 2006, 2009, 2013 and 2016 for a sample of around 6000 children from poorer households across

20 sentinel sites each in Ethiopia and India . The rich data set allows for the investigation of outcomes at age 15 such as self-esteem and agency, subjective wellbeing and cognitive outcomes proxied by school enrolment, highest grade achieved and test scores. Outcomes at age 22 include personality traits such as conscientiousness and neuroticism (part of the Big Five personality traits), labour market soft skills such as perseverance or effort, leadership ability, teamwork skills, self-esteem and self-efficacy, time use patterns and alcohol consumption. The impact of the father dying is likely to be different to the impact when a mother dies, as noted in the literature, so we consider these two situations separately².

A key challenge is to disentangle correlation from causality as parental death is not an entirely random event. If a parent's death is correlated to unobserved characteristics such as attitudes to health or omitted variables then a comparisons of observed outcomes between orphans and non-orphans will not necessarily reflect the true effect of orphanhood. For example the effects of being orphaned maybe over-estimated if parents unobserved health problems affect children's development as well as contribute to parent's death. On the other hand if becoming an orphan meant that the child died or was attrited in between rounds of a longitudinal survey, the measured impact could be an underestimate. We address the issue of sample selection and omitted variable bias issues in this paper by including pre-orphanhood characteristics in a multivalued treatment effects model. Robustness of results is checked for using propensity score matching using an alternative specification of the model. Even so, if parental death was not unanticipated and preceded by ill health they could have affected outcomes prior to death (through unemployment, hospitalisation, requiring care at home or changes to the quality of parenting during the survival time). This would mean the estimates are biased. In our sample, only around 10 per cent of the households in India where a parent died report that the parent was also seriously ill during the same round. For Ethiopia this number was 20 per cent. Thus the bias introduced by prior parental illness is assumed to be relatively small, particularly for India.

² Only cases where one parent dies (but the remaining parent is alive) are considered and not the case of double orphans due to small sample size and evidence of attrition among the latter that could lead to biased results. Although it would be good to look at the impact of parental death on girls versus boys, our sample of orphans is too small to split into further groups.

The rest of this paper is organised as follows. The next section looks at data and descriptive statistics, section 3 looks at results taken from the baseline specification while section 4 looks at robustness checks using alternative specifications and models. Section 5 concludes.

2. Data and Summary Statistics

The data for this paper comes from the older and younger cohort data for the Young Lives longitudinal survey data for children, households and their communities collected in 2002, 2006, 2009, 2013 and 2016 for Ethiopia and from two regions in Andhra Pradesh (Coastal Andhra and Rayalaseema), and Telangana, India (see <https://www.younglives.org.uk/>). Both samples are largely pro-poor, as the aim of the Young Lives project is to look at the causes and consequences of childhood poverty. 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, similar to nationally representative datasets. 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 for analysing correlates, causal relations and dynamics (Kumra 2008, Dercon and Outes-Leon 2008).

The survey adopted a multi-stage sampling procedure where 150 households each were selected from 20 sentinel sites in each country. A thousand of these households contain children belonging to the 'older cohort' aged 7-8 at the time the first round of data was collected in 2002 (round 1). Two thousand children belong to the 'younger cohort' who were 7-8 years old at the time the third round of data was collected in 2009 (round 3). Data for these 'index children' from the older and younger cohorts were collected again when they were 11-12 years of age in 2006 and 2013 respectively, and then again at 14-15 years in 2009 and 2016, respectively. Our analysis for outcomes at age 15, pool both cohorts together, by age, such that there is a sample close to 3000 children for each country. Thus the baseline characteristics for children aged 7-8 are based on pooling round 1 data for the older cohort and round 3 data for the younger cohort. However the analysis for outcomes at age 22 can only contain children from the older cohort taken during the fifth (and final) round of data collection in 2016.

Pooling round 1 data for the older cohort and round 3 data for the younger cohort gives us a sample of 2885 children aged 7-8 years for Ethiopia and 2931 children for India. The data gathered seven years later when these children were 14-15 years of age, sees a fall in overall sample sizes by 3.4% and 1.8% for Ethiopia and India, respectively. However, attrition rates are higher if we only consider the older cohort from round 1 to round 5 (ages 7-8 to ages 21-22) at 18.6 per cent overall for Ethiopia and 7.8 per cent for India. Although still relatively low for a 15 year longitudinal study, we first looked at summary statistics to see if there was any systematic bias in the children who attrited in terms of individual and household characteristics at age 8 compared to those that remained in the sample. Table 1 reports only results for selected variables such as gender and those where significant differences were found. It shows that in both countries children from wealthier households were more likely to attrite, probably due to migration. There are no significant differences at the 5 per cent level or above by ethnicity, caste or other characteristics. There were also no differences in terms of future orphanhood status if we consider the situation where only one parent died while the other remained alive until the child was 22 years old, apart from the case of India, where a mother's death seemed to correlate more positively with a child dropping out of the survey. However, losing both parents between ages 8-22 is strongly associated with the child dropping out of the survey in both countries. Thus in our estimations we interpret with great caution the results pertaining to a mother dying given that they are based mainly on those maternal orphans who remained in the sample. It is therefore possibly an under-estimate of the 'true' impact of the mother dying.

Table 2 shows the number of orphans considered for the empirical analysis that looks at outcomes at age 15. The sample is divided by gender of the parent that died and the period during a child's life-course that the death occurred. Thus the total number of children who lost a father between the four years spanning ages 8-12 (but whose mother remained alive at age 15) is 71 for Ethiopia, with 80.6 per cent of these deaths assumed to be unanticipated or sudden. The survey does not record cause of death but a proxy for sudden death of the father is to see if father's illness has been recorded as a 'shock' the family experienced in the round of the survey where his death is also recorded. The same method is used to approximate the percentage of mothers' deaths that was sudden. Overall around 15 per cent of parental deaths are assumed to have been anticipated. The table also shows that maternal orphans are few in number in our samples for Ethiopia and India. If we

focus only on the older cohort data, as we do to investigate outcomes at age 22, the sample is even smaller, and even when we widen the age grouping of the child as being between 8-15 and 15-22, as in Table 3 we still have around 15 to 20 children in each age group in Ethiopia and 11 each in India. The sample sizes for paternal death are larger and therefore lend to more robust regression results. Even in this case, however, the 15-19 age group is expanded to being 15-22 to avoid issues arising due to small sample size if age range was narrower. The regression analysis in this paper uses only the children present in all relevant rounds for whom all the relevant information is available.

Appendix Table A1 presents summary statistics for pre-orphanhood characteristics at age 8 for Ethiopia and India separately. Unreported tables that present these figures for orphans vs non-orphans show systematic differences that are statistically significant at least at the 5 per cent level only in terms father's and mother's age with orphans having parents who are older on average by about 4 years for Ethiopia and about 3 years in India. Apart from this, just for the case of maternal orphans in India the household wealth index is significantly lower and the mother has lower formal schooling compared to non-orphans.

In terms of outcomes at age 15, we look at school enrolment and highest grade completed as well as proxies for cognitive and non-cognitive achievement. Cognitive achievement is proxied by maths scores and the score on the Peabody Picture Vocabulary test, both designed and administered by *Young Lives*. The non-cognitive outcomes include agency (i.e., power or ability to influence one's life and related to the concept of 'locus of control' as discussed in (Rotter, 1966), self-esteem (i.e., an evaluation of self-worth which follows an adapted version of the self-esteem Scale in Rosenberg 1965, tailored to suit a context of child poverty and specific dimensions of the child's living circumstances (e.g., housing, clothing, work, school) and a child's subjective wellbeing measures using an adapted version of Cantril's 'ladder' ([Cantril, 1965](#)) that asks the child, where she places herself on a ladder of one to nine rungs with the lowest and highest rungs reflecting the worst and best possible outcomes in life. Apart from this the hours of paid work a child engages in a day is also looked at. Appendix Table A2 presents further details on the instruments used to calculate these outcomes.

Appendix Table A3 presents summary statistics for outcomes at age 15. Unreported summary outcomes at age 15 disaggregated by orphanhood status indicate significantly more negative outcomes at age 15 along cognitive and non-cognitive dimensions for those

whose father died in middle childhood compared to non-orphans than for those whose father died in early adolescence. More specifically, maths scores are lower, hours of paid work are higher and subjective wellbeing is significantly lower for those that lost a father in middle childhood in Ethiopia compared to non-orphans. In India, highest grade achieved is lower; hours of paid work higher, sense of agency lower and subjective wellbeing are significantly lower for this group compared to non-orphans. For the maternal orphans who lost a parent between 8-15 years, subjective wellbeing is lower than for non-orphans at age 15 in both countries.

The outcomes considered at age 22 are enrolment in formal education, highest grade and age-appropriate items that measure labour market readiness, skills and other behavioural traits that are important for individuals in the older cohort. These latter outcomes include personality traits such as neuroticism (tendency to be prone to psychological stress, experiencing emotions such as anger, anxiety easily with a high score often reflecting worse psychological well being) and conscientiousness (tendency to be organized and responsible and hardworking" that are subscales from the big 5 personality tests (King and Watkins, 2012). Other non-cognitive traits include self-esteem and subjective wellbeing as discussed previously as well as self-efficacy (coping with daily hassles as well as adaptation after experiencing all kinds of stressful life events, see Schwarzer and Jerusalem 2010), leadership ability and cooperative teamwork (subscales of the Review of Personal Effectiveness with Locus of Control (ROPELOC; Richards et. al 2002) aimed mainly at measuring social abilities and self-conceptions of relationships with peers (Marsh and O'Neill, 1984). Also measured are personality traits that predict achievement such as perseverance of effort and consistency of interest that this paper terms 'grit' ((Duckworth and Quinn, 2009). Apart from this, outcomes indicating time use such as hours spent a day in paid work and non-paid work, and alcohol consumption are also investigated. Appendix Table A4 presents summary statistics for these outcomes by country.

3. Empirical Strategy

To estimate the causal effect of a parent dying at different points in childhood on outcomes later in life, ideally outcomes for the same individual under different scenarios has to be compared. For example, outcomes when both parents are alive compared to outcomes

for the same individual had the father died in middle childhood. But it is impossible for the same individual to be subject to both these situations (i.e., having both parents alive as well as having a parent die). This missing counterfactual issue is solved using the potential outcomes framework (Imbens, 2009, Imbens and Wooldridge 2009). If we consider the case of a father dying (but the mother remains alive), then under the potential outcomes framework the ‘treatment’ T that child i is subject to can take multiple values depending on when in childhood the death occurs. A father could die when the child is between ages 8-12 (middle childhood) when $T_i = 1$, or between ages 12-15 (early adolescence; $T_i = 2$) or between ages 15-19 (later in adolescence, $T_i = 3$). The case of both parents being alive (i.e., no treatment) is presented by $T_i = 0$. In alternative specifications we consider the treatment to be mother’s death at various stages in childhood and also the treatment as both parents dying in middle childhood or adolescence.

For each individual i , $i = 1, \dots, N$, in the sample, the triple (Y_i, T_i, X_i) is observed. Y_i is the outcome variable, T_i is the multivalued treatment variable with $T \in \{0, 1, 2, 3\}$ and X_i represents the vector of pre-treatment covariates. The indicator $D_{it}(T_i)$ for receiving treatment t for individual i can be written as

$$D_{it}(T_i) = \begin{cases} 1, & \text{if } T_i = t \\ 0, & \text{otherwise} \end{cases}$$

For each individual, there is a set of potential outcomes $(y_{i0}, \dots, y_{i3})$. Y_{it} denotes potential outcomes for each individual i for $t \in \{0, 1, 2, 3\}$. Only one of the potential outcomes is observed depending on the treatment status. Adopting the potential outcomes framework pioneered by Rubin (1974), the observed outcome y_i can be written in terms of the treatment indicator $D_i(t_i)$ and the potential outcomes y_{it} as

$$Y_i = \sum_{t=0}^3 D_{it}(T_i) Y_{it}$$

If parental death was random, the average effect of the treatment in the population (ATE) for receiving treatment for t instead of treatment 0 is:

$$ATE_t = E(Y_t - Y_0)$$

But the data does not come from a randomised experiment so the ATE is estimated with additional conditioning on X_i assumed to contain all characteristics associated with treatment assignment mechanism and potential outcomes so that the treatment is as good as randomly assigned. The key identifying assumption for the estimators we use is that the potential outcomes are independent of the treatment, given a set of observables x (i.e., conditional independence – (Heckman and Robb, 1985) is met. Formally, $y_{it} \perp t_i \mid \forall t \in \{0..3\}$ where $\perp$ stands for independence. Apart from this the common support of overlap condition also needs to be satisfied that requires each child to have a positive probability of receiving each treatment level (Imbens and Wooldridge, 2009). Formally for each possible x in the population and each treatment level $\tilde{t}$, $0 < \Pr(t = \tilde{t} \mid x) < 1$. Finally, the standard independent and identically distributed (i.i.d) sampling assumption is also required that implies the potential outcomes and treatment status of each individual is unrelated to the potential outcomes and treatment status of other individuals in the population (Wooldridge, 2010).

In order to solve the missing data problem the potential outcomes framework uses the parameters of an auxiliary model to condition on covariates so that the treatment is as good as randomly assigned. This auxiliary model can focus on a model for the outcome variable or a model for the treatment variable or both. If a model for the outcome variable were used, such as the Regression Adjustment (RA) estimator, the outcome is regressed on a set of covariates for each treatment level, after which the predicted outcomes for each individual and treatment level are computed using data only from the individuals receiving the relevant treatment level. Potential outcomes means are estimated using the average of these predicted values. These potential outcomes can then be contrasted to estimate ATEs. Drawbacks of this technique include biases arising out of miss-specifying the outcome model and the investigator not being able to directly assess the covariate balance between treatment groups. An alternative estimator addressing directly the latter issue is one that uses weighting techniques such as the Inverse Probability Weighted estimators. Here the auxiliary model focuses on how the treatment is assigned with the use of weighted regression coefficients to compute averages of treatment-level predicted outcomes. The weights are the estimated inverse probabilities of treatment. Observations that are not likely to contain missing data get a weight close to one; observations that are likely to contain missing data

get a weight larger than one, potentially much larger. The contrasts of the treatment-level predicted outcomes provide the estimated treatment effects. This paper uses for its baseline results the Inverse Probability Weighted Regression Adjustment (IPWRA) estimator to estimate ATE, thus using an auxiliary model that focuses both on the outcome and treatment models. It is thus 'doubly robust' (Wooldridge 2010, section 21.3.4) as it is sufficient that either the outcome model or treatment model is specified correctly to consistently estimate treatment effects.

The pre-orphanhood characteristics at age 8 that we use in the outcome model, that explain outcomes at ages 15 and 22 are gender of child, age in months, highest grade completed at school, region of residence (Ethiopia: Addis, Amhara, Oromia and Tigray with Southern Nations Nationalities and People's region and others omitted; India: Rayalaseema, Coastal Andhra with Telangana omitted), caste (India: Scheduled Caste, Schedule Tribe and Backward caste with other castes omitted), the education level of the caregiver, household wealth, the log of household size, household demographic composition and rural residence (with urban omitted). The treatment model when the treatment is father's death uses age of father, his education level, household wealth index and rural residence (urban omitted) when the child was eight years old. The treatment model when the treatment is the death of the mother is mother's age, education level, household wealth index and rural residence (urban omitted). A diagnostic test is performed to see if the distribution of these covariates are 'balanced' over the treatment and control groups as should be if the models are well specified, and therefore the treatment is as good as randomly assigned. The unreported tests confirm that although raw means of covariates differ over treated and control observations the weighted means are similar (i.e., differences are close to zero).

A drawback with the IPW estimators especially with small sample sizes as in the case of maternal deaths is that they become extremely unstable as the overlap assumption gets close to being violated even if the functional form for the treatment model is correctly specified. We therefore use the Propensity Score matching estimator as an additional check of robustness of results. Here the missing potential outcome for each subject is imputed by using an average of the outcomes of similar subjects (based on treatment probabilities) that receive the other treatment level. The ATE is computed by taking the average of the difference between the observed and potential outcomes for each subject. The use of multivalued treatment effects faces complications when applied to the case of propensity

score matching, and the model reduces to the simple binary case when the treatment contains values of just 0 or 1 as discussed in many papers including (Imbens, 2004; Heckman and Vytlačil, 2007).

4. Results

4.1. Death of the father

The results in this section look first at how outcomes at age 15 differed between orphans and non-orphans, using the IPWRA estimator, conditioning on pre-orphanhood characteristics at age 8. Only the results pertaining to the ATEs are reported in this paper in the interest of space and clarity. As Table 4 shows, children who lost a father had significantly poorer maths scores and subjective wellbeing at age 15 compared with non-orphans. However those who lost a father in early adolescence (between ages 12-15) seem to engage significantly less in paid work as well. Do these effects persist to age 22? The results in Table 5 seem to suggest that the negative psychosocial outcomes amongst those that lost a father in middle childhood persist to young adulthood with self-esteem, leadership and teamwork skills both significantly lower than that for non-orphaned counterparts while they spend less hours in paid employment and more in unpaid work (excluding household chores). In contrast, those that lost the father in early adolescence indicate significantly *higher* outcomes compared to non-orphans in terms of self-efficacy, peer relationships and leadership/team work skills although they continue to report lower levels of subjective wellbeing and more hours in unpaid work. There are no differences in the IPWRA results in terms of enrolment in formal education and highest grade completed between orphans and non-orphans at age 22. Those that lost a father later in adolescence and as youth (between ages 15-22) show significantly lower leadership/teamwork skills and grit at age 22 than their non-orphaned counterparts.

The results for India also matches the Ethiopian case in that paternal death when a child is between age 8-12 has more lasting and more adverse impacts in the non-cognitive sphere as opposed to those that lost a parent between ages 12-15. But apart from this there are considerable differences in the case of India compared to Ethiopia. First, as Table 6, shows, at age 15 a child who lost a father in middle childhood has significantly lower school enrolment, grade completion and maths scores than non-orphans. They also have lower

sense of agency, subjective wellbeing and engage more in paid work. These negative outcomes persist to age 22 as seen in Table 7, with the youth indicating they have lower grade completion, self-esteem, leadership and team work traits than those not orphaned, as well as higher traits of neuroticism and higher alcohol consumption. In contrast to this group of paternal orphans, those that lost a father in early adolescence report less adverse consequences at age 15 and 22 compared to non-orphans. As Table 5 shows they do have significantly lower subjective wellbeing than non-orphans at age 15 but by the time they reach age 22, their non-cognitive outcomes such as subjective wellbeing, self-esteem, self-efficacy, leadership and team work skills, peer relationships are all significant more positive compared to those of non-orphans. This is similar to the case of Ethiopia. However, unlike for their counterparts in Ethiopia, those who lost a father in early adolescence in India show lower school enrolment and grade completion at age 22, indicating that the death of the father probably interrupted their schooling. Interestingly, this interruption does not seem to have had a negative influence on the development of their non-cognitive skills. This group also engages in more paid and unpaid work compared to non-orphans and report significantly less alcohol consumption.

The Indian case is also different to the Ethiopian case also in that those children who lost a father later in adolescence and in young adulthood (between ages 15-22) have significantly poorer outcomes than non-orphans at age 22 across almost all the measures that we use in terms of schooling, time use and non-cognitive outcomes. This supports the findings in the literature in India that paternal investments in children are likely to be higher later in adolescence and has a significant impact on their 'status' as a young adult (Shenk and Scelza, 2012).

The robustness of results are checked for by using an alternative estimator- propensity score matching with results reported in Appendix Table A5- A8. The approach used in the matching estimator is to use dichotomous treatment relevant within the age groups we consider and to condition the estimations on pre-orphanhood characteristics closest to the child's age bracket during which the parent died. Thus for those that lost a father between 8-12 years the treatment is 1 if father died but mother remained alive at age 15, and 0 if both parents were alive at age 15. The pre-orphanhood characteristics considered are those at age 8. Similarly for those that lost a father between 12-15 years the dichotomous treatment is 1 if father died between ages 12-15 but mother was alive at age 15, and 0 if

both parents were alive at age 15. The pre-orphanhood characteristics in this case are those at age 12. A similar methodology is adopted to define three dichotomous treatment groups for the estimations that look at outcomes at age 22.

The robustness checks confirm the overall result that a father dying during a child's middle childhood has more persistent negative effects particularly in terms of non-cognitive outcomes lasting up to young adulthood at age 22 compared to a father dying earlier in adolescence, for both India and Ethiopia. For example, Table A5 for Ethiopia shows that those that lost the father between 8-12 years have lower subjective wellbeing and maths scores at age 15 than non-orphans as well as higher engagement in paid work. By age 22 this group of paternal orphans also indicate poorer leadership and team work skills, poorer self-efficacy, conscientiousness, peer relationships as seen in Table A6. They also engage less in paid work and more in unpaid work. In contrast, although those that lost the father in early adolescence report lower subjective wellbeing at age 15 their outcomes are not negative across as many measures as the group that lost a parent in middle childhood. Although the propensity score matching estimates do not indicate positive non-cognitive outcomes for this age group at age 22 as did the IPWRA estimations, the robustness check supports the finding that the negative effects of being orphaned as a young adolescent are not as persistent as those of being orphaned in middle childhood.

The robustness results for India given in Table A7 and A8 follow similar patterns as the baseline results: paternal death occurring during a child's middle childhood has negative schooling and non-cognitive outcomes that persist to adulthood. These orphans also consume more alcohol at age 22 than non-orphans. This is in contrast to those who lost a father in early adolescence who tend to show more positive outcomes in certain spheres than do non-orphans at age 22.

Again the results for India and Ethiopia defer considerably when it comes to the outcomes for those children that lost a father later in adolescence. In Ethiopia their outcomes do not defer significantly to those of non-orphans at age 22. In India they differ very significantly to the detriment of orphans.

4.2. Death of the mother

Due to fewer children experiencing the death of a mother in middle childhood and early adolescence (and overlap conditions being violated for the case of India), these two

groups have been merged to make the results more statistically robust. Thus there are 47 children in Ethiopia and 33 in India whose mother died when they were 8-15 years of age while the father remained alive. Table 8 provides results for Ethiopia that compare outcomes at age 15 for this group of children, conditioned for pre-orphanhood characteristics. It shows that maternal orphans are significantly less enrolled in school, lower maths scores and have lower self-esteem compared to non-orphans. The negative effects persist to age 22 with many outcomes such as school enrolment, highest grade completed, self-esteem, self-efficacy, peer relationships, grit, conscientiousness and neuroticism all being significantly worse for maternal orphans than non-orphans. They also spend significantly more time in paid and unpaid employment than non-orphans. Those who lost a mother between ages 15-22 indicate significantly negative results on enrolment, highest grade completed, conscientiousness and higher neuroticism. The robustness check using propensity matching for age 22 outcomes indicate fewer negative outcomes for maternal orphans than the IPWRA results. However, as noted previously sample sizes are small at 15 and 20 for the mother died between 8-15 and 15-22 groups and the results using both the IPWRA and matching estimators should be treated with great caution and are indicative at best.

Table 10 presents ATE on outcomes at age 15 conditioned on characteristics at age 8 for India. Maternal orphans have significantly lower school enrolment, lower self-esteem and engage more in paid work. The estimated results for longer term effects using outcomes at 22 are unreliable as the sample size (i.e., 11 children each in the two groups age 8-15 and 15-22) violates the overlap conditions. These results are therefore omitted from this paper.

5. Conclusions

This paper compared outcomes at ages 15 and 22 for single orphans versus non-orphans based on average treatment effects derived on a multi-valued treatment effects framework that conditioned outcomes on pre-orphanhood characteristics. A 'single orphan' was defined to be a child that loses one parent due to any cause of death, but not the other. The paper showed that the point in a child's life-course during which he or she loses a parent matters to outcomes at age 22, when compared to non-orphans. These outcomes included labour market soft skills (i.e., leadership and teamwork skills), psychosocial

outcomes (self-esteem, self-efficacy, subjective wellbeing, peer relationships), personality traits (conscientiousness and neuroticism), time use and alcohol consumption habits. More specifically, losing a father in middle childhood between ages 8-12 seemed to have more persistent negative outcomes at age 22 in terms of reporting significantly lower team work and leadership skills and higher traits of neuroticism compared to non-orphans in both Ethiopia and India. Apart from this, the Ethiopian paternal orphans report significantly lower self-efficacy, less hours of paid work and more hours of unpaid work. The Indian orphans show significantly lower self-esteem, grade completion at school and alcohol consumption compared to non-orphans. In contrast, those children that lost a father during early adolescence (between ages 12-15), indicate far fewer negative outcomes at age 22 compared to non-orphans in several dimensions in both countries. A key difference between the two countries with regard to those that lost a father later in adolescence or young adulthood (between ages 15-22) was that the negative outcomes at age 22 were far worse for these orphans in India than it was in Ethiopia.

An identical analysis for maternal orphans was not possible with the dataset due to fewer maternal deaths in the sample. However a mother dying –whether in middle childhood or adolescence--seems to affect schooling negatively with grade completion and enrolment in formal education significantly lower among maternal orphans than non-orphans. Moreover, at least for the Ethiopian data, patterns observed for maternal orphans seem to be broadly similar to those of paternal orphans in the long run. Thus a mother dying when a child is in late adolescence seems to have a lower longer term impact than death during the earlier stages of life considered in this paper. These effects are likely to be an under-estimation of the true impact of a mother dying particularly for India as the attrition rate for maternal orphans was higher in this sample.

Why does a father dying during a child's middle childhood affect negatively non-cognitive traits in the longer term much more than death in early adolescence? Disruptions to schooling and therefore the context within which a child develops may be an explanation for India, where several schooling-related outcomes suffer significantly as a result of the father's death. There could also be further changes to context as caregiver arrangements change as well as the quality of parenting from the remaining parent that possibly affects younger children more than it does early adolescents. This is an area that requires further investigation. Nonetheless, adolescents seek increasingly more autonomy from parents and

look to making stronger relationships with peers as discussed in the introduction and the results for both countries confirm that those that lost a father in early adolescence claim significantly stronger relationships with peers than do non-orphans. It is likely therefore that paternal death during early adolescence resulted in less negative impacts on the development of personality traits and peer relationships and was even a source of resilience, facilitating positive adaptive behaviour for children in our sample.

The Ethiopian and Indian orphan's experiences seem to diverge in terms of paternal death that occurs later in a child's adolescence. The Ethiopian data indicates lower negative impacts at age 22 for these orphans compared to non-orphans. In contrast the Indian data shows that youth who lose a father between ages 15-22 show significantly lower schooling outcomes and non-cognitive outcomes. This suggests that a father's investments in children are likely to be higher later in adolescence and has a significant impact on their schooling and non-cognitive outcomes as young adults. A related important implication of this result is the importance of country context in analysis that seeks to look at how inequalities evolve over the life-course.

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Table 1: Comparing characteristics at age 8 for non-attrited versus attrited index children in the older cohort

	Ethiopia			India		
	Non-attrited	Attrited	Difference	Non-attrited	Attrited	Difference
Proportion of males	0.525	0.446	0.080	0.486	0.5	-0.014
Wealth Index	0.221	0.273	-0.053***	0.404	0.484	-0.080***
Observations	813	184		922	86	
Future Orphanhood						
Will lose father between 8-22 (but mother alive)	0.124	0.038	0.086	0.104	0.00	0.104
Will lose mother between 8-22 (but father alive)	0.054	0.0384	0.016	0.027	0.166	-0.139**
Will lose both parents between ages 8-22	0.023	0.906	-0.822***	0.035	0.935	-0.901***

Table 2: Number of children with both parents alive versus 'orphans' at age 15

	Both parents alive at ages 8, 12 and 15	Father died between ages 8 and 12 but mother alive at 15	Father died between 12 and 15 but mother alive at 15	Mother died between ages 8 and 12 but father alive at 15	Mother died between 12 and 15 but father alive at 15
Ethiopia					
Older Cohort	774	36	22	13	13
Younger Cohort	1413	35	23	14	7
Total (% sudden death) ¹	2187	71 (80.6)	45 (76.1)	27 (92.6)	20 (75)
India					
Older Cohort	861	33	16	10	2
Younger Cohort	1730	41	32	14	7
Total (% sudden death) ¹	2591	74 (97.3)	48 (87.5)	24 (95.8)	9 (88.8)

¹The proxy for sudden death of a parent (as opposed to anticipated death) is that illness is not recorded as a shock the family experienced in the round of the survey where the parent's death is also recorded.

Table 3: Number of children with both parents alive versus ‘orphans’ at age 22 (Older Cohort only)

	Both parents alive at ages 8, 12 and 15	Father died between ages 8 and 12 but mother alive at 22	Father died between 12 and 15 but mother alive at 22	Father died between 15 and 22 but mother alive at 22	Mother died between ages 8 and 15 but father alive at 15	Mother died between 15 and 22 but father alive at 22
Ethiopia	615	29	17	38	15	20
% sudden death ¹	-	73.5	58.8	90.7	76.7	84.21
India	759	29	15	44	11	11
% sudden death ¹	-	100	80	94.3	95.45	86.4

¹The proxy for sudden death of a parent (as opposed to anticipated death) is that illness is not recorded as a shock the family experienced in the round of the survey where the parent's death is also recorded.

Table 4: Ethiopia: ATE for outcomes at age 15, conditioned on characteristics at age 8

	Schooling and cognitive outcomes				Non-cognitive outcomes			Paid Work
	School enrolment	Highest grade	Maths Score	PPVT Score	Agency	Self esteem	Subjective wellbeing	
Father died between 8- 12 vs. both alive at 15	0 (0.046)	0.13 (0.206)	-1.16** (0.494)	0.02 (0.02)	0.01 (0.059)	-0.1 (0.067)	-0.88*** (0.224)	0.38 (0.41)
Father died between 12- 15 vs. both alive at 15	0.04 (0.031)	-0.11 (0.176)	-1.05* (0.549)	0.03 (0.028)	-0.05 (0.071)	0.02 (0.082)	-0.56*** (0.199)	-0.20*** (0.057)
Observations	2,107	2,171	2,051	1,974	2,156	2,156	2,156	2,157

Note: Only ATEs reported. The results based on IPWRA estimations where outcome model includes gender, age, school enrolment status, wealth index, caregiver's education, log of household size, region of residence, rural residence. Treatment model includes father's age, father's education, wealth index, rural residence, region of residence. Sample pools older and younger cohort data. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 5: Ethiopia: ATE for outcomes at age 22, conditioned on characteristics at age 8

	Schooling		Non-cognitive outcomes							Time use		Alcohol	
	Enrol.	Highest grade	Self eff.	Peer relat.	Lead/Tea m.	Grit	Consc.	Nuero-ticism	Self Esteem	Subj. welbn.	Paid work		Unpaid work
Father died between 8-12 vs. both alive	-0.07 (0.068)	-0.77 (0.746)	-0.32*** (0.058)	-0.07 (0.048)	-0.42*** (0.059)	0.01 (0.087)	-0.05 (0.048)	-0.17*** (0.047)	0.03 (0.068)	0.05 (0.198)	-1.93*** (0.463)	2.60*** (0.515)	-0.02 (0.051)
Father died between 12-15 vs. both alive	0 (0.091)	0.55 (0.484)	0.37*** (0.074)	0.23* (0.117)	0.14** (0.069)	0 (0.066)	0.1 (0.093)	0.07 (0.129)	0.04 (0.108)	-1.29*** (0.416)	0.5 (0.514)	1.54** (0.776)	0.04 (0.044)
Father died between 15-22 vs. both alive	0 (0.056)	-0.62 (0.532)	0.04 (0.075)	0.04 (0.071)	-0.23*** (0.072)	-0.18*** (0.058)	-0.02 (0.071)	0.03 (0.07)	0.16 (0.132)	0.14 (0.158)	1.3 (0.879)	-0.54 (0.358)	0.04 (0.058)
Obs.	571	597	571	571	571	571	571	571	571	570	571	571	570

Note: Only ATEs reported. The results based on IPWRA estimations where outcome model includes the following characteristics at age 8: gender, age, school enrolment status, caregiver education, region of residence, rural residence, wealth index, log of household size; treatment model includes father's age, father's education, wealth index, rural residence, region of residence. Only older cohort data are used. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6: India: ATE for outcomes at age 15, conditioned on characteristics at age 8

	Schooling and cognitive outcomes				Non-cognitive outcomes			Paid Work
	School enrolment	Highest grade	Maths Score	PPVT Score	Agency	Self esteem	Subjective wellbeing	
Father died between 8-12 vs. both alive at 15	-0.18*** (0.054)	-0.52*** (0.176)	-1.17** (0.545)	-0.01 (0.02)	-0.15** (0.062)	-0.02 (0.095)	-0.49** (0.195)	1.07*** (0.391)
Father died between 12-15 vs. both alive at 15	-0.04 (0.051)	0.13 (0.222)	-0.4 (1.018)	-0.04 (0.037)	0 (0.06)	0.09 (0.087)	-0.69*** (0.199)	-0.29 (0.212)
Observations	2,687	2,695	2,583	2,650	2,674	2,673	2,675	2,679

Note: Only ATEs reported. The results based on IPWRA estimations where outcome model includes gender, age, school enrolment status, wealth index, caregiver's education, log of household size, region of residence; caste, rural residence. Treatment model includes father's age, father's education, wealth index, rural residence and caste. Sample pools older and younger cohort data. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 7: India: ATE for outcomes at age 22, conditioned on characteristics at age 8

	Schooling		Non-cognitive outcomes								Time use		Alcohol
	Enrol.	Highest grade	Self eff.	Peer relat.	Lead /Team.	Grit	Consc.	Nuero-ticism	Self Esteem	Subj. welbn.	Paid work	Unpaid work	
Father died between 8-12 vs. both alive	-0.03 (0.066)	-1.33** (0.555)	-0.14 (0.112)	-0.04 (0.078)	-0.25*** (0.053)	0.02 (0.058)	0.06 (0.065)	0.13** (0.057)	-0.23** (0.105)	0.07 (0.148)	0.23 (0.627)	-0.49** (0.245)	0.08* (0.042)
Father died between 12-15 vs. both alive	-0.37*** (0.06)	-1.95** (0.977)	0.35*** (0.087)	0.54*** (0.053)	0.28*** (0.089)	0.06 (0.044)	0.07 (0.098)	-0.04 (0.048)	0.43*** (0.064)	1.01*** (0.158)	2.24** * (0.407)	1.48*** (0.347)	-0.02*** (0.006)
Father died between 15-22 vs. both alive	-0.19*** (0.032)	-1.41* (0.849)	-0.18** (0.08)	-0.22** (0.1)	-0.32*** (0.103)	-0.21*** (0.064)	-0.12** (0.058)	0.1 (0.081)	-0.45*** (0.169)	-1.00*** (0.232)	-0.93** (0.459)	0.58 (0.582)	0.01 (0.028)
Observations	836	841	836	836	835	836	836	835	836	836	836	836	833

Note: Only ATEs reported. The results based on IPWRA estimations where outcome model includes the following characteristics at age 8: gender, age, highest grade at school, region of residence, caste, rural residence, wealth index, log of household size; treatment model includes father's age, father's education, wealth index, rural residence, caste. Only older cohort data are used. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 8: Ethiopia: ATE for outcomes at age 15, conditioned on characteristics at age 8

	Schooling and cognitive outcomes				Non-cognitive outcomes			Paid Work
	School enrolment	Highest grade	Maths Score	PPVT Score	Agency	Self esteem	Subjective wellbeing	
Mother died between 8-15 vs. both parents alive	-0.13** (0.057)	-0.29 (0.237)	-1.09* (0.571)	-0.01 (0.028)	0.07 (0.068)	-0.22** (0.109)	-0.38 (0.276)	0.01 (0.174)
Observations	2,134	2,202	2,083	2,013	2,185	2,185	2,185	2,186

Note: Only ATEs reported. The results based on IPWRA estimations where control variables in the outcome model include gender, age, school enrolment status, wealth index, caregiver's education, log of household size, region of residence, rural residence. Treatment model includes mother's age, mother's education, wealth index, rural residence, region of residence. Sample pools older and younger cohort data. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 9 Ethiopia: ATE for outcomes at age 22, conditioned on characteristics at age 8

	Schooling		Non-cognitive outcomes							Time use		Alcohol	
	Enrol.	Highest grade	Self eff.	Peer relat.	Lead /Team.	Grit	Consc.	Nuero-ticism	Self Esteem	Subj. welbn.	Paid work		Unpaid work
Mother died between 8-15 vs. both alive	-0.30***	-2.52***	-0.10*	-0.46***	-0.33***	-0.27***	-0.39***	0.38***	-0.36***	0.93**	4.74***	0.83**	-0.06*
	(0.099)	(0.56)	(0.052)	(0.065)	(0.066)	(0.072)	(0.053)	(0.104)	(0.069)	(0.472)	(0.509)	(0.39)	(0.034)
Mother died between 15-22 vs. both alive	-0.14***	-1.21***	-0.13	0.03	-0.08	0.04	-0.19***	0.15**	0.04	-0.24	0.26	-0.56	0.08** *
	(0.045)	(0.371)	(0.094)	(0.073)	(0.115)	(0.053)	(0.062)	(0.057)	(0.123)	(0.26)	(0.68)	(0.491)	(0.028)
Observations	603	629	603	603	603	603	603	603	603	602	603	603	602

Note: Only ATEs reported. The results based on IPWRA estimations where outcome model controls for gender, age, school enrolment status, wealth index, caregiver's education, log of household size, region of residence.. Treatment model controls for mother's age, mother's education, wealth index, rural residence, region of residence. Sample only includes older cohort data. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 10. India: ATE for outcomes at age 15, conditioned on characteristics at age 8

	Schooling and cognitive outcomes				Non-cognitive outcomes			Paid Work
	School enrolment	Highest grade	Maths Score	PPVT Score	Agency	Self esteem	Subjective wellbeing	
Mother died between 8-15 vs. both alive	-0.16** (0.081)	-0.44 (0.378)	-0.08 (1.126)	0.01 (0.022)	-0.18 (0.124)	-0.30** (0.147)	-0.3 (0.228)	2.03*** (0.682)
Observations	2,609	2,616	2,514	2,574	2,596	2,595	2,597	2,601

Note: Only ATEs reported. The results based on IPWRA estimations where outcome model includes gender, age, school enrolment status, wealth index, caregiver's education, log of household size, region of residence ; caste, rural residence. Treatment model includes mother's age, mother's education, wealth index, rural residence and caste. Sample pools older and younger cohort data. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix

Table A1 Pre-orphanhood characteristics (at age 8)

	Obs	Mean	Ethiopia Std. Dev.	Min	Max	Obs	Mean	India Std. Dev.	Min	Max
Caregiver characteristics										
Education (years)	2,352	2.49	3.46	0	14	2,746	3.22	4.11	0	15
Age	2,337	35.23	7.86	15	83	2,737	31.05	5.88	18	76
Gender=1 (if female)	2,352	0.92	0.27	0	1	2,737	0.99	0.08	0	1
Biological mother	2,336	1.10	0.52	1	7	2,746	0.97	0.18	0	1
gender	2,352	0.53	0.50	0	1	2,746	0.53	0.50	0	1
Child characteristics										
Gender (=1 if male)	2,352	0.53	0.50	0	1	2,746	0.53	0.50	0	1
Age (in months)	2,352	4.00	86	109	96.26	2,742	95.49	3.83	86	106
Enrolled at school	2,349	0.58	0.49	0	1	2,739	0.95	0.22	0	1
Highest grade competed	2,352	0.53	0.75	0	4	2,746	1.72	0.97	0	5
Mother's education	2,352	2.55	3.48	0	14	2,746	3.23	4.12	0	15
Father's education	2,352	3.66	3.83	0	15	2,746	4.95	4.70	0	15
Mother's age	2,323	34.28	6.56	18	60	2,746	30.54	4.71	18	56
Father's age	2,218	43.33	9.08	24	85	2,737	36.49	5.52	24	68
Wealth index	2,345	0.30	0.19	0.01	0.86	2,740	0.48	0.19	0	1
Household size	2,349	6.50	1.99	2	16	2,742	5.51	2.20	2	30
Rural residence	2,352	0.69	0.46	0	1	2,746	0.75	0.44	0	1
Region- Tigray	2,352	0.20	0.41	0	1					
Oromo	2,352	0.21	0.41	0	1					
Amhara	2,352	0.20	0.39	0	1					
Addis Ababa		0.12	0.33	0	1					
SNNP		0.27	0.46	0	1					
Caste-SC						2,746	0.19	0.39	0	1
ST						2,746	0.13	0.34	0	1
BC						2,746	0.47	0.50	0	1

Table A2: Survey questions used to build psychosocial outcome indices

Index Name	Survey questions used
Outcomes at age 15 (using round 3 questionnaire for the older cohort and round 5 questionnaire for the younger cohort)	
Self Esteem, compatible with questions in previous rounds of data Scale:1-5	I am proud of my clothes; I am proud of the work I have to do; I feel my clothing is right for all occasions; I am proud of my shoes or of having shoes
Agency, compatible with questions in previous rounds of data Scale:1-5	Other people in my family make all the decisions about how I spend my time; I have no choice about the type of work I do- I must do this sort of work; If I try hard I can improve my situation in life; I like to make plans for my future studies and work; If I study hard at school I will be rewarded by a better job in the future
Outcomes at age 22 (using round 5 questionnaire for older cohort)	
Self Esteem	See above.
Self Efficacy Scale:1-4	If someone opposes me, I can find the means and ways to get what I want; When I am confronted with a problem I can usually find several solutions; If I am in trouble, I can usually think of a solution; I am confident that I can deal efficiently with unexpected events; I can always manage to solve difficult problems if I try hard enough; It is easy for me to stick to my aims and accomplish my goals; I can remain calm when facing difficulties because I can rely on my own coping abilities; I can usually handle whatever comes my way; Thanks to my resourcefulness I can handle unforeseen situations; I can solve most problems if I invest the necessary effort

Peer Relations Scale:1-4	I make friends easily; I am popular with kids of my own age; Most other kids like me; Other kids want me to be their friend; I have more friends than other kids; I have lots of friends; I am easy to like; I get along with other kids easily
Neuroticism Scale:1-4	I am someone who is depressed, blue; I am someone who is relaxed, handles stress well; I am someone who can be tense; I am someone who worries a lot; I am someone who is emotionally stable, not easily upset; I am someone who can be moody; I am someone who remains calm in tense situations; I am someone who gets nervous easily
Conscientiousness Scale:1-4	I am someone who does a thorough job; I am someone who can be somewhat careless; I am someone who is a reliable worker; I am someone who tends to be disorganised; I am someone who tends to be lazy; I am someone who persevered until the task is finished; I am someone who does things efficiently; I am someone who makes plans and follows through with them; I am someone who is easily distracted.
Grit Scale:1-4	New ideas and projects sometimes distract me from previous ones; I have been obsessed with a certain idea or project for a short time but later lost interest; I often set a goal but later choose to pursue a different one; I finish whatever I begin, Set backs don't discourage me; I am a hard worker; I have difficulty maintaining my focus on projects that take more than a few months to complete; I am diligent
Leadteam Scale:1-4	I can be a good leader; I am capable of being a good leader; I am seen as a capable leader; I like cooperating in a team; I cooperate well when working in a team; I am good at cooperating with team members.

The procedure adopted to compute the indices is to first recode all relevant questions are recoded to be positive outcomes, second, normalise all responses to z-scores (subtract mean and divide by SD) and third, take an average of the relevant z-scores across the questions that have no missing values. Questions follow Likert type scales ranging from 1 to 4 or 5.

Table A3: Outcomes at age 15 –full sample

	Ethiopia					India				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Enrolment (proportion)	2,720	0.91	0.29	0	1	2,877	0.84	0.36	0	1
Highest grade completed	2,999	5.54	2.18	0	14	3,019	7.92	1.99	0	12
Maths raw score	2,638	7.88	4.87	0	26	2,760	10.02	5.57	0	29
PPVT index	2,579	0.68	0.19	.02	1	2,834	0.73	0.22	0	1
Hours worked	2,781	0.32	1.51	0	13	2,868	0.67	2.32	0	12
agency	2,774	0	0.55	-2.49	1.42	2,863	0	0.54	-2.87	1.49
Self esteem	2,774	0	0.73	-2.86	1.48	2,862	0	0.75	-2.90	1.65
Subjective wellbeing	2,780	5.4	1.72	1	9	2,864	4.96	1.57	1	9

Table A4: Summary Statistics for Outcomes at age 22

	Ethiopia				India			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Schooling outcomes								
Enrolment (proportion)	0.361	0.481	0	1	0.213	0.409	0	1
Highest grade completed	7.54	4.309	0	14	8.116	5.323	3	15
Non-cognitive outcomes								
Self esteem	0.002	0.744	-2.618	1.583	0.003	0.743	-2.858	1.658
agency	0.001	0.571	-2.128	1.251	0.001	0.533	-2.271	1.628
Self efficacy	0	0.545	-2.236	1.82	-0.003	0.557	-2.188	1.672
Peer relationships	-0.001	0.613	-2.181	1.829	-0.003	0.613	-2.371	1.6
Leadership and teamwork	-0.001	0.639	-2.667	1.634	-0.003	0.653	-3.07	1.65
Grit	0.015	0.527	-1.634	1.552	0.004	0.529	-2.01	1.853
conscientiousness	0	0.498	-1.595	1.451	0.001	0.516	-2.275	1.411
Neuroticism	0	0.513	-1.608	2.418	0.007	0.567	-1.636	1.78

Subjective wellbeing	5.406	1.617	1	9	4.998	1.399	1	9
Time Use	0	0	0	0	0	0	0	0
Hours of paid work a day	2.95	4.487	0	20	3.289	4.481	0	15
Hours of unpaid work a day	2.034	3.455	0	15	1.075	2.517	0	15
Consumes alcohol	0.20	0.40	0	1	0.032	0.17	0	1
Observations	814				922			

Table A5. Robustness Check Ethiopia: ATE for outcomes at age 15 based on the propensity score matching

	Schooling and cognitive outcomes				Non-cognitive outcomes			Paid Work
	School enrolment	Highest grade	Maths Score	PPVT Score	Agency	Self esteem	Subjective wellbeing	
Father died between 8-12 vs. both alive ¹	-0.02	0.12	-1.05**	0.02	-0.02	-0.27***	-0.96***	0.55**
	(0.028)	(0.245)	(0.515)	(0.017)	(0.017)	(0.074)	(0.174)	(0.258)
Observations	2,062	2,124	2,009	1,933	2,109	2,109	2,109	2,110
Father died between 12-15 vs. both alive ²	0.07***	0.17	-0.68	-0.03	-0.01	-0.07	-0.66**	-0.11
	(0.019)	(0.194)	(1.638)	(0.026)	(0.037)	(0.1)	(0.283)	(0.082)
Observations	2,039	2,102	1,984	1,910	2,086	2,086	2,086	2,087

Notes: Only ATEs reported. ¹ Conditioned on the following characteristics at age 8: gender, age, enrolment status at school, carer education, region of residence, rural residence, wealth index, log of household size, household demographic composition, father's age and mother's age. ² Conditioned on the same characteristics as for the preceding regression, but values are at age 12. Sample pools older and younger cohort data. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A6: Robustness Check Ethiopia: ATE for outcomes at age 22 based on the propensity score matching

	Schooling		Non-cognitive outcomes						Time use			Alcohol	
	Enrol.	Highest grade	Self eff.	Peer relat.	Lead /Team.	Grit	Consc.	Neuroticism	Self Esteem	Subj. welbn.	Paid work		Unpaid work
Father died between 8-12 vs. both alive ¹	-0.01 (0.224)	-0.32 (0.215)	-0.53*** (0.098)	-0.12** (0.057)	-0.56*** (0.103)	0.04 (0.06)	-0.19*** (0.069)	-0.15* (0.082)	0.14 (0.133)	0.22 (0.192)	-1.63*** (0.573)	1.09*** (0.271)	-0.03 (0.034)
Observations	523	548	523	523	523	523	523	523	523	522	523	523	522
Father died between 12-15 vs. both alive ²	-0.08 (0.345)	1.77 (1.986)	-0.11*** (0.025)	0.11 (0.194)	-0.1 (0.139)	-0.12 (0.338)	-0.09 (0.184)	0.37 (0.43)	-0.23 (0.197)	-0.76 (1.369)	4.96*** (0.83)	0.01 (0.718)	0.3 (0.352)
Observations	509	534	509	509	509	509	509	509	509	508	509	509	508
Father died between 15-22 vs. both alive ³	-0.20** (0.084)	-1.19 (0.801)	0.34** (0.137)	0.17** (0.084)	-0.19*** (0.056)	0.03 (0.108)	0.11 (0.1)	-0.18 (0.122)	0.42** (0.196)	0.3 (0.275)	1.32 (1.745)	-0.52 (1.14)	0.06 (0.124)
Observations	528	554	528	528	528	528	528	528	528	527	528	528	527

Notes: Only ATEs reported. ¹ Conditioned on the following characteristics at age 8: gender, age, school enrolment, region of residence, rural residence, wealth index, log of household size, father's age, mother's age. ² Conditioned on the same characteristics as for the preceding regressions, but values are at age 12. ³ Conditioned on the same characteristics as for the preceding regressions, but values are at age 15. Only older cohort data are used. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A7. Robustness Check India: ATE for outcomes at age 15 based on the propensity score matching

	Schooling and cognitive outcomes				Non-cognitive outcomes			Paid work
	School enrolment	Highest grade	Maths Score	PPVT Score	Agency	Self esteem	Subjective wellbeing	
Father died between 8-12 vs. both alive at 15	-0.08 (0.062)	-0.57*** (0.09)	-1.30*** (0.278)	0 (0.025)	-0.19*** (0.054)	0.1 (0.123)	-0.35 (0.234)	0.61 (0.391)
Observations	2,639	2,647	2,538	2,605	2,626	2,625	2,627	2,631
Father died between 12-15 vs. both alive at 15	-0.04 (0.066)	-0.27 (0.226)	-1.36*** (0.496)	-0.07* (0.038)	-0.16* (0.087)	-0.08 (0.11)	-0.80*** (0.286)	0.04 (0.335)
Observations	2,616	2,623	2,521	2,581	2,605	2,604	2,606	2,610

Notes: Only ATEs reported. ¹ Conditioned on the following characteristics at age 8: gender, age, school enrolment, carer education, caste, region of residence, rural residence, wealth index, log of household size, father's age, mother's age demographic composition ²Conditioned on the same characteristics as for the preceding regressions, but values are at age 12. ³Conditioned on the same characteristics as for the preceding regressions, but values are at age 15. Only older cohort data are used. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A8. Robustness Check India: ATE for outcomes at age 22 based on the propensity score matching

	Schooling		Non-cognitive outcomes							Time use		Alcohol	
	Enrol.	Highest grade	Self eff.	Peer relat.	Lead /Team.	Grit	Consc.	Nuero- ticism	Self Esteem	Subj. welbn.	Paid work		Unpaid work
Father died between 8-12 vs. both alive ¹	-0.15** (0.07)	-3.20*** (0.912)	-0.20** (0.093)	-0.21 (0.176)	-0.22 (0.211)	0.06 (0.061)	-0.11 (0.232)	0.29*** (0.067)	0.04 (0.375)	0.23 (0.184)	1.56 (1.268)	-0.74*** (0.115)	0.38*** (0.135)
Observations	783	788	783	783	782	783	783	782	783	783	783	783	781
Father died between 12- 15 vs. both alive ²	-0.1 (0.106)	-0.54 (1.049)	0.51*** (0.118)	0.28 (0.257)	0.25 (0.357)	-0.08 (0.156)	0.26** (0.12)	-0.17 (0.109)	0.09 (0.067)	0.03 (0.7)	2.28*** (0.858)	-0.51 (0.346)	-0.02*** (0.006)
Observations	765	770	765	765	764	765	765	764	765	765	765	765	763
Father died between 15- 22 vs. both alive ³	-0.07 (0.069)	-2.18*** (0.687)	-0.04 (0.119)	0.04 (0.062)	-0.10* (0.051)	-0.23*** (0.055)	-0.29** (0.12)	0.2 (0.136)	-0.16 (0.176)	-0.64** (0.284)	-0.82** (0.321)	1.00* (0.541)	0.01 (0.024)
Observations	790	795	790	790	789	790	790	789	790	790	790	790	787

Notes: Only ATEs reported. ¹ Conditioned on the following characteristics at age 8: gender, age, school enrolment, carer education, region of residence, caste, rural residence, wealth index, log of household size, father's age, mother's age. ² Conditioned on the same characteristics as for the preceding regressions, but values are at age 12. ³ Conditioned on the same characteristics as for the preceding regressions, but values are at age 15. Only older cohort data are used. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A9. Robustness check Ethiopia: ATE for outcomes at age 15 based on the propensity score matching

	Schooling and cognitive outcomes				Non-cognitive outcomes			Paid Work
	School enrolment	Highest grade	Maths Score	PPVT Score	Agency	Self esteem	Subjective wellbeing	
Mother died between 8-15 vs. both parents alive	-0.19*** (0.043)	-0.19 (0.445)	-0.21 (0.656)	-0.06 (0.057)	-0.05 (0.124)	-0.13* (0.068)	-0.63* (0.356)	0.18 (0.315)
Observations	2,038	2,100	1,982	1,910	2,082	2,082	2,082	2,083

The pre-orphanhood characteristics at age 8 used for matching are gender, age, school enrolment status, wealth index, caregiver's education, log of household size, region of residence, rural residence and caste. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A10. Robustness Check Ethiopia: ATE for outcomes at age 22 based on the propensity score matching

	Schooling			Non-cognitive outcomes							Time use		Alcohol
	Enrol.	Highest grade	Self eff.	Peer relat.	Lead /Team.	Grit	Consc.	Nuero-ticism	Self Esteem	Subj. welbn.	Paid work	Unpaid work	
Mother died between 8-15 vs. both alive ¹	-0.27*** (0.036)	0.34 (0.993)	0.04 (0.145)	0.24 (0.249)	-0.04 (0.153)	-0.01 (0.161)	-0.22 (0.296)	0.09 (0.162)	0.12 (0.184)	0.59 (0.985)	1.42 (2.669)	1.58 (2.642)	-0.11*** (0.032)
Observations	603	628	603	603	603	603	603	603	603	602	603	603	602
Mother died between 15-22 vs. both alive ²	0.09	-0.66**	0.15	0.1	0.06	0.01	-0.13	-0.03	-0.15***	-0.43	-0.04	0.39	0.27

	(0.271)	(0.278)	(0.144)	(0.13)	(0.189)	(0.112)	(0.103)	(0.166)	(0.047)	(0.351)	(3.196)	(1.527)	(0.274)
Observations	585	611	585	585	585	585	585	585	585	584	585	585	584

¹Conditioned also on the following pre-orphanhood characteristics at age 8 gender, age, school enrolment status, wealth index, caregiver's education, log of household size, region of residence, rural residence. Robust standard errors in parentheses. Conditioned on same characteristics as for the previous regression but values are for age 15. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A11. Robustness Check: India: ATE for outcomes at age 15, conditioned on characteristics at age 8 based on propensity score matching

	Schooling and cognitive outcomes				Non-cognitive outcomes			Paid Work
	School enrolment	Highest grade	Maths Score	PPVT Score	Agency	Self esteem	Subjective wellbeing	
Mother died between 8-15 vs. both alive ¹	-0.35***	-0.33	-1.61***	-0.04***	3.23***	-0.35***	-0.33**	0.12
	(0.097)	(0.349)	(0.495)	(0.011)	(0.883)	(0.104)	(0.15)	(0.182)
	2,604	2,613	2,509	2,570	2,596	2,591	2,590	2,592

