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Parental Loss and Schooling: Evidence from Metropolitan Cape Town

by

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Parental Loss and Schooling: Evidence from Metropolitan Cape Town[1]

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Abstract

This paper makes use of the Cape Area Panel study (CAPS), a longitudinal study of youth and their families in metropolitan Cape Town in order to broaden the empirical body of evidence of the causal impact of parental death on children's schooling in South Africa in two dimensions. First, analysis of CAPS allows us to examine the extent to which results may generalize across geographically and socioeconomically distinct areas. Second, CAPS allows for an explicit exploration of whether the causal impact lessens as time since the parental death lengthens. Evidence from the CAPS is consistent with that from a large demographic surveillance site in rural KwaZulu-Natal in supporting the findings that mother's deaths have a causal impact on

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children's schooling outcomes and that there is no evidence of a causal effect of paternal loss on schooling for African children. The loss of a father has a significant negative impact on the education of coloured children but a significant amount of this impact is driven by socioeconomic status. We exploit the longitudinal data to investigate the extent to which orphan disadvantage precedes parental death and whether orphans begin to recover in the period following a parent's death or whether they continue to fall behind. We find no evidence of orphan recovery in the period following their parent's death and results suggest that negative impacts increase with the time since the parent died. The longer-run impact of parental death in childhood is also evident in an analysis of the completion of secondary schooling by early adulthood. These results suggest that parental death will reduce the ultimate human capital attainment of the child.

1 Introduction

The AIDS epidemic in sub-Saharan Africa has resulted in the number of orphans in the region increasing by 50% since 1990 (UNICEF 2008). Recent empirical evidence suggests that children who have suffered parental loss are at risk of poorer educational outcomes with the death of a mother generally having greater impacts on children's schooling than the death of a father (Bicego, Rustein and Johnson 2003, Case, Paxson and Ableidinger 2004, Monash and Boerma 2004, Guarcello *et al*. 2004, Case and Ardington 2006, Beegle, de Weerdt and Dercon 2006, Evans and Miguel 2007, Ardington and Leibbrandt forthcoming). Researchers and international agencies point out that diversity across countries and the uncertainty about the multiple pathways through which orphanhood may affect schooling endorses an in-depth focus within each particular country (UNICEF 2008, Ainsworth and Filmer 2006).

In the South African context Ardington and Leibbrandt (forthcoming) use a series of ten nationally representative cross-sectional data sets spanning 1993 to 2005 to assess the extent to

which the vulnerability of orphans to poorer educational outcomes has changed over time as the AIDS crisis deepens in South Africa. They find that at every point in time orphans are at risk of poorer educational outcomes with maternal deaths generally having stronger negative effects than paternal deaths. Despite a significant increase in the number of orphans over the last decade, they find no evidence of a systematic strengthening of these negative effects.

In order to interpret correlations such as those in Ardington and Leibbrandt (forthcoming) as evidence of the causal effect of parental death on schooling outcomes, one has to make the strong assumption that parental death is exogenous. This assumption is false if there are processes that jointly determine parental death and children's schooling outcomes. For example, orphans may come from households that were systematically poorer prior to a parent's death leading to correlations between the death of a parent, household poverty and schooling. On the other hand, if the socioeconomic distribution of HIV infection is such that AIDS deaths are concentrated in households of higher socioeconomic status and socioeconomic variation is partially unobserved or mis-measured then estimates of the impact of orphanhood will be biased towards zero (Evans and Miguel 2007). Ardington and Leibbrandt (forthcoming) attempt to isolate the impact of parental death by controlling for as many other relevant factors as the data permit and by employing household fixed effects. However, in cross-sectional studies household characteristics observed after a parent's death may have been affected by the death and are therefore potentially endogenous and household fixed effect estimation strategies are still limited to comparing orphans to other children with whom they currently live. Beegle *et al*. (2007: 1267) argue insightfully that "it is not clear that a household fixed effects approach is appropriate if orphans are strategically placed in better-off households within the extended family and the orphans in a household fixed effects framework are compared to a non-random sample of non-orphan co-residents." Alternatively, if the education of all children in a household suffers when the household absorbs orphans the impact of parental death may be partially hidden.

Longitudinal data can go some way to establishing whether the impact of parental death is causal by observing children and their households both before and after the death. Given this it is not surprising that recent literature evidences a move to studies using such longitudinal data (Case and Ardington 2006, Beegle, de Weerdt and Dercon 2006, Evans and Miguel 2007). Such longitudinal studies are, however, rare and not without their disadvantages. They are usually localized and the generalisability of findings is not clear; attrition can pose serious problems particularly as children experiencing parental death may be more likely to be lost to follow up; and sample sizes are often small with resultant imprecise estimates of rare events such as parental death. To date there are two studies that investigate the impact of parental death on schooling outcomes in South Africa using longitudinal data.

Case and Ardington (2006) analyse data from a demographic surveillance site in northern KwaZulu-Natal and find significant differences in the impact of mother' and fathers' deaths. Children whose mothers have died are significantly less likely to be enrolled in school, have completed significantly fewer years of schooling and have significantly less spent on their education than children whose mothers are alive. This large longitudinal dataset allows them to follow over 17,000 six to sixteen year olds through time and so investigate whether parental death has a causal effect on children's schooling outcomes. They use the timing of mothers' deaths and employ individual fixed effects models to argue that these deaths have a causal effect on children's education. They find that the correlation between father's deaths and children's schooling outcomes appear to be driven entirely by their link to household socio-economic status.

Timæus and Boler (2007) follow a cohort of 925 nine to fourteen year olds over six years using the second and third wave of the KwaZulu-Natal Income Dynamics Study in South Africa. They find fathers' deaths and absence to result in slower progress through school and find "no evidence that maternal orphanhood or living apart from their mother adversely affected

children's schooling (Timæus and Boler 2007:S83)." Timæus and Boler (2007: S92) devote considerable attention to comparing their results to those of Case and Ardington (2006) and argue that differences between the findings of these two papers "caution against drawing general conclusions about the impact of the AIDS epidemic from investigations in a few geographically localised populations."

The sample used by Case and Ardington (2006) is exclusively rural and for Timæus and Boler (2007) is only part rural. Nonetheless, both samples are from the province of KwaZulu-Natal and, therefore, it is not totally compelling that in this particular case the differences between localised populations is the right emphasis for comparison rather than, for example, differences in analytic approaches or differences in the type and reliability of the data.[2] That said, the general point about the need for sensitivity to local specificities is a very important one. This is especially true given the fact mentioned above of the trade-off that is frequently made in this corpus between breadth of coverage of data versus data that better support appropriate methodologies.

The Cape Area Panel study (CAPS), a longitudinal study of youth and their families in metropolitan Cape Town, allows further investigation into the causal impact of parental death and an examination of the extent to which findings from KwaZulu-Natal may generalize to an urban population in another province. Longitudinal results from geographically and socioeconomically distinct areas allow for a more comprehensive empirical body of evidence of

[2] For example, their conclusion about the limited importance of maternal orphanhood is only partially substantiated in their paper. Their findings on the impact of maternal orphanhood or living apart from one's mother differ depending on whether orphans are identified solely from the household roster or from the household roster and information from previous waves. Analysis based on the former method of identification suggests that children separated from their mothers are more likely to be behind in school than those children who co-reside with their mothers. In analyses based on the latter (and the authors' preferred) method of identification of orphans, the point estimates indicate that children whose mothers have died are more likely to be behind in school but these estimates are not statistically significant. The sample size is relatively limited with resultant imprecise estimates of rare events such as parental death and maternal death in particular. The interpretation of the results is also somewhat complicated in that deceased mothers are compared to co-resident mothers who went to primary school whereas deceased fathers are compared to co-resident fathers with any level of education. They provide no information about the educational status of mothers who died. Attrition is also a concern with only 68% of the nine to fourteen year olds in the 1998 wave re-contacted in 2004, in addition to considerable attrition in the panel between 1993 and 1998.

the causal impact of parental loss on children's schooling. The CAPS data also lend themselves to slightly different methodological approaches permitting additional insights into parental death effects. Due to apartheid settlement policies Cape Town is the only major city in South Africa to have substantial numbers of white, coloured and African residents.[3] The CAPS data therefore also provide a unique opportunity to study racial differences in outcomes following parental death.[4]

It is important from a policy perspective to understand if the negative impact of parental death on children's schooling is a temporary setback with orphans 'bouncing back' or whether orphans continue to fall behind. If the latter is true it implies that parental loss in childhood will have serious consequences for the ultimate human capital attainment of the child. While a number of studies document that orphans are vulnerable to poorer schooling outcomes there is very little evidence that orphanhood matters in the long-run for education, or indeed health or other economic, outcomes (see Beegle *et al.* 2006 for an exception). Investigating the consequences in adulthood of parental loss in childhood is difficult as cross-sectional datasets typically do not identify adults who were orphaned in childhood and lack adequate controls for childhood circumstances. Longitudinal datasets that span a sufficient time frame to observe both parental loss in childhood and adult outcomes are rare. In addition these longitudinal studies suffer from attrition which is frequently correlated with educational status, particularly in areas where work related migration is prevalent (Ardington *et al.* 2009).

[3] The distribution of populations groups in Cape Town in the 2001 census was 48% coloured, 32% African, and 19% white.

[4] Under apartheid, South Africans were classified into four population groups, namely African, coloured, Asian and white. Africans represent over 80% of the South African population. The apartheid classification was used to differentiate the rights and opportunities of these groups across all spheres of life. Apartheid enforced the privileges of whites at the expense of the black majority. All blacks were severely discriminated against but coloureds and Asians occupied an intermediate status under apartheid with greater rights and opportunities than Africans. Educational institutions were racially segregated and "all aspects of education – governance, funding, professional training and curriculum – were defined and operated along racial lines in an egregiously unequal manner (Fiske and Ladd 2004:3)." In 1994, after substantial reductions in racial disparities in funding, spending on white learners was 15%, 46%, 147%, 413% more than spending on Asian, coloured, urban African and rural African learners respectively (Fiske and Ladd 2004:102). Fiske and Ladd (2004) provide an excellent discussion on the history of apartheid education and the reform of the education system in the post-apartheid era.

CAPS offers a unique opportunity to investigate the longer-run impact of parental loss on education in two complimentary ways. Firstly, the base wave of the CAPS data included a life history calendar from which one can create a retrospective panel for every year since birth. This allows an investigation into whether orphans begin to recover at some point following a parent's death or whether they continue to lag behind. Secondly, the CAPS sample were all 18 years of age or older by the fourth wave allowing a direct examination of schooling outcomes in early adulthood for individuals who experienced parental loss in childhood.

Empirical work in this paper contributes to our understanding of the impact of parental death on children's schooling in a number of ways. Firstly, evidence from the CAPS supports Case and Ardington's (2006) interpretation that mother's deaths have a causal impact on children's schooling outcomes. Also consistent with Case and Ardington (2006), we find no evidence of a causal effect of paternal loss on schooling for African children. The loss of a father has a significant negative impact on the education of coloured children but it is not clear how much of this association is driven by socioeconomic status. Secondly, we find no evidence of orphan recovery in the period following their parent's death and results suggest that negative impacts increase with the time since the parent died. The longer-run impact of parental death in childhood is also evident in an analysis of the completion of secondary schooling by early adulthood. Young adults who lost parents in childhood are significantly less likely to have completed secondary school. Finally, we document interesting differences in the impact of parental death between African and coloured children. These racial differences are not accounted for by father-child co-residency patterns.

The paper is organized as follows. The next section introduces the CAPS data. Section 3 documents racial differences in schooling outcomes measured on a number of dimensions. The following section examines rates of orphanhood by population group. Section 5 presents evidence on the association between parental death and various schooling outcomes, with a

particular focus on the completion of secondary school by early adulthood. Section 6 proceeds to estimate the causal impact of parental death on a child's schooling. The following section investigates the impact of the timing of a parent's death. Section 8 considers child-parent co-residency patterns and parental roles as an explanation for racial differences in the impact of parental death on schooling. The final section summarises the key results.

2 Data

The first wave of the CAPS, collected in 2002, included 4,752 young people aged 14-22.[5] Details about the CAPS, a collaborative project of the University of Cape Town, the University of Michigan and Princeton University, are available in Lam *et al.* (2008).[6] Areas classified as predominantly African and white were oversampled with the aim of producing a sample with equal numbers of African and coloured young adults and half as many white young adults. Typical of South African household surveys, household response rates in the first wave were high in African and coloured areas and low in white areas. Household response rates were 89% in African areas, 83% in coloured areas, and 46% in white areas. Conditional on participation of the household, young adult response rates were fairly high, even in white areas. Young adult response rates were 93% in African areas, 88% in coloured areas, and 86% in white areas (Lam *et al.* 2008).

A young adult questionnaire was administered to up to three residents aged 14-22 in each sampled household, covering a wide range of issues including schooling, employment, and fertility. The questionnaire also included a life history calendar that recorded residential movements, marriage and partnerships, pregnancies, schooling outcomes, employment and whether the young adult lived with their mother, father, maternal and paternal grandparents

[5] Following terminology used by the CAPS project we will refer to CAPS respondents as young adults. We will refer to these young adults as children when analysing sub-samples of CAPS respondents who are under 18 year of age.
[6] Additional detail and technical documentation are available on the CAPS web site, www.caps.uct.ac.za.

every year since birth.[7] The first wave also included a self-administered written literacy and numeracy evaluation. The test took 20 minutes to complete and was available in English or Afrikaans, the two official languages of instruction in all secondary schools. The vast majority (99%) of Xhosa speaking respondents chose to take the test in English. In comparing the results it should therefore be borne in mind that coloured and white young adults completed the test in their first language, while Africans took the test in a second language.

Youth respondents were interviewed a second time in either 2003 or 2004, a third time in 2005 and a fourth time in 2006. In the third wave respondents completed a second residential and schooling history calendar. A detailed history of the outcome of each school year is available through a combination of the Wave 1 and Wave 3 calendars and the schooling questions asked in every wave. The CAPS Waves 1, 3 and 4 included a household questionnaire providing data on all household members and details on the relationship of each household member to the young adult. A household roster was also included in the young adult questionnaire for Wave 2.

Table 1 shows sample sizes and attrition rates by age and population group for Waves 1 and 4. The African attrition rate between Wave 1 and Wave 4 is 26%, with most attrition due to migration back to the rural Eastern Cape province that is the main sending region for Africans living in Cape Town. The coloured population has its roots primarily in Cape Town, a factor contributing to its lower 20% attrition rate. In addition to the initial low response rates for whites, attrition for this group has been high with 58% of the Wave 1 sample not re-interviewed in Wave 4. There is a clear relationship between age and attrition with the attrition rate for the full sample remaining below 23% for respondents under 18 years of age at Wave 1 and then increasing to the 30-35% range for the older sample.

[7] Life history calendars are used as a tool to improve the quality of retrospective data "by increasing the respondent's ability to place different activities within the same time frame (Freedman *et al.* 1988: 39)." Freedman *et al.* (1988) employed a life history calendar in a later wave of a panel and found that data collected retrospectively corresponded highly with the data collected at the time of the event in an earlier wave of the panel. They found that the correspondence was particularly high for variables such as education where there was a low degree of volatility in the activity patterns.

Table 1: Sample size by population group and age in 2002 and attrition between CAPS Waves 1 and 4

Age	Wave 1				Wave 4				Rate of attrition			
	African	Coloured	White	Total	African	Coloured	White	Total	African	Coloured	White	Total
14	204	217	69	490	170	185	37	392	17%	15%	46%	20%
15	221	245	80	546	183	214	39	436	17%	13%	51%	20%
16	239	253	63	555	180	215	39	434	25%	15%	38%	22%
17	238	284	82	604	190	240	38	468	20%	15%	54%	23%
18	259	246	72	577	187	184	31	402	28%	25%	57%	30%
19	292	216	68	576	200	162	27	389	32%	25%	60%	32%
20	249	200	51	500	161	147	15	323	35%	27%	71%	35%
21	218	194	59	471	156	138	15	309	28%	29%	75%	34%
22	231	150	52	433	169	109	8	286	27%	27%	85%	34%
Total	2151	2005	596	4752	1596	1594	249	3439	26%	20%	58%	28%

Notes to Table 1: Own calculations using Cape Area Panel Study

Table 2: CAPS sample size, potential sample size and rate of attrition by population group and age

	Sample size				Potential sample				Rate of attrition			
Age at 1 January	**African**	**Coloured**	**White**	**Total**	**African**	**Coloured**	**White**	**Total**	**African**	**Coloured**	**White**	**Total**
13	2151	2005	596	4752	2151	2005	596	4752	0%	0%	0%	0%
14	2144	2003	589	4736	2151	2005	596	4752	0%	0%	1%	0%
15	2132	1997	584	4713	2151	2005	596	4752	1%	0%	2%	1%
16	2105	1985	566	4656	2151	2005	596	4752	2%	1%	5%	2%
17	2064	1952	537	4553	2151	2004	595	4750	4%	3%	10%	4%
18	1885	1770	461	4116	1993	1840	540	4373	5%	4%	15%	6%
19	1636	1503	380	3519	1776	1588	464	3828	8%	5%	18%	8%
20	1380	1247	300	2927	1545	1349	399	3293	11%	8%	25%	11%
21	1099	941	212	2252	1308	1069	309	2686	16%	12%	31%	16%
22	841	701	131	1673	1053	827	243	2123	20%	15%	46%	21%
23	598	480	77	1155	768	587	170	1525	22%	18%	55%	24%
24	381	297	37	715	496	382	118	996	23%	22%	69%	28%
25	213	137	12	362	278	185	60	523	23%	26%	80%	31%

Notes to Table 2: The first four columns show the number of African, coloured and white CAPS respondents who were observed (either retrospectively through the wave 1 and/or wave 3 life history calendars or prospectively through waves 1 to 4) at each age from 13 to 25. The fifth to eighth columns show the potential sample that could have been observed at each age based on their date of birth and the age that they would have reached by the 1st January 2006 - the year that the fourth wave of interviews took place. The final four columns show the attrition rate by age. All respondents were observed for every age below 13.

The CAPS questionnaires in Waves 2 to 4 were designed to collect information on a range of outcomes such as schooling and employment relative to when the young adult was last interviewed. For many analyses information about an outcome in a particular year could be sourced from different waves for different young adults. This questionnaire design together with the life history calendar collected in Wave 1 enables one to observe a range of outcomes at each age. In the empirical work to follow we will use this data to create a panel dataset spanning every age from 0 to 17. The first four columns of Table 2 show the number of respondents who were observed (either retrospectively through the Wave 1 life history calendar and/or through the data collected in Waves 1 to 4) at each age from 13 to 25 where age is calculated at the 1st of January. The fifth to eight columns show the potential sample that could have been observed at each age based on their date of birth and the age that they would have reached by 1 January 2006, the year that the fourth wave of interviews took place. For example a respondent who was 15 years old when we first interviewed her and who was seen again in Waves 2 and 3 but lost to follow up in Wave 4 would be observed at every age up till age 18 but could have potentially been observed up till age 19. The final four columns show the attrition rate by Wave 4 by age and population group. By design all young adults were observed for every year up to the age of 13. Attrition is initially very low with observations on more than 90% of the sample all the way up to the age of 20. Beyond 21 the sample size diminishes rapidly both due to the fact that increasing numbers of young adults would not yet have reached that age by January 2006 and increasing attrition.

3 Racial inequities in schooling outcomes

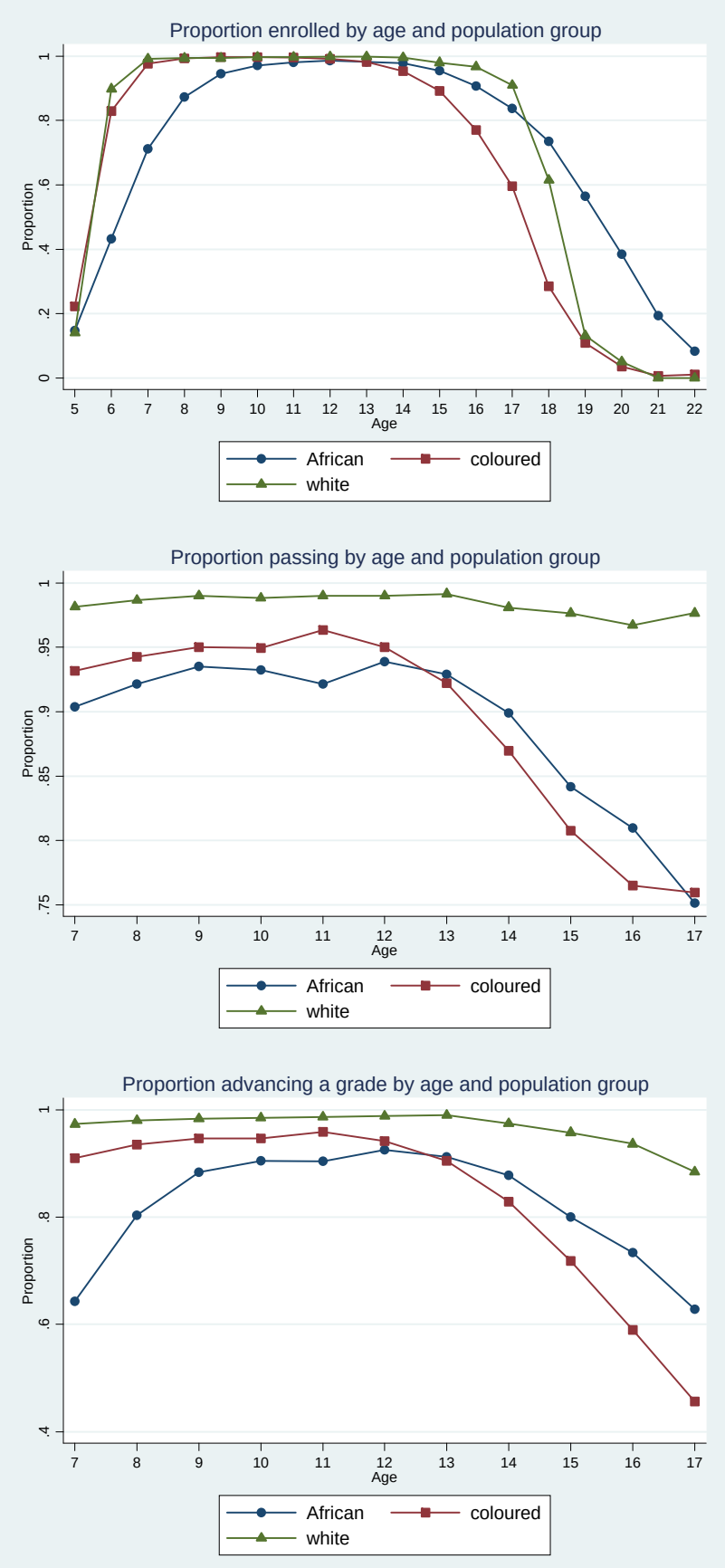
This section provides important background information for the investigation of the impact of parental death on schooling to follow by documenting racial differences in schooling outcomes for the CAPS young adults. A child progressing through school at the correct pace should have enrolled by the age of 6, completed primary school (grade 7) by the age of 13 and completed secondary school (grade 12) by the age of 18. More than a decade after the end of

apartheid racial inequities in educational outcomes still persist with high rates of grade repetition and many African students never completing secondary school (Anderson *et al.* 2001, Lam *et al.* 2007).

Using data from the life history calendars and data collected in each of the four waves, Figure 1 shows a range of schooling outcomes at each age by population group.[8] The first panel of Figure 1 shows the proportion of young adults enrolled in school at each age from 5 to 22. A substantial portion of African children have a delayed start to their schooling but from the age of 9 till the age of 15 there is almost universal enrolment for all population groups. From age 15 onwards coloured children begin to drop out of school. There is a sharp drop in white enrolment after the age of 17 as these children complete their schooling at the correct pace. African young adults continue to be enrolled in school in substantial numbers beyond the age of 18. The second panel of Figure 1 shows the proportion of children who pass their grade at each age conditional on being enrolled in school. The probability of passing clearly decreases with age with the proportion of African and coloured children passing diminishing steadily from age 13. Similar to enrolment there are stark racial differences with the proportion of white children passing close to one. At every age African and coloured children are significantly more likely to fail or withdraw and the gap increases with age. At ages 16 and 17 white children are around 20 percentage points more likely to pass than African or coloured children. The final panel of Figure 1 combines the first two panels by showing the proportion of children at each age who advance a grade at that age. This panel includes those children who are not enrolled as not advancing. The patterns by age are similar to the second panel but the effects of delayed initial enrolment for African children and high dropout rates in the teens for coloured children are now also apparent.

[8] Note that the scale of the vertical axis for each of the panels in Figure 1 is different.

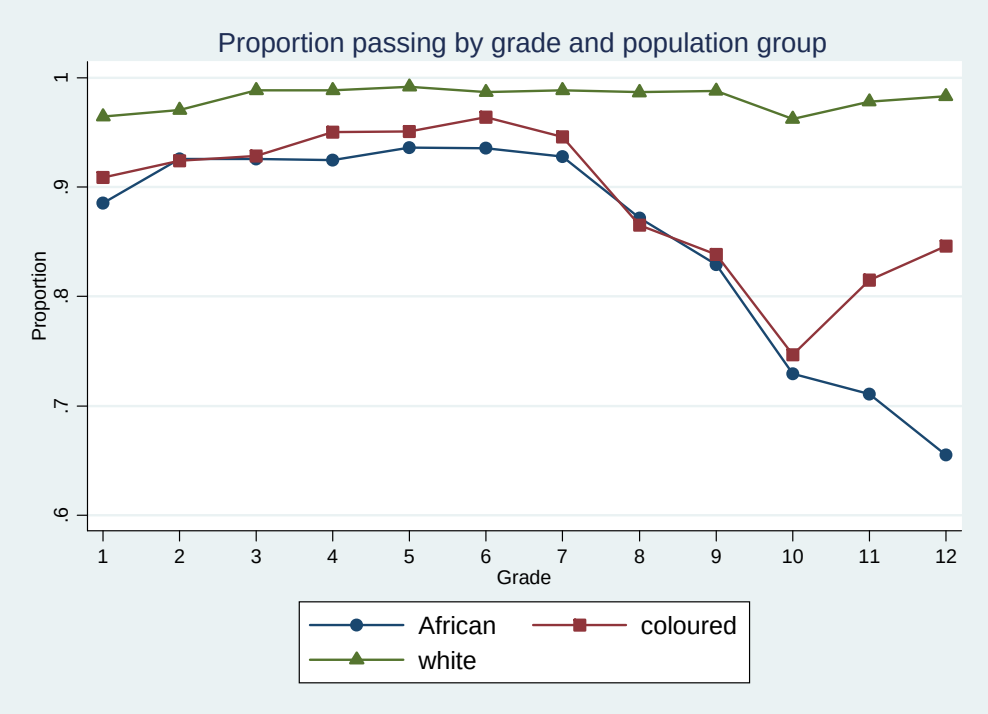
Figure 1: Proportion of CAPS respondents enrolled in school, passing conditional on enrolment and advancing a grade at each age by population group



Notes to Figure 1: Data from waves 1 through 4 and from retrospective schooling histories collected in waves 1 and 3.

Figure 2 shows the probability of passing each grade by population group. Pass rates for all population groups are fairly high until grade 7 although there is consistently a more than 5 percentage point differential between white children and their African counterparts in the same grade. Once students enter into secondary school, pass rates begin to decline steadily for African and coloured children. The increase in coloured pass rates after grade 10 is probably explained by the higher dropout rate amongst coloureds with better students selecting to stay in school. For white children pass rates remain high throughout secondary school.

Figure 2: Proportion of CAPS respondents passing each grade by population group

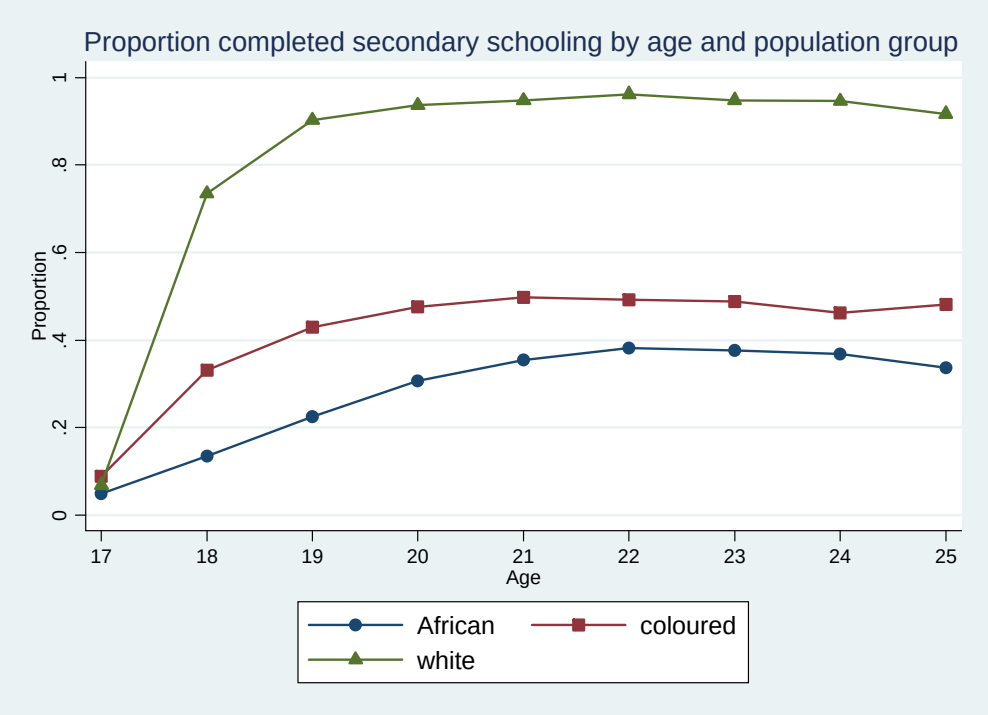


Notes to Figure 2: Data from waves 1 through 4 and from retrospective schooling histories collected in waves 1 and 3.

That these racial differences in enrolment and failure at younger ages translate into educational disparities in early adulthood is clear from Figure 3. This figure shows the fraction of young adults who have successfully completed secondary school by age and population group. Over 90% of white young adults have completed secondary school by the January in which they are 19 years old. In sharp contrast only 23% of African and 43% of coloured 19 year olds have completed secondary school. Secondary school completion rates continue to increase for

coloured and Africans into the early twenties but flatten out by 22 with only 38% of Africans and 49% of coloureds completing secondary school by that age.

Figure 3: Proportion of CAPS respondents who had successfully completed grade 12 by age at 1 January



Notes to Figure 3: Data from waves 1 through 4 and from retrospective schooling histories collected in waves 1 and 3.

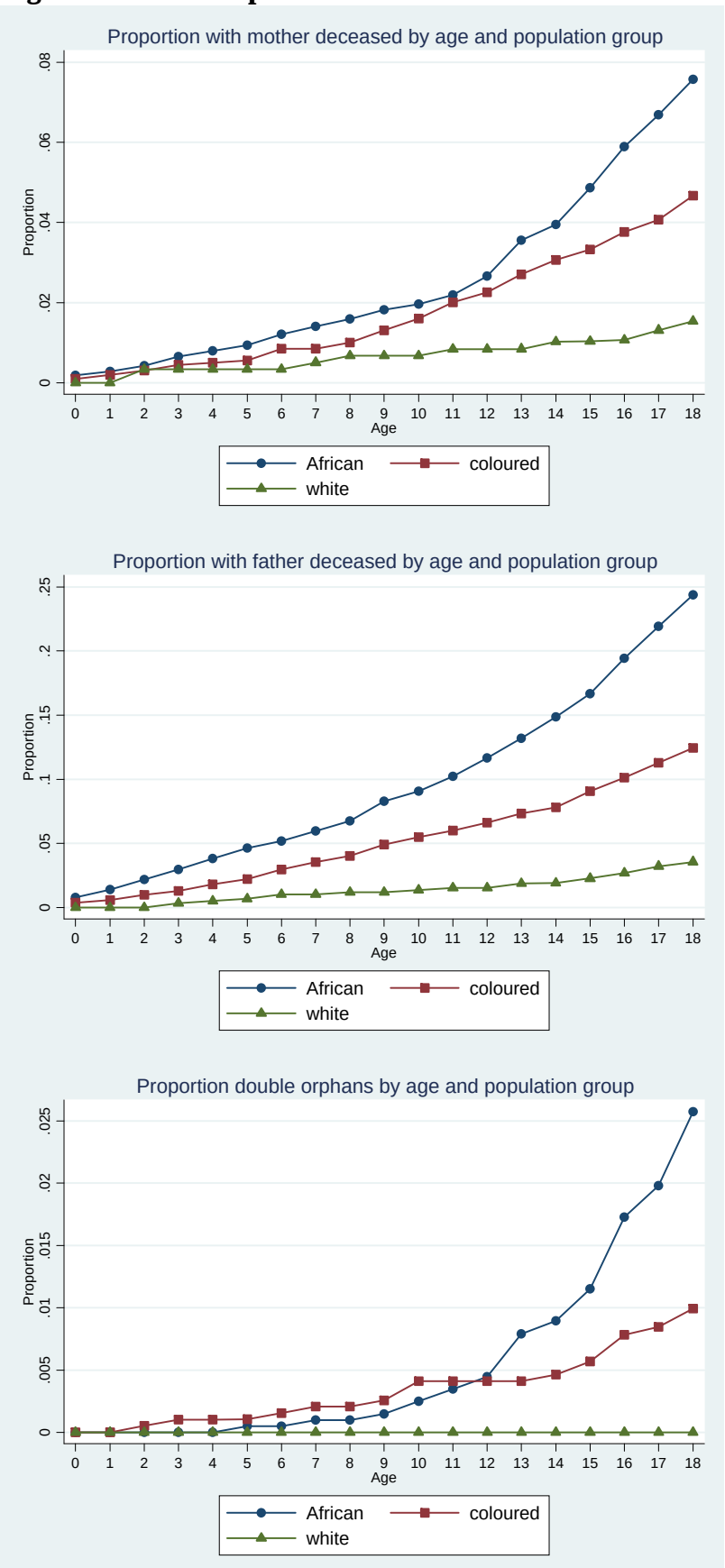
This section has provided background information on South African schooling outcomes and in particular on the persistence of racial inequities more than a decade after the end of apartheid. Importantly going forward, one needs to ensure that the impact of parental death on education is assessed after controlling for the fact that in general there are these stark differences in educational paths by race. We begin by looking at rates of orphanhood.

4 Rates of parental death

Figure 4 shows rates of parental death by age and population group from age 0 to age 17. The scales of the vertical axes are not the same for maternal deaths, paternal deaths and double orphans as there is significant variation in the prevalence of these three outcomes. As with education there are stark differences by race. African young adults are significantly more likely than coloureds who in turn are significantly more likely than whites to have experienced parental loss before the age of 18 – 6.3% of Africans, 4.2% of coloureds and 1.5% of whites had lost their mother before the age of 18 and 21.1% of Africans, 11.1% of coloureds and 3.5% of whites had lost their father before the age of 18.

Parent's vital status at any particular age can be missing either because their vital status is unknown or because the exact timing of the death is unknown. In the first wave if respondents said a parent was deceased they were asked for either the year the parent died or how old they were when their parent died. In the fourth wave respondents were asked for either the year that the parent died or how many years ago the death occurred. Depending on the response given it is not always possible to know for certain on the 1st of January each year whether the parent was alive or dead. If the respondent gave the parent's year of death then we assume that the parent was alive on the 1st January of the year in which they died. But if they gave their age when their parent died we are unable to assign a year of death. For example if a respondent says that their mother died when they were 12, we do not know whether the mother was dead on the 1st of January in the year that the young adult was 12. We do know that the mother was alive on the 1st of January when they were 11 and dead on the 1st of January when they were 13. The exact year of their mother's death is unknown for 26 (1.2%) Africans and 38 (1.9%) coloureds. Father's exact year of death is unknown for 85 Africans (4.0%) and 131 coloureds (6.5%).

Figure 4: Rates of orphanhood in the CAPS



Notes to Figure 4: Data from waves 1 through 4 and from retrospective life history calendar collected in Wave 1.

In addition to cases where one cannot pinpoint the exact year of death there are cases where we only know that a parent died more than 10 years ago, cases where we don't know when they died but know their vital status at each wave of the panel and cases where their vital status at every point is unknown. The percentage of respondents with unknown parent's vital status for every age from 0 to 17 are 0.3%, 0.2%, 3.8% and 1.4% for African mothers, coloured mothers, African fathers and coloured fathers respectively. The number of cases where the vital status is unknown for more than one year but not every year from 0 to 17 is small with 0.5%, 0.6%, 3.2% and 1.9% of respondents in that category for African mothers, coloured mothers, African fathers and coloured fathers respectively. In Figure 4 and the analyses that follow, data are included for every age at which an individual has non-missing information on parent's vital status.

Data from different waves can also be contradictory with parents who were deceased in an earlier wave being reported as alive in a later wave or where the year of death in a later wave conflicts with information about vital status in an earlier wave. For example, a mother may be reported as alive in the first wave (2002) and dead in the fourth wave (2006) with her date of death being before 2002. Alternatively she may be reported as deceased in 2002 but her date of death in the fourth wave is after 2002. There are also a few cases where the dates of death in the first and the fourth wave disagree (mostly by one year) but where the date from the fourth wave does not contradict the parent's vital status in the first wave. In the cases of conflicting information between waves of the survey we assumed that the information from the first wave was correct. In order to assess the impact of this assumption we created the same variables assuming that the data from the fourth wave were correct. The percentage of respondents whose information differed depending on whether Wave 1 or Wave 4 information was assumed to be correct are 0.74%, 0.65%, 5.67% and 5.49% for African mothers, coloured mothers, African

fathers and coloured fathers respectively.[9] The higher percentage of differences for father's deaths is a reflection of both the higher rates of paternal death and the greater uncertainty around father's vital status. For all the analyses that follow regressions were re-run assuming information from the fourth wave was correct (see Table A1 in the appendix for the analogous results to Table 7 when the data from the fourth wave are assumed to be correct. Analogous results for other tables are not shown but are available on request). The choice of correct wave in the case of conflicts makes no substantive difference to any of the results that follow.

Figures 1 to 4 clearly show that both the risk of poor schooling outcomes and the risk of orphanhood increase with age making it essential to adequately control for age in any analyses of the impact of parental death on schooling. Double orphanhood in childhood is fairly rare (1.2% of the sample lost both parents before the age of 18) so in the analyses that follow we will estimate effects separately for maternal and paternal deaths but will not include indicators that both parents are deceased. The figures in the previous section highlighted racial differences in schooling outcomes and in all that follows we will estimate results separately for each population group in order to not confound the effect of higher prevalence of parental death with race. The white sample is excluded from the analyses that follow for two reasons. Primarily, parental death in childhood is too rare in the white sample to allow an examination of the impact of parental loss on schooling outcomes. Secondly, the low initial response rate and subsequent high rate of attrition amongst white households and young adults may introduce bias into the analyses.

5 Orphan schooling deficits

The CAPS data allow us to view the young adult sample either at a particular point in time or at a particular age. For example one can consider schooling outcomes at the time of the

[9] For these respondents the parental death variables would not necessarily be different for every age from 0 to17. For example if the mother's year of death differed by one year in Wave 1 and Wave 4 then the mother deceased variable would only differ for two ages between 0 and 17 for this respondent. The percentage of observations that differ depending on which wave is taken as correct are 0.3%, 0.4%, 3.5% and 3.5% for African mothers, coloured mothers, African fathers and coloured fathers respectively.

first interview in the base wave (2002) or at the age of 18. In the latter case data could be drawn from the life history calendar or any of the four waves. This section begins with an examination of how parental death impacts on schooling outcomes at particular ages for the full sample and then considers schooling outcomes at Wave 1 for a subsample of young adults who should have been enrolled in school at the time. The results in this section are based on regressions of the following form:

$$Y_{it} = \beta_m M_{it} + \beta_F F_{it} + \gamma X_{it} + \varepsilon_{it}. \quad (1)$$

Y_{it} is a schooling outcome for individual i at time t where t can either be a particular age or a survey wave. The schooling outcomes are modelled as a function of the mother's vital status (M_{it} = 1 if a child's mother is deceased at time t; = 0 otherwise) and father's vital status (F_{it} = 1 if a child's father is deceased at time t; = 0 otherwise). Also included in equation 1 are a set of household and individual level controls X which will vary depending on whether we are estimating equation 1 at a particular age or at a particular time.

Table 3 presents regression results of the association between parental death and three outcome variables - an indicator that they were enrolled in school at age 16, the number of grades successfully completed by age 18 and an indicator that they had successfully completed secondary school (grade 12) by the age of 20. Ordinary least squares estimates of β_M and β_F for each of the three outcomes are shown in columns 1 to 3 respectively. With respect to the outcome variables, age (t) refers to age of the young adult on the 1st of January. Samples for columns 1, 2 and 3 are all young adults who were observed until they were at least 16, 18 and 20 respectively. In the event that parents' vital status was unknown the parental death indicator was coded as a zero and the regressions include indicators that parents' vital status was unknown. The regressions also include dummies for year of birth, an indicator that the young adult was

born before July and an indicator that they are female. [10] In column 1 the mother deceased and father deceased variables indicate that the respondent's parent was deceased on the 1st of January in the year that they were 16 years of age. In columns 2 and 3 the mother deceased and father deceased variables indicate that the respondent's parent died before the respondent was 18 years of age. Regressions were run separately for Africans and coloureds. Standard errors that allow for correlation in the unobservables of individuals who are members of the same sampling cluster are presented in parentheses below the coefficients and weights are used to adjust for sample design and non-response.

Consistent with the national and Africa Centre results presented in Case and Ardington (2006) and Ardington and Leibbrandt (forthcoming), the results presented in Table 3 suggest that the loss of a mother in childhood is significantly associated with poorer schooling outcomes for African young adults. African young adults who experienced maternal loss are 10 percentage points less likely to be enrolled in school at 16, have completed 0.69 fewer grades at age 18 and are 11 percentage points less likely to have completed secondary school by age 20. The loss of a father in childhood is only significantly associated with the number of grades completed by the age of 18 for African young adults and the magnitude of this effect is less than a third of the maternal death effect.

In contrast coloured young adults who have lost a father are significantly disadvantaged relative to those whose father is still alive. They are 10 percentage points less likely to enrolled at age 16, 0.93 grades behind by age 18 and 17 percentage points less likely to have completed secondary school by age 20 than those who did not experience paternal loss. Although the point estimates for the impact of maternal death on the probability of completing secondary school by age 20 are almost identical for African and coloured young adults, the standard errors render the coloured coefficient insignificant. The maternal death coefficients for enrolment at age 16 and

[10] Before the Education Laws Amendment Act (Act 50 of 2002) set the age of admission to Grade 1 as the year in which the child turns 7, the age of admission policy was to accept children into Grade 1 if they turned 6 before the 30th of June in their Grade 1 year. Children born in the first half of the year should therefore be one grade ahead of those born in the second half of the year.

grades completed at age 18 are negative but small and not significant for Coloured young adults. The lower prevalence of maternal death for coloureds results in the coefficients being imprecisely measured.[11]

From Table 3 it is clear that respondents who have lost parents have on average poorer schooling outcomes than other adolescents and young adults of the same age and gender. The regressions take no account, however, of the socioeconomic status of the young adults' households and how this may differ by parents' vital status. Using the CAPS data Lam *et al.* (2007) find a strong effect of household income on the probability of progressing through school at the correct pace. In order to assess how the association between parental death and schooling is mediated by socioeconomic status we consider a sub-sample of CAPS respondents for whom there are various measures of household well-being and structure at a time when they were of school going age.

[11] The number of African young adults whose mother is deceased is 123, 119 and 77 for columns 1 to 3 respectively. For coloured young adults 74, 74 and 47 have deceased mothers in columns 1 to 3 respectively. There are 385, 398 and 277 African young adults whose father is deceased in columns 1 to 3 respectively. The number of coloured young adults whose father is deceased is 195, 196, 138 for columns 1 to 3 respectively.

Table 3: Parental death and schooling outcomes for CAPS respondents at various ages

	African			Coloured		
	Dependent variable:			Dependent variable:		
	Enrolled at age 16	Highest grade completed at age 18	Grade 12 completed by age 20	Enrolled at age 16	Highest grade completed at age 18	Grade 12 completed by age 20
	(1)	(2)	(3)	(1)	(2)	(3)
Mother deceased	-0.101	-0.685	-0.109	-0.017	-0.311	-0.091
	(0.037)**	(0.210)**	(0.048)*	(0.058)	(0.266)	(0.070)
Father deceased	-0.009	-0.188	-0.019	-0.102	-0.931	-0.165
	(0.017)	(0.114)	(0.033)	(0.035)**	(0.202)**	(0.048)**
Observations	2072	1874	1372	1963	1766	1244

Notes to Table 3: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include dummies for year of birth, an indicator that the respondent was born before July, an indicator that the respondent is female and indicators that parent's vital status is unknown. Age refers to the age of the respondent on 1 January. In column 1 the mother deceased and father deceased variables indicate that the respondent's parent was deceased on 1 January when they were 16 years of age. In columns 2 and 3 the mother deceased and father deceased variables indicate that the respondent's parent died before the respondent was 18 years of age. Samples for columns 1, 2 and 3 are all young adults who were observed until they were at least 16, 18 and 20 years of age respectively. Estimates marked with two asterisks (**) are significant at the 1 percent level, those marked with one (*) are significant at the 5 percent level, and those marked with a plus sign (+) are significant at the 10% level.

Table 4: Sample characteristics for CAPS respondents born between 1985 and 1987 (aged 14 to 16 on 1 January 2002

	African			Coloured			
	Obs.	**Mean**	**Std Err.**	**Obs.**	**Mean**	**Std Err.**	
Characteristics at Wave 1 (2002)							
Highest grade completed	684	7.71	0.06	771	8.38	0.05	**
Enrolled in school	684	0.934	0.009	770	0.856	0.013	**
Mother deceased	685	0.073	0.010	771	0.048	0.008	*
Father deceased	685	0.210	0.016	771	0.109	0.011	**
Mother's vital status unknown	685	0.001	0.001	771	0.001	0.001	
Father's vital status unknown	685	0.020	0.005	771	0.010	0.004	
Female	685	0.584	0.019	771	0.532	0.018	*
Number of assets	684	4.73	0.10	770	8.42	0.11	**
Per capita household income	684	369	21	770	890	33	**
Household size	684	6.05	0.11	770	5.98	0.09	
Fraction of household under age 14	684	0.236	0.006	770	0.230	0.006	
At least one pension-eligible female in household	684	0.136	0.013	770	0.173	0.014	+
At least one pension-eligible male in household	684	0.032	0.007	770	0.066	0.009	**
Grades completed by age 12	685	4.96	0.05	771	5.70	0.03	**
Standardized literacy and numeracy evaluation score	676	-0.574	0.032	764	0.020	0.030	**
Mother is co-resident	685	0.688	0.018	771	0.809	0.014	**
Father is co-resident	685	0.378	0.019	771	0.536	0.018	**
Both parents co-resident	685	0.318	0.018	771	0.489	0.018	**
Neither parent co-resident	685	0.253	0.017	771	0.144	0.013	**
Lives with mother only	685	0.369	0.018	771	0.320	0.017	*
Lives with father only	685	0.060	0.009	771	0.047	0.008	

Notes to Table 4: The notation in the final column denotes that differences between African and coloured respondents are significant at the 1% (**), 5% (**) or 10% (+) level.

The household characteristics included in any regression model would ideally reflect living conditions at a time when the respondent was of school going age. This is not always going to be possible with this data. In the first wave of the CAPS respondents were aged 14 to 22. Many of the older respondents were no longer living in the households where they resided in the period when they would or should have been enrolled in school. The characteristics of their Wave 1 household may have been quite dissimilar to their childhood home. Household characteristics may also have changed in the period since they left school for those older respondents who were still living in their childhood home. To address these concerns the sample for the next set of regressions is restricted to those respondents born between 1985 and 1987

who would have been aged 14 to 16 on the 1st of January 2002 as these respondents are unlikely to be living independently. Table 4 provides descriptive statistics for this sample. Significant differences between African and coloured children are marked with + at the 10% level, * at the 5% level and ** at the 1% level. On average these African children live in households with significantly fewer assets and less than half the per capita income of these coloured children.

The first four columns of Table 5 examine the impact of parental death on enrolment and grade attainment for children aged 14 to 16 years old in 2002. For each outcome ordinary least squares regressions were first run without any household level controls and then household controls were introduced. The first column of Table 5 presents estimates of the impact of parental death on enrolment in 2002. African children who have lost a mother are 12 percentage points less likely to be enrolled while there is no disadvantage associated with the loss of a father. In contrast, for coloured children the loss of a mother appears to have no effect on enrolment whereas the loss of a father decreases the probability of enrolment by 13 percentage points. The regression in the second column includes a set of household controls reflecting the household situation of children in 2002. These controls are the logarithm of household per capita income, number of household assets, logarithm of household size, fraction of household residents under the age of 14, an indicator that there is at least one resident female of pension-eligible age and an indicator that there is at least one resident male of pension-eligible age. Including measures of household well-being and household structure has no effect on the maternal death coefficient for African children but the paternal death coefficient for coloured children is substantially reduced.

The third and fourth columns show the estimated impact of parental death on the highest grade completed by 2002; respectively without and then with the household controls. African children whose mothers have died are almost a third of a year behind those whose mother is alive although the estimate is only significant once household controls are included. Those African children whose fathers have died are not significantly behind. The loss of a father

has a significant and substantial effect on grade attainment for coloured children. Introducing household controls substantially reduces the paternal death coefficient for coloured children from 0.77 to 0.53 of a year. The coefficient estimates for maternal death for coloured children are negative but imprecisely measured due to the small numbers of coloured children who had lost a mother.

The fifth and sixth columns of Table 5 show the estimated impact of parental death on the standardized score from the literacy and numeracy evaluation (LNE) conducted in Wave 1. Performance on the test reflects a combination of many factors, including innate ability, home environment, and the quantity and quality of schooling to that point and can be thought of as a measure of cumulative learning at the time of the 2002 interview. Interestingly, although African children who have lost their mothers are less likely to be enrolled and are behind in school for their age they do not have significantly lower test scores. Both African and coloured children whose fathers have died score lower on the test but the coefficients lose significance once household controls are included in the regressions. Coloured children who have experienced maternal death score 0.24 standard deviations lower on the test. To the extent that the test captures prior learning and ability these results suggest that although African children whose mothers have died are behind in school they are not significantly less able than children who have not lost their parents.

Table 5: Parental death and schooling outcomes in 2002 for CAPS respondents born between 1985 and 1987

	African						Coloured					
	Dependent variable:						Dependent variable:					
	Enrolled 2002		Highest grade 2002		LNE score 2002		Enrolled 2002		Highest grade 2002		LNE score 2002	
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Mother deceased	-0.121	-0.123	-0.299	-0.307	-0.007	-0.019	0.039	0.032	-0.259	-0.274	-0.244	-0.249
	(0.068)+	(0.065)+	(0.186)	(0.178)+	(0.129)	(0.103)	(0.046)	(0.044)	(0.324)	(0.321)	(0.160)	(0.143)+
Father deceased	-0.042	-0.036	-0.102	-0.059	-0.154	-0.114	-0.125	-0.083	-0.766	-0.526	-0.292	-0.131
	(0.030)	(0.030)	(0.168)	(0.157)	(0.090)+	(0.083)	(0.045)**	(0.044)+	(0.219)**	(0.207)*	(0.099)**	(0.089)
Log of per capita household income		-0.007		0.05		0.074		0.055		0.286		0.186
		(0.014)		(0.063)		(0.046)		(0.020)**		(0.059)**		(0.051)**
Number of assets		0.017		0.138		0.076		0.017		0.108		0.074
		(0.004)**		(0.021)**		(0.014)**		(0.006)**		(0.019)**		(0.013)**
Logarithm of household size		-0.002		-0.385		-0.159		0.002		-0.125		-0.109
		(0.033)		(0.133)**		(0.084)+		(0.035)		(0.130)		(0.104)
Fraction of household under age 14		0.032		0.332		0.197		0.017		0.747		0.2
		(0.068)		(0.393)		(0.233)		(0.083)		(0.282)**		(0.223)
Pension age-eligible female		0.029		0.258		-0.014		-0.008		0.193		0.136
		(0.025)		(0.176)		(0.100)		(0.036)		(0.122)		(0.075)+
Pension age-eligible male		-0.019		-0.084		0.362		0.091		0.16		0.008
		(0.051)		(0.334)		(0.194)+		(0.044)*		(0.169)		(0.092)
Observations	684	684	684	683	676	675	770	769	771	770	764	763

Notes to Table 5: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include dummies for year of birth, an indicator that the respondent was born before July, an indicator that the respondent is female and indicators that parent's vital status is unknown. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Ardington and Leibbrandt (forthcoming) provide a national picture of the relationship between orphan status and schooling for African children only. To investigate the extent to which the results for coloured children in metropolitan Cape Town might generalise to the national level, we estimated regressions similar to those in Ardington and Leibbrandt (forthcoming) for coloured children using the 1996 and 2001 Censuses (results in Table A2 in the appendix). The large sample sizes in the Censuses also allow for a more precise estimate of the impact of maternal death. The national results for coloureds are very similar to those for Africans nationally and for coloureds in Cape Town. Coloured children whose mothers have died are significantly behind in school and although the effect is somewhat diminished, but still highly significant, when household controls are included in the regression and when household fixed effect models are estimated. The paternal death effect with no household controls is significant but substantially smaller than the maternal death effect. The paternal death effect seems to be largely explained by socioeconomic status. In these national datasets racial differences in paternal death effects are less apparent than in the CAPS data.

Parental death and longer-run schooling outcomes

Results for the full sample in Table 3 showed that parental death in childhood significantly affected the likelihood of completing secondary school by the age of 20 for African young adults who lost a mother and coloured young adults who lost a father. All young adults born between 1985 and 1987 should have been enrolled in school in 2002 and should have completed secondary school by the time they were re-interviewed in 2006. Restricting the sample in this way allows us to observe outcomes in young adulthood (18 to 20 years of age) and to control for household characteristics at the time when these young adults should have been enrolled in school.[12] Table 6 shows the estimated impact of parental loss before the age of 18 on

[12] Attrition in this age group is lower than for the full sample. The African attrition rate amongst this cohort is 20% and the coloured attrition rate is 14%. Respondents who were not interviewed in Wave 4 are significantly different on a range of dimensions – they are 7 percentage points less likely to be enrolled, have completed 0.27 fewer grades,

the probability of completing secondary school by 2006. The loss of a mother in childhood reduces the probability of completing secondary school by around 15 and 12 percentage points for African and coloured young adults respectively and this effect is not diminished by including controls for household socioeconomic status in 2002. The loss of a father has no effect for African young adults but significantly reduces the probability of completing secondary school for coloured young adults. Once controls for socioeconomic status are included coloured young adults who lost a father in childhood are no longer at a significant disadvantage.[13]

Table 6: Parental death and completion of secondary schooling for CAPS respondents born between 1985 and 1987 and re-interviewed in 2006

	African		Coloured	
	Dependent variable: Completed Grade 12 by 2006		Dependent variable: Completed Grade 12 by 2006	
	(1)	(2)	(1)	(2)
Mother deceased before 18	-0.158	-0.152	-0.101	-0.119
	(0.054)**	(0.053)**	(0.076)	(0.069)+
Father deceased before 18	0.042	0.055	-0.149	-0.032
	(0.048)	(0.047)	(0.056)**	(0.054)
Logarithm of per capita household income		0.024		0.131
		(0.025)		(0.028)**
Number of assets		0.028		0.035
		(0.008)**		(0.007)**
Logarithm of household size		-0.043		-0.125
		(0.057)		(0.063)*
Fraction of household under age 14		-0.043		0.231
		(0.158)		(0.138)+
Pension age-eligible female		0.077		0.099
		(0.064)		(0.050)+
Pension age-eligible male		-0.018		0.092
		(0.105)		(0.074)
Observations	549	549	661	660

Notes to Table 6: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include dummies for year of birth, an indicator that the respondent was born before July, an indicator that the respondent is female and indicators that parent's vital status is unknown. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

have a 6 percentage point higher risk of losing their mother and it is more likely that their mother and father's vital status is unknown. Attritors are not significantly different to those re-interviewed in terms of any of the other characteristics shown in Table 4.

[13] In regressions run, but not shown, we included the literacy and numeracy test score and grades successfully completed by age 13 as a measure of how far behind the young adult was by the age when they should they should have completed primary school. The results are not included in Table 6 due to the potential endogeneity of these variables. Including these variables reduces the maternal death effect but African young adults who lost their mothers in childhood are still 10 percentage points less likely to have completed secondary school by 2006. The inclusion of these variables results in the paternal death effect for coloured children becoming positive.

It is apparent from Figure 1 that a number of respondents born between 1985 and 1987 would have been so far behind in their schooling that there was no chance of them completing secondary school by 2006. We considered the probability of completing secondary school *or* successfully passing four grades as an alternative outcome. Results for both African and coloured young adults are very similar to those for the probability of completing secondary school (see Table A3 in the appendix for results).

Consistent with the results of Ardington and Leibbrandt (forthcoming) and Case and Ardington (2006), it appears that the association between maternal death and poor schooling outcomes is not exclusively or even predominately channelled through socioeconomic status. African and coloured children who have lost a mother do not live in households that are systematically richer or poorer than those of children whose mother is alive (see columns 1 and 2 in Table A4 in the appendix) and the maternal death effects are not reduced when we add controls for household socioeconomic status to the regressions. In contrast, African and coloured children who have lost a father live in households with significantly lower per capita incomes and the paternal death effects for coloured children are substantially reduced when controls for household socioeconomic status are included in the regressions. This suggests that part of the paternal orphan deficit for coloured children is explained by socioeconomic status although the paternal death effect remains significant and large when household controls are included. Parental loss in childhood appears to have long-run implications for the human capital attainment of the child with schooling disparities between orphans and non-orphans persisting into early adulthood. The next section focuses on whether parental death causes children to fall behind in their schooling.

6 The causal effect of parental death

Due to the age of respondents in the first wave, the sample size and the infrequency of parental death, the CAPS data do not lend themselves to an analysis of the impact of parental

death *between* waves on changes in schooling outcomes. One is, however, able to observe a range of schooling outcomes at each age either retrospectively using the life history calendar collected in Wave 1 or prospectively using information from each of the four waves. Information about the timing of parental deaths from Wave 1 and Wave 4 allows one to determine parent's vital status at each age. Using these data we constructed a panel containing schooling outcomes (enrolment, grade enrolled in, result of schooling, highest grade completed) and parent's vital status for every age from 7 to 17 with ages measured at the 1st of January. This panel dataset spanning 11 ages allows one to compare the same individual before and after a parental death and go some way towards establishing whether parental death has a causal effect on children's schooling. With data available for each age from 7 to 17, we can modify equation 1 to allow for individual fixed effects. That is, the unobservable component of 1 can be written

$$\varepsilon_{it} = \alpha_i + u_{it}, \qquad (2)$$

where α_i is an individual-specific fixed effect. This effect will absorb all time invariant individual level unobservable or unmeasured characteristics. The fixed effects models are estimated from ordinary least squares regressions of the following form:

$$Y_{it} - \bar{Y}_{i.} = \beta_m (M_{it} - \bar{M}_{i.}) + \beta_F (F_{it} - \bar{F}_{i.}) + \gamma (X_{it} - \bar{X}_{i.}) + (u_{it} - \bar{u}_{i.}), \qquad (3)$$

where $\bar{Y}_{i.}$ is the average value of Y across all time periods t for individual i. It can be seen that subtracting the individual means removes α_i from the equation.[14]

By sample design every respondent is 'observed' at every age from 0 to 14. After the age of 14 some children are lost through attrition but 96% of original Wave 1 respondents are 'observed' until they are at least 17 years old. Missing data on schooling outcomes are relatively

[14] See Deaton (1997:106-108) for a discussion on within- estimation techniques with panel data.

rare. For example information on enrolment is missing for 0.26% of the potential observations.[15] Section 4 provided a detailed discussion on missing data on parent's vital status. Information on parent's vital status is missing for 0.54%, 0.64%, 5.67% and 2.72% of the potential observations for African mothers, coloured mothers, African fathers and coloured fathers respectively.

In the analyses that follow, data are included for every age at which an individual has non-missing information on parent's vital status and the relevant schooling outcome. We experimented with various approaches to missing data on parent's vital status. Firstly we excluded all individuals with any missing information from the analyses. Secondly, we excluded any individuals whose parents' vital status was missing for more than one year; i.e., we kept those to whom we were not able to assign an exact year of death. Thirdly, we replaced the parental death indicators with a zero where they were missing and created dummy variables indicating that the parent's vital status was missing. These dummy variables were then included in the regressions. Finally, we replaced the parental death indicators with zero and included dummies for missing information when the exact year of death was unknown and parent's vital status was only missing for one age. Results presented below were not substantively affected by the way in which we dealt with missing data on parent's vital status (see Tables A5 to A8 for the analogous results to Table 7 for the various approaches to missing data).

Parental death effects are identified from the observations for respondents who lose a parent in the period covered by the panel.[16] Between the ages of 7 and 17, 111 African respondents and 60 coloured respondents lost a mother and 275 African respondents and 125 coloured respondents lost a father.

[15] Information on enrolment is missing for one of the ages for 1.95% of Africans and 1.10% of coloureds. A smaller percentage (0.61% of Africans and 0.70% of coloureds) are missing data for more than one of the ages. There are no cases where enrolment data is missing for every year.

[16] Some children had already lost a parent by the age of 7 (31 Africans had lost a mother, 17 coloureds had lost a mother, 119 Africans had lost a father and 69 coloureds had lost a father).

Table 7 presents coefficient estimates and standard errors from linear regressions with child fixed effects of indicators that a child's mother and father were deceased on three schooling outcomes - an indicator that they advanced a grade at that age, an indicator that there were enrolled in school at that age and an indicator that they passed conditional on being in school. The first outcome incorporates both enrolment and passing (or drop outs and failure). As before we use robust standard errors that allow for correlation in the unobservables of individuals who are members of the same sampling cluster. These standard errors are presented in parentheses below the coefficients. These child fixed effect models allow one to compare schooling outcomes in periods after a parental death with periods before a parental death. The child is necessarily older in the post death period and Figure 1 clearly shows that schooling outcomes deteriorate with age so it is very important to adequately control for age. All regressions include a full set of dummies for age.

Table 7: Parental death and schooling outcomes at ages 7-17: child fixed effects

	African			Coloured		
	Dependent variable:			Dependent variable:		
	Advancing a grade	Enrolment	Passing (conditional on being in school)	Advancing a grade	Enrolment	Passing (conditional on being in school)
	(1)	(2)	(3)	(1)	(2)	(3)
Mother deceased	-0.077	-0.078	-0.022	-0.065	-0.018	-0.057
	(0.037)*	(0.030)*	(0.031)	(0.036)+	(0.032)	(0.034)+
Father deceased	0.012	-0.002	0.009	-0.098	-0.064	-0.067
	(0.024)	(0.019)	(0.017)	(0.033)**	(0.028)*	(0.025)**
Child fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21545	21876	19860	20814	21065	19353
Number of children	2060	2060	2052	1975	1975	1967

Notes to Table 7: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include a full set of indicators for age. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Maternal death has a significant negative effect on grade advancement and enrolment for African children – respondents are 8 percentage points less likely to advance a grade and 8 percentage points less likely to be enrolled post their mother's death than prior to her death. The

maternal death effect on the probability of passing conditional on being enrolled is negative although not significant. Coloured children are also significantly less likely to advance a grade and pass conditional on enrolment in the period post their mother's death than prior to her death. They are not significantly less likely to be enrolled in periods post their mother's death. These results suggest that impact of a mother's death for African children operates primarily through a greater likelihood of dropping out after her death. For coloured children the effect operates primarily through performance in school with children more likely to fail after their mother's death. The relatively high dropout rate amongst all coloured teenagers evident in Figure 1 may partly explain why the differences in enrolment between coloured children who have and have not lost their mothers are not significant.

Paternal death appears to have no impact on grade advancement, enrolment or passing for African children. In contrast, for coloured children schooling outcomes are significantly adversely affected by father's death with coloured children being 10 percentage points less likely to advance a grade, 6 percentage points less likely to enrolled and 7 percentage points less likely to pass post their father's death than prior to his death.

These individual fixed effect models allow one to control for all time-invariant individual level unobservable or unmeasured characteristics. A causal interpretation of the parental death coefficients assumes that there are no unobserved time-varying factors that affect both parental death and schooling outcomes. The most plausible problem factor is arguably changes in household socioeconomic status. Aggregate socioeconomic status between the ages of 7 and 17 and socioeconomic status at baseline (age 7) will be absorbed into the individual fixed effect but changes in socioeconomic status between these ages are omitted from the models in Table 7. Whether omission of changes in socioeconomic status threatens the validity of a causal interpretation of the parental death effects in Table 7 depends on whether changes in

socioeconomic status are correlated with the probability of parental death. In the event that there is such a correlation the temporal ordering of the changes is important.

The aim of the empirical work in this paper is to estimate the reduced form effect of parental death via a range of possible pathways. Therefore, a scenario where parental death results in a negative change in socioeconomic status which in turn has a negative impact on a child's schooling would not threaten a causal interpretation. In this case we would argue that parental death has a causal effect on children's schooling but that this effect is both direct and indirect with the indirect effect operating through the negative impact of parental death on socioeconomic status. If on the other hand the causality ran the other way with a change in socioeconomic status increasing the probability that a parent died then one cannot argue for a causal interpretation of the coefficients presented in Table 7 as the correlation between parental death and poor schooling outcomes is merely spurious.

The life history calendar did not include any information on socioeconomic status and, therefore, we are unable to directly address concerns about time-varying socioeconomic status. Although each wave of the CAPS collected a rich set of socioeconomic information, there are insufficient parental deaths between waves to allow any within-child estimation of parental death impacts. Among African young adults, 80 lost their mother and 144 lost their father between Wave 1 and Wave 4. Thirty four (34) coloured young adults lost a mother and 60 lost a father. Around half of these young adults were already aged 18 or older at Wave 1 and they all would have been 18 or older at Wave 4. Less than 16% of the parental deaths occurred before the young adults were 18 years old. The characteristics of older respondent's Wave 1 and Wave 4 households may also be quite dissimilar to their household when they were of school-going age especially if they had moved away from their childhood home. This sample clearly does not lend itself to an analysis of the impact of parental death between waves on a change in schooling outcomes controlling for changes in socioeconomic status. Nevertheless an examination of their

Wave 1 household characteristics does suggest an association between future paternal death and current socioeconomic status. African and coloured respondents whose fathers die between Wave 1 and Wave 4 live in households in Wave 1 with significantly lower household per capita incomes. Respondents whose mothers died between waves did not live in significantly poorer or richer households (see columns 3 and 4 of Table A4 in the appendix).

Lam *et al*. (2007) in their analysis of progression through school in the CAPS found that the association between grade advancement and many variables typically included in an education production function, such as income and parents' education, is weaker for African children than for coloured children. The cross-sectional results in Tables 5 and 6 are similar in that the logarithm of per capita household income had no predictive power for African children. Including household controls also had no impact on the maternal death coefficients for both African and coloured children. This cross-sectional evidence from the CAPS together with the evidence from the Ardington and Leibbrandt (forthcoming) and Case and Ardington (2006) suggests that there is no systematic relationship between maternal death and socioeconomic status. The association between maternal death and poor schooling outcomes appears to be direct rather than channelled through socioeconomic status. Paternal deaths, on the other hand, are associated with poorer socioeconomic status and in cross-sectional work much of the deficit experienced by children who have lost a father is explained by the relative poverty of their current household. We would argue that empirical evidence supports a causal interpretation of the maternal death coefficients in Table 7 and that the results from Case and Ardington (2006) are therefore generalizable beyond the rural field site. It is less clear how much of a causal interpretation can be placed on the coloured paternal death coefficients.

7 Timing and parental death effects

Longitudinal datasets seldom span a sufficient time frame to allow us a more nuanced view of the exact timing of when children start to fall behind in relation to the parental death and

whether they begin to recover at some point. The number of time periods (or ages) in the panel allows an investigation into the timing of parental death effects in the fixed effects framework that was not possible with the Africa Centre data. The fixed effects models in Table 7 assume that parental death effects are constant in the period following the parent's death. This assumption is relaxed in Table 8 in two ways. Firstly, we include interaction terms between the length of time since the parent's death and the parental death indicators in the fixed effects specification shown in equation 3. Secondly, we estimate a fixed effects model with indicator variables for specific periods pre and post the parental death.

The first column of Table 8 shows results from regressions similar to those presented in Table 7 with interaction terms between the length of time (in years) since the parent's death and the parental death indicators included. Specifically, we estimate individual fixed effect regressions of the following form:

$$Y_{it} = \beta_m M_{it} + \beta_F F_{it} + \pi_m M_{it} \times T_{it} + \pi_F F_{it} \times S_{it} + \gamma X_{it} + \varepsilon_{it}, \qquad (4)$$

where T_{it} is the time in years since the mother's death when the child is observed at age t and S_{it} is the time in years since the father's death. If children suffer developmental delays when parents die, we would expect the coefficient on the indicator that a parent is dead to be negative ($\beta < 0$). If developmental delays are cumulative, we would expect the coefficient on time since death to be negative also ($\pi < 0$). However if children recover from the loss, time since death would bring children back toward where they may have been before the parent's death: $\beta < 0, \pi > 0$.

All observations for individuals who are missing parent's vital status for more than one year are excluded from the analysis. For the small number of cases where the exact year of a parent's death is unknown it is assumed that the first year in which we know the parent is dead is the first year since death. Results are very similar if we omit these individuals from the analysis.

For African children the impact of maternal death on the probability of advancing a grade increases with the length of time that the mother has been deceased. The magnitude of the disadvantage doubles for every additional four years since the mother's death. Findings are similar for paternal deaths for coloured children with the impact increasing with time since the death although the magnitude of the disadvantage only doubles for each additional seven years since the father's death. Interestingly the impact of maternal death for coloured children does not appear to increase with time since the death.

Table 8: Time since parental death and progress through school at ages 7-17: child fixed effects

	African		Coloured	
	Dependent variable: Advanced a grade		Dependent variable: Advanced a grade	
	(1)	(2)	(1)	(2)
Mother deceased	-0.032		-0.096	
	(0.043)		(0.042)*	
Mother deceased x years since mother died	-0.018		0.008	
	(0.009)+		(0.009)	
Father deceased	0.021		-0.07	
	(0.024)		(0.033)*	
Father deceased x years since father died	-0.005		-0.011	
	(0.004)		(0.005)*	
One and two years before mother died		-0.04		-0.072
		(0.037)		(0.036)*
Mother died this year		-0.064		-0.12
		(0.046)		(0.051)*
One and two years after mother died		-0.075		-0.097
		(0.046)		(0.048)*
Three plus years after mother died		-0.171		-0.097
		(0.057)**		(0.055)+
One and two years before father died		0.005		-0.036
		(0.022)		(0.034)
Father died this year		-0.001		-0.143
		(0.030)		(0.040)**
One and two years after father died		0.019		-0.089
		(0.031)		(0.044)*
Three plus years after father died		0.016		-0.131
		(0.037)		(0.049)**
Child fixed effects	Yes	Yes	Yes	Yes
Observations	21147	21221	20563	20662
Number of children	1988	1988	1929	1929

Notes to Table 8: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include a full set of indicators for age. Regressions exclude individuals whose parents' vital status information is missing for more than one age. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Following Evans and Miguel (2007), the second column of Table 8 presents coefficients and standard errors from child fixed effects models that include a combined indicator for the two years prior to the death, an indicator for the year of the death, a combined indicator for the two years following the death and another combined indicator for the period three or more years after the death. For African children there do not appear to be any significant pre-death effects for mother's deaths and the impact of maternal death increases with the length of time since the death. Paternal death appears to have the greatest impact on grade advancement for coloured children in the year of the death and in the period three years or more after the death. Maternal death has a significant negative effect on grade advancement for coloured children in the two years before the mother dies and in all periods thereafter.[17] Similarly to Evans and Miguel (2007), these preliminary results provide no evidence of orphan recovery after parental death. The evidence presented here together with the earlier cross sectional findings in this paper suggest that orphan schooling deficits in childhood will result in long run deficits in the ultimate human capital that these orphans acquire. There is no evidence that orphans begin to bounce back or that the gap between orphans and non-orphans diminishes as the time since the death increases.

Table 9 investigates whether the impact of parental death increases or decreases with the age of the respondent. The first column shows results from regressions that separate the maternal and paternal death indicators into two indicators each – one for ages at which the parent was deceased and the child was younger than 13 years of age and another for ages at which the parent was deceased and the child was older than 13 years of age. For African children whose mothers have died the impact of her death is greater the older they are. Indeed there appears to be no maternal death effect before the age of 13. For coloured children the impact of

[17] Not all children whose parents die are observed 3 or more years after their parent's death. The panel is constructed in such a way that children whose parents die when they are 15 or older are never observed 3 or more years after their parent's death. The coefficient on the indicator for the period of 3 or more years after the parent's death is therefore estimated off a group of children whose parents died before they were 15 years old. The average age of the child when their mother or father died is between 4 to 5 years younger for those who are observed 3 or more years after the death compared to those who are not observed that far after the death. It is therefore not clear if the indicator for 3 or more years after the death is capturing length since parental death or is an indicator that the parent died when the child was younger. If we restrict the sample to those children who were observed at least 3 years after the death the coefficient on the indicator for 3 or more years after the death is very similar.

maternal death does not differ significantly by the age of the respondent while paternal death impacts are significantly greater for children aged 13 and older than children under the age of 13. Regressions were also run including interaction terms between the parental death indicators and the age of the child (results shown in Table A9 in the appendix). For African children the predicted maternal death effect is only negative from age 12 onwards. For coloured children the interaction term is insignificant for maternal death. The predicted paternal death effect for coloured children is negative from age 7 onwards and increases with age. Although the positive correlation between the age of the respondent and the length of time since the parent has been deceased is not strong (the correlation coefficients are 0.07, 0.20, 0.19 and 0.28 for African mothers, coloured mothers, African fathers and coloured fathers respectively) it makes it difficult to distinguish greater impacts as the time since the parent's death increases and greater impacts as children age.

The second column of Table 9 shows results from regressions that investigate whether the parental death effect varies with the age of the child when the death occurred. Regressions are run with separate indicators for parental death before the child was 13 years old and parental death after the child was 13 years or older. Interestingly although outcomes tend to be worse the longer the parent has been deceased, the death of a mother in one's teenage years appears to have a greater impact than a death pre-teens. For both African and coloured children it seems that the loss of a mother in one's teens has a more adverse affect on schooling outcomes than losing her before one turns 13 years old although the difference between the coefficients is only significant for coloured children. For coloured children the impact of paternal death does not differ significantly by the age of the respondent when their father died.

Table 9: Age at parental death and progress through school at ages 7-17: child fixed effects

	African		Coloured	
	Dependent variable: Advanced a grade		Dependent variable: Advanced a grade	
	(1)	(2)	(1)	(2)
Mother deceased x age less than 13	0.038		-0.097	
	(0.055)		(0.040)*	
Mother deceased x age 13 or older	-0.085		-0.055	
	(0.038)*		(0.037)	
Father deceased x age less than 13	0.053		-0.046	
	(0.025)*		(0.034)	
Father deceased x age 13 or older	0.001		-0.111	
	(0.025)		(0.034)**	
Mother deceased when child less than age 13		-0.041		-0.014
		(0.068)		(0.044)
Mother deceased when child aged 13 or older		-0.082		-0.136
		(0.045)+		(0.062)*
Father deceased when child less than age 13		0.039		-0.083
		(0.037)		(0.049)+
Father deceased when child aged 13 or older		-0.021		-0.115
		(0.033)		(0.051)*
Child fixed effects	Yes	Yes	Yes	Yes
Observations	21538	21064	20807	20453
Number of children	2060	1981	1975	1918

Notes to Table 9: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include a full set of indicators for age. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Although it is difficult to separate out the effects of the age of the child and the length of time since the parent died the results in Tables 8 and 9 show no evidence of orphans 'bouncing back' and suggest the negative impacts of losing a parent in childhood are likely to have lasting effects on the ultimate human capital accumulation of these children. This interpretation is supported by the direct examination of the impact of parental loss in childhood on the probability of completing high school by early adulthood in the previous section.

The next section uses the rich set of data collected in the first wave of the CAPS to try and understand why effects are different for maternal and paternal deaths and why there are racial differences in the impact of paternal death on a child's schooling outcomes.

8 Parental presence, characteristics and roles and children's schooling

The cross-sectional and longitudinal results presented earlier show that the impact of parental death differs by the gender of the parent and these gender differences are not uniform across population groups. The loss of a mother has a negative impact that is not associated with socioeconomic status on the schooling of African and coloured children. In contrast, paternal deaths only have a negative impact on the schooling of coloured children and this negative impact is partly explained by socioeconomic status. The CAPS data allow some insight into the different roles of mothers and fathers particularly with respect to their children's education and how these roles differ by population group. This section begins with an examination of racial and gender differences in child-parent co-residency patterns and the association between these co-residency patterns and schooling outcomes. We then present some descriptive evidence on racial differences in parental characteristics and roles.

Anderson *et al.* (2001) use the 1995 OHS and find that children who do not reside with both genetic parents are at risk for poorer educational outcomes. It is possible that much of the difference between maternal and paternal death for African children and between coloured and African children for paternal death is explained by differences in parent-child co-residency patterns. Table 4 includes summary measures of parent-child co-residency patterns by population group. Both African and coloured children are significantly more likely to live with their mothers than their fathers but African children are much less likely to live with either parent than coloured children. One in five African children lives with neither parent as opposed to one in eight coloured children. Thirty five percent (35%) of African children live with both parents as opposed to 52% of coloured children.

Table 10: Parental co-residence and the completion of secondary school for CAPS respondents born between 1985 and 1987 and re-interviewed in 2006

	African				Coloured			
	Dependent variable: Completed Grade 12 by 2006				Dependent variable: Completed Grade 12 by 2006			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Proportion of life up to age 14 lived with mother	0.097	0.102			-0.008	0.075		
	(0.062)	(0.058)+			(0.077)	(0.065)		
Proportion of life up to age 14 lived with father	-0.089	-0.079			0.198	0.087		
	(0.047)+	(0.049)			(0.048)**	(0.044)*		
Mother is co-resident (2002)			0.065	0.085			-0.003	0.072
			(0.040)	(0.040)*			(0.051)	(0.048)
Father is co-resident (2002)			-0.063	-0.054			0.209	0.112
			(0.039)	(0.040)			(0.040)**	(0.038)**
Includes household controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	549	549	549	549	661	660	661	660

Notes to Table 10: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include dummies for year of birth, an indicator that the respondent was born before July, an indicator that the respondent is female and indicators that parent's vital status is unknown. Estimates marked with two asterisks (**) are significant at the 1 percent level, those marked with one (*) are significant at the 5 percent level, and those marked with a plus sign (+) are significant at the 10% level.

It is not clear to what extent the racial differences in parent-child co-residency patterns seen in Table 4 explain the racial differences in the impact of parental death on schooling outcomes. It is plausible that the physical absence of a father for the majority African children explains the lack of a paternal death effect. However the difference between the percentage of coloured children who live with their mother and with their father is also substantial and there are significant negative effects of paternal death for these children. Table 10 presents results from regressions that explore the association between parent-child co-residency patterns and progress through school for the same sample as that used in Table 6. The first column presents estimates of the impact of the proportion of one's life up to the age of 14 lived with your mother and your father on the probability of passing grade 12 by 2006. For African children there is positive but insignificant effect of living with your mother and a significant negative effect of living with your father. Taken literally the coefficients imply that children who always lived with their father are 9 percentage points less likely to matriculate than those that never lived with their father. This effect is unchanged by adding household controls. For coloured children the proportion of life up to the age of 14 that one has lived with their mother has no significant effect on completing secondary school while more time spent co-residing with their father has a large positive effect. Much of the positive effect of living with a father is explained by household socioeconomic status as is seen by the fact that the co-residency coefficient is substantially reduced in the second column where household controls are added to the regression. For coloured children household per capita income at Wave 1 is significantly lower if their father is not resident (see column 5 of Table A4 in the appendix). There are no significant differences in household per capita income between African children whose fathers are co-resident and those whose fathers are absent.

The third and fourth columns show estimates of the impact of co-residence with one's parents at the first wave of the CAPS in 2002. Results are very similar to those for the proportion of one's life up to the age of 14 that one lived with one's parents. The evidence from

Table 10 makes it clear that we cannot attribute the racial differences in the impact of paternal death to the fact that coloured fathers are more likely to be co-resident. The impact of paternal presence appears to differ markedly by race and the relationship between father's co-residence and socioeconomic status is also very different. Results in Table 10 also suggest that the loss of maternal presence only explains a portion of the negative effect of maternal death.

Table 11 attempts to shed some light on to why the impact of paternal presence differs for African and coloured children by looking at parental characteristics. Information about mother's and father's level of education and employment status is available from the household roster for co-resident parents and from the young adult questionnaire for non-resident parents. Young adults were also asked a number of questions about their parent's involvement and influence in their education. Table 11 presents parental characteristics for respondents of school going age (younger than age 18) at Wave 1. The sample is restricted to children whose parents are known to be alive as there are differential rates of parental mortality by population group. Characteristics are presented separately for co-resident mothers, absent (but alive) mothers, co-resident fathers and absent fathers.

Table 11: Parental characteristics and roles for CAPS respondents under the age of 18 years at Wave 1 (2002

	African			Coloured		
	Obs.	**Mean**	**Std Err**	**Obs.**	**Mean**	**Std Err.**
Mother is co-resident						
Mother helped with homework in the last 12 months	625	0.214	0.016	818	0.257	0.015
Mother had most important influence on how you performed in school	624	0.768	0.017	818	0.687	0.016
Mother's education	614	8.13	0.12	805	8.56	0.10
Mother is employed	596	0.589	0.020	784	0.642	0.017
Mother is absent but alive						
Mother helped with homework in the last 12 months	209	0.048	0.015	136	0.066	0.021
Mother had most important influence on how you performed in school	208	0.438	0.034	136	0.257	0.038
Mother's education	152	8.65	0.23	86	8.65	0.31
Mother is employed	188	0.378	0.035	117	0.556	0.046
Mother lives in Cape Town	205	0.390	0.034	133	0.887	0.028
Father is co-resident						
Father helped with homework in the last 12 months	346	0.101	0.016	525	0.190	0.017
Father had most important influence on how you performed in school	346	0.240	0.023	525	0.234	0.019
Father's education	334	6.85	0.19	509	8.76	0.14
Father is employed	330	0.745	0.024	509	0.827	0.017
Father is absent but alive						
Father helped with homework in the last 12 months	359	0.003	0.003	355	0.048	0.011
Father had most important influence on how you performed in school	359	0.033	0.009	355	0.014	0.006
Father's education	138	8.20	0.35	125	8.90	0.29
Father is employed	256	0.570	0.031	229	0.721	0.030
Father lives in Cape Town	332	0.428	0.027	330	0.827	0.021

Over three quarters (77%) of African children and 69% of coloured children who co-resided with their mothers reported their mother as the person who had the most important influence on how well they performed in school. In contrast just under a quarter of African and coloured children who live with their fathers mention their father as the person who had the most important influence. Amongst children who were not living with their mothers at Wave 1, 44% of Africans and 26% of coloureds mentioned their mother as having the most influence. Absent fathers were almost never mentioned as having the most important influence on their child's educational performance. Responses to a question about who gave the child the most encouragement towards achieving their personal goals were very similar. Children were asked who helped them with their homework in the last 12 months. Multiple mentions were allowed with mothers and fathers in the list of possible responses that were read out. Mothers were significantly more likely than fathers to help with homework in the last 12 months with similar percentages helping African (21%) and coloured (26%) children who lived with their mothers. Only 10% of African children who lived with their fathers reported that their fathers helped with their homework as opposed to 19% of coloured children who lived with their fathers. A small percentage (5%) of absent fathers helped coloured children and no absent fathers were reported to help African children.

Unfortunately there are a high percentage of don't know responses for the education and employment status of absent parents and it is unlikely that parents for whom information is missing are a random sample. It is therefore difficult to say anything about differences in the characteristics of resident and absent parents. In terms of co-resident parents' characteristics, racial differences between mothers are less pronounced than those between fathers. Co-resident mothers of African children have completed on average 8 years of education as opposed to mothers of coloured children who have completed 8.6 years of education. Co-resident fathers of

coloured children have on average completed almost two more years of schooling than co-resident fathers of African children. Interestingly there is very little difference between mothers' and fathers' education for coloured children. For African children co-resident fathers have completed about 1.2 years less education than co-resident mothers. Turning to employment, there are stark racial and gender differences. Fifty nine percent (59%) of co-resident mothers of African children are employed as opposed to 64% of co-resident mothers of coloured children. Eighty three percent (83%) of co-resident fathers of coloured children are employed as opposed to 75% of co-resident fathers of African children.

Non co-resident parents of coloured children are much more likely to live in Cape Town than non co-resident parents of African children. Fifty one percent (51%) of absent mothers and 35% of absent fathers of African children live in the Eastern Cape. One might expect outcomes for children with co-resident and absent parents to differ less if the absent parent lives close by. If this were the case the proximity of these absent parents to their children would imply smaller effects of co-residence for coloured children which is not borne out in the data.

Amongst all living parents African fathers are the least likely to co-reside with their children of school-going age. In stark contrast to coloured children, living with a father does not seem to be associated with better schooling outcomes for African children. Amongst all co-resident parents African fathers are the least likely to help with homework and have the lowest levels of education. Their employment levels are lower than coloured fathers but considerably higher than that of African and coloured mothers.

The evidence presented in this section is descriptive and largely suggestive. Further research is needed to understand the mechanisms through which parental death affects a child's schooling, and the racial differences in the impact of paternal presence on schooling outcomes.

9 Conclusion

African and coloured children in metropolitan Cape Town who have experienced parental loss are at risk of poorer schooling outcomes and these educational deficits persist into early adulthood. Longitudinal evidence from the CAPS supports the interpretation of Case and Ardington (2006) that mother's deaths have a causal impact on children's schooling outcomes. African and coloured children are 7 to 8 percentage points less likely to advance a grade in the years following a mother's death than in the years prior to her death. Also consistent with Case and Ardington (2006), we find no evidence of a causal effect of paternal loss on schooling for African children. For coloured children, however, the loss of a father has a significant and material negative effect on their education in both the cross-section and the panel. In the cross-section a substantial portion of the paternal death effect for coloured children is explained by socioeconomic status. This makes a causal interpretation of the longitudinal results for coloured paternal death somewhat less clear cut than those for maternal deaths.

We find no evidence of orphan recovery in the period following their parent's death and results suggest that negative impacts increase with the time since the parent died. The longer-run impact of parental death in childhood is also evident in an analysis of the completion of secondary schooling by early adulthood. Young adults who lost parents in childhood are significantly less likely to have completed secondary school. Together these results suggest that parental death will reduce the ultimate human capital attainment of the child.

Together, the KIDS, ACDIS and CAPS data allow for a more comprehensive body of empirical evidence on the causal impact of parental death. The estimates of the impact of parental death on schooling for African children from Case and Ardington (2006) using Africa Centre data from rural KwaZulu-Natal and from our work in this paper using CAPS data from urban Cape Town are entirely consistent with and of a similar magnitude to Ardington and

Leibbrandt's (forthcoming) nationally representative cross-sectional results. The consistency of these results suggest that the findings from Africa Centre and CAPS may be generalizable beyond the rural and urban field sites and that the biases introduced by comparing African orphans to children with whom they currently live in cross-sectional data may not be substantial. However, the pathways through with these negative impacts occur and then remain or worsen over time are very hard to nail down empirically.

Table A1: Parental death and schooling outcomes at ages 7-17: Wave 4 information assumed correct

	African			Coloured		
	Dependent variable:			Dependent variable:		
	Advancing a grade	Enrolment	Passing (conditional on being in school)	Advancing a grade	Enrolment	Passing (conditional on being in school)
	(1)	(2)	(3)	(1)	(2)	(3)
Mother deceased	-0.084	-0.081	-0.027	-0.061	-0.007	-0.065
	(0.036)*	(0.030)**	(0.029)	(0.038)	(0.029)	(0.036)+
Father deceased	0.004	-0.013	0.012	-0.068	-0.039	-0.046
	(0.024)	(0.019)	(0.018)	(0.035)+	(0.030)	(0.031)
Child fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21626	21953	19934	20514	20762	19043
Number of children	2064	2064	2058	1972	1972	1959

Notes to Table A1: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include a full set of indicators for age. In the event of conflicting information about parent's vital status between Wave 1 and Wave 4, the Wave 4 information is assumed to be correct. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Table A2: Regressions of years of completed education on indicators that mother and father are deceased for coloured children aged 8-17: Census 1996 and Census 2001

	Census 1996			Census 2001		
	Dependent variable: Grades successfully completed			Dependent variable: Grades successfully completed		
	(1)	(2)	(3)	(1)	(2)	(3)
Mother deceased	-0.356	-0.23	-0.18	-0.375	-0.242	-0.152
	(0.048)**	(0.048)**	(0.065)**	(0.038)**	(0.039)**	(0.053)**
Father deceased	-0.157	-0.048	0.031	-0.219	-0.13	-0.062
	(0.028)**	(0.030)	(0.049)	(0.023)**	(0.025)**	(0.040)
Household controls	No	Yes	No	No	Yes	No
Household fixed effects	No	No	Yes	No	No	Yes
Observations	65076	54700	65076	60562	50592	60562

Notes to Table A2: Standard errors that allow for correlation between unobservables for children in the same sampling cluster are presented in parenthesis below the coefficients. First column controls for child's age and sex. The second column also includes household controls: age, sex and education level of the household head, indicators for each of the 9 provinces, an indicator that the area is urban, logarithm of per capita household income, indicators that the household has access to a hygienic toilet facility, access to piped water and electricity the logarithm of household size, the fraction of residents who are less than 14 years old and indicators that there is a least one female/male resident who is age-eligible for the social pension. The third column estimates household fixed effects. Indicators that parent's vital status is missing included in all regressions. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Table A3: Parental death and progress through school for CAPS respondents born between 1985 and 1987 and re-interviewed in 2006

	African		Coloured	
	Dependent variable: Completed Grade 12 by 2006 or successfully completed 4 grades between 2002 and 2006		Dependent variable: Completed Grade 12 by 2006 or successfully completed 4 grades between 2002 and 2006	
	(1)	(2)	(1)	(2)
Mother deceased before 18	-0.179	-0.166	-0.114	-0.133
	(0.064)**	(0.065)*	(0.076)	(0.067)+
Father deceased before 18	-0.013	-0.004	-0.159	-0.042
	(0.050)	(0.051)	(0.057)**	(0.054)
Logarithm of per capita household income		0.03		0.138
		(0.032)		(0.028)**
Number of assets		0.021		0.032
		(0.010)*		(0.007)**
Logarithm of household size		-0.061		-0.109
		(0.064)		(0.065)+
Fraction of household under age 14		-0.058		0.205
		(0.166)		(0.141)
Pension age-eligible female		0.005		0.081
		(0.070)		(0.051)
Pension age-eligible male		-0.006		0.104
		(0.102)		(0.071)
Observations	549	549	661	660

Notes to Table A3: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include dummies for year of birth, an indicator that the respondent was born before July, an indicator that the respondent is female and indicators that parent's vital status is unknown. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Table A4: Parental death and socioeconomic status

	African					Coloured				
	Dependent variable:					Dependent variable:				
	Assets (2002)	Logarithm of per capita household income (2002)				Assets (2002)	Logarithm of per capita household income (2002)			
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Mother deceased (2002)	0.005	0.136				0.545	-0.131			
	(0.579)	(0.183)				(0.595)	(0.131)			
Father deceased (2002)	-0.433	-0.203				-1.278	-0.379			
	(0.318)	(0.118)+				(0.407)**	(0.110)**			
Mother deceased (2006)			0.018					-0.091		
			(0.128)					(0.109)		
Father deceased (2006)				-0.138					-0.218	
				(0.084)					(0.144)	
Father is co-resident (2002)					0.098					0.456
					(0.083)					(0.072)**
Observations	684	684	1462	1114	704	770	770	1520	1365	879

Notes to Table A4: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include dummies for year of birth, an indicator that the respondent was born before July, an indicator that the respondent is female and indicators that parent's vital status is unknown. The sample in columns 1 and 2 is restricted to CAPS respondents born between 1985 and 1987. The sample in column 3 is restricted to CAPS respondents who were re-interviewed in 2006 (Wave 4) and whose mother was alive in 2002 (Wave 1). The sample in column 4 is restricted to CAPS respondents who were re-interviewed in 2006 (Wave 4) and whose father was alive in 2002 (Wave 1). The sample in column 5 is restricted to CAPS respondents who were younger than 18 years of age and whose fathers were alive in 2002 (Wave 1). Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Table A5: Parental death and schooling outcomes at ages 7-17: missing data strategy 1

	African			Coloured		
	Dependent variable:			Dependent variable:		
	Advancing a grade	Enrolment	Passing (conditional on being in school)	Advancing a grade	Enrolment	Passing (conditional on being in school)
	(1)	(2)	(3)	(1)	(2)	(3)
Mother deceased	-0.076	-0.08	-0.018	-0.048	-0.017	-0.04
	(0.035)*	(0.027)**	(0.029)	(0.035)	(0.029)	(0.033)
Father deceased	0	-0.008	0.001	-0.116	-0.08	-0.082
	(0.024)	(0.019)	(0.017)	(0.032)**	(0.028)**	(0.026)**
Child fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22962	23310	21146	21473	21733	19945
Number of children	2151	2151	2147	2005	2005	2001

Notes to Table A5: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include a full set of indicators for age. All missing observations on parents' vital status have been replaced with zeros and regressions include indicators that mother's and father's vital status is unknown. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Table A6: Parental death and schooling outcomes at ages 7-17: missing data strategy 2

	African			Coloured		
	Dependent variable:			Dependent variable:		
	Advancing a grade	Enrolment	Passing (conditional on being in school)	Advancing a grade	Enrolment	Passing (conditional on being in school)
	(1)	(2)	(3)	(1)	(2)	(3)
Mother deceased	-0.081	-0.078	-0.029	-0.059	-0.022	-0.048
	(0.036)*	(0.030)*	(0.031)	(0.035)+	(0.031)	(0.034)
Father deceased	0.011	-0.004	0.009	-0.108	-0.074	-0.07
	(0.024)	(0.019)	(0.017)	(0.033)**	(0.029)*	(0.026)**
Child fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21613	21943	19921	20907	21155	19429
Number of children	2060	2060	2052	1975	1975	1966

Notes to Table A6: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include a full set of indicators for age. Where individuals were missing only one observation on parent's vital status, this observation was replaced with a zero and regressions include indicators that mother's and father's vital status is unknown. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Table A7: Parental death and schooling outcomes at ages 7-17: missing data strategy 3

	African			Coloured		
	Dependent variable:			Dependent variable:		
	Advancing a grade	Enrolment	Passing (conditional on being in school)	Advancing a grade	Enrolment	Passing (conditional on being in school)
	(1)	(2)	(3)	(1)	(2)	(3)
Mother deceased	-0.077	-0.079	-0.021	-0.073	-0.024	-0.062
	(0.038)*	(0.032)*	(0.031)	(0.036)*	(0.032)	(0.035)+
Father deceased	0.009	-0.004	0.009	-0.1	-0.066	-0.068
	(0.024)	(0.019)	(0.017)	(0.032)**	(0.029)*	(0.025)**
Child fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21147	21463	19493	20563	20807	19121
Number of children	1988	1988	1985	1929	1929	1926

Notes to Table A7: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include a full set of indicators for age. Individuals with parent's vital status missing for more than one observation were excluded from the sample.
Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Table A8: Parental death and schooling outcomes at ages 7-17: missing data strategy 4

	African			Coloured		
	Dependent variable:			Dependent variable:		
	Advancing a grade	Enrolment	Passing (conditional on being in school)	Advancing a grade	Enrolment	Passing (conditional on being in school)
	(1)	(2)	(3)	(1)	(2)	(3)
Mother deceased	-0.081	-0.075	-0.018	-0.059	-0.015	-0.063
	(0.043)+	(0.035)*	(0.031)	(0.046)	(0.041)	(0.044)
Father deceased	0.019	-0.004	0.023	-0.078	-0.043	-0.064
	(0.025)	(0.021)	(0.019)	(0.038)*	(0.031)	(0.036)+
Child fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20430	20732	18850	19594	19828	18235
Number of children	1913	1913	1910	1829	1829	1826

Notes to Table A8: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include a full set of indicators for age. Individuals with parent's vital status missing any observations were excluded from the sample.
Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

Table A9: Age at parental death and progress through school at ages 7-17: child fixed effects

	African	Coloured
	Dependent variable: Advanced a grade	Dependent variable: Advanced a grade
	(1)	(1)
Mother deceased	0.218	-0.082
	(0.133)	(0.111)
Mother deceased x child's age	-0.019	0.001
	(0.008)*	(0.008)
Father deceased	0.134	0.076
	(0.052)*	(0.072)
Father deceased x child's age	-0.009	-0.012
	(0.004)*	(0.005)*
Child fixed effects	Yes	Yes
Observations	21538	20807
Number of children	2060	1975

Notes to Table A9: Standard errors that allow for correlation between unobservables for young adults in the same sampling cluster are presented in parenthesis below the coefficients. All regressions include a full set of indicators for age. Estimates marked with two asterisks (**) are significant at the 1% level, those marked with one (*) are significant at the 5% level, and those marked with a plus sign (+) are significant at the 10% level.

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The Southern Africa Labour and Development Research Unit

The Southern Africa Labour and Development Research Unit (SALDRU) conducts research directed at improving the well-being of South Africa's poor. It was established in 1975. Over the next two decades the unit's research played a central role in documenting the human costs of apartheid. Key projects from this period included the Farm Labour Conference (1976), the Economics of Health Care Conference (1978), and the Second Carnegie Enquiry into Poverty and Development in South Africa (1983-86). At the urging of the African National Congress, from 1992-1994 SALDRU and the World Bank coordinated the Project for Statistics on Living Standards and Development (PSLSD). This project provide baseline data for the implementation of post-apartheid socio-economic policies through South Africa's first non-racial national sample survey.

In the post-apartheid period, SALDRU has continued to gather data and conduct research directed at informing and assessing anti-poverty policy. In line with its historical contribution, SALDRU's researchers continue to conduct research detailing changing patterns of well-being in South Africa and assessing the impact of government policy on the poor. Current research work falls into the following research themes: post-apartheid poverty; employment and migration dynamics; family support structures in an era of rapid social change; public works and public infrastructure programmes, financial strategies of the poor; common property resources and the poor. Key survey projects include the Langeberg Integrated Family Survey (1999), the Khayelitsha/Mitchell's Plain Survey (2000), the ongoing Cape Area Panel Study (2001-) and the Financial Diaries Project.

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