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Trends in teenage childbearing and schooling outcomes for children born to teens in South Africa

by

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Abstract

Teenage childbearing is considered a social problem with costs to the teenage mother, her child and society at large. In South Africa, media attention suggests a contemporary crisis in teen childbearing, often linking this to a fear that the Child Support Grant incentivises motherhood among teens. Despite these assertions, there is little empirical research assessing the trends in teen childbearing over time in South Africa and the intergenerational consequences of teenage childbearing. This paper uses six nationally representative household surveys to show that, while teenage childbearing decreased between 1980 and 2008, it is not an uncommon event in South Africa. Around 25% of women gave birth before age 20 in 2008. Children born to teen mothers are found to have worse educational outcomes, with children of young teen mothers most at risk. Differences are found between population groups, with the association is largest and increasing over time for coloureds and relatively small and stable for Africans. About half the association can be explained by relative levels of poverty and maternal education.

Keywords: Teenage childbearing, South Africa, National household survey data

JEL classification codes: I24 (Education and Inequality) J13 (Fertility, family planning, child care, child, youth)

Introduction

Teenage childbearing is generally considered a social problem with costs to the teenage mother, her child and society at large. Empirical research into the consequences of teenage childbearing in South Africa is accumulating, but due to data availability is not nationally representative with findings specific to certain regions of the country (Ardington et al. 2011; Ranchhod et al. 2011; Branson et al. 2011). In this paper we use birth history data from national household surveys spanning 14 years to estimate levels of teenage childbearing between 1980 and 2008 before estimating the association between being born to a teenage mother and education outcomes for children.

This paper makes two main contributions to the South African teenage childbearing literature. First, while Chimere-Dan (referenced in Makiwane 2010) documents rates of teenage childbearing over the same period, we present estimates of the proportion of women who gave birth before age twenty as well as the proportion of younger teen (under 18) versus older teen (18-19) mothers. Given that younger teens are found to be particularly at risk of poor outcomes (Ardington et al. 2011; Ranchhod et al. 2011), it is important to document this breakdown. The second contribution is to estimate at the national level the relationship between teenage childbearing and children's educational outcomes.

The prevalence of teenage childbearing in contemporary South Africa is high by developed world standards; in 2008 25% of twenty year old women had given birth to a child in their teens and 35% of children were born to a mother who first gave birth in her teens. Teenage childbearing has however declined over the last two decades with a particular decline in the proportion of women who gave birth before age 18. This presents an important shift in the risk profile of teen mothers and their children.

Children born to teens were found to be at risk of worse educational outcomes. African children born to teen mothers attained 0.1 of a year less education than children born to older mothers of similar socioeconomic status, although they were not found to be significantly more likely to drop out of school. The size of the disadvantage remained similar between 1994 and 2002. The teen mother deficit was much larger for coloureds than Africans and increased over time. While coloured children born to teens were an eighth of a grade behind in 1994, by 2008 they were a fifth of a grade behind. They were also more likely to drop out of school and the likelihood of dropping out quadrupled (3 percentage points to 12 percentage points) for coloured children born to teens over the period. The younger the teen mother at first birth, the higher the child's schooling deficit. Household-level controls for socioeconomic status explain close to half the disadvantage in educational outcomes for children born to teens. This suggests that while a large portion of the schooling deficit is explained by relative poverty, teenage childbearing is also directly associated with poorer schooling outcomes due to channels other than their worse socioeconomic situation.

The rest of this paper is organised as follows. Section 2 details some of the difficulties in measuring the impact of teenage childbearing, highlighting the strengths and limitations of the analysis in this paper. Section 3 presents the data and samples before documenting the levels and trends of teenage childbearing in South Africa. The main analysis on the

relationship between teenage childbearing and children's educational outcomes is in section 4. Section 5 further explores the decline in the association between teen childbearing and African children's outcomes between 2002 and 2008 and section 6 concludes.

Measuring the impact of teenage childbearing

It is generally agreed upon in the international literature that women who give birth in their teens are, prior to the birth of their child, on a disadvantaged life trajectory (see Hoffman et al. 1993 for a review of the literature). Hence, when comparing women who gave birth in their teens to those who did not, the full extent of the difference in observed outcomes should not be attributed to the teen birth itself. Stated more formally, teenage fertility is selective of women from worse socioeconomic backgrounds. While some studies (see Macleod 1999a and Macleod & Tracey, 2010 for two reviews of the South African literature) have documented the association between teenage childbearing and subsequent outcomes for South African mothers and children, there are only a few studies in South Africa that attempt to estimate the actual or causal impact of teenage childbearing (Ranchhod et al., 2011, Ardington et al., 2011 and Branson et al., 2011).

Unlike the international literature, the South African studies find that a difference in educational outcomes between teen mothers and their peers cannot be fully explained by pre childbearing characteristics. While socioeconomic status prior to the birth explains a portion of the difference in educational outcomes, especially for coloured teen mothers in urban Cape Town, part of the educational deficit is likely attributable to the teen birth itself. Even after controlling for socio-economic status, Ardington et al. (2011) find that teen mothers in rural Kwazulu-Natal are more likely to drop out of school and complete fewer grades than women who delay childbearing into their twenties. Ranchhod et al. (2011) similarly find an educational disadvantage for teen mothers in Cape Town. Given the high documented returns to schooling in South Africa (Keswell and Poswell 2004; Branson et al. 2009), this educational deficit will have consequences for future employment and earnings prospects and likely impact their children's outcomes.

An important part of the empirical literature on teen childbearing is the determination of the extent to which the measured teen disadvantage is actually attributable to socioeconomic disadvantages that precede childbearing. Interestingly, Ardington et al. (2011) find that only a small part of the basic association is explained by worse pre childbearing characteristics for Africans in rural KwaZulu-Natal. On the other hand, focusing on Africans and coloureds in urban Western Cape, Ranchhod et al. (2011) attribute a large portion of the basic association to pre childbearing characteristics.

Then there is a literature that focuses on the children of teen mothers rather than on the teen mothers themselves. There is little evidence of any educational disadvantage for children born to teenage mothers in Cape Town. While Branson (2011) finds some evidence of an association between being born to a teenage mother and worse educational outcomes for coloured children in Cape Town, she finds little evidence that children born to teen mothers have worse educational outcomes when compared to their siblings/cousins who

are born to older mothers¹. No association between teenage childbearing and worse educational outcomes is found for African children. This study is specific to urban Cape Town and the teen mother effect is identified off a sample of children born to teen mothers who have a sibling/or cousin resident in their household that is not born to a teen mother. In another study of Cape Town, Branson et al. (2011) assess the impact of teenage childbearing on child health outcomes. They use the longitudinal aspect of the Cape Area Panel Study (CAPS) to control for pre childbearing characteristics and find that, even after controlling for pre childbirth socioeconomic status, children born to teen mothers are more likely to be born underweight and to be stunted. The negative consequence on child health is found to be much larger for coloured children than African children.

Given the variation in findings in different regions and between different population groups of South Africa, there is a need to assess the national situation. In this paper we document the level of teenage childbearing in South Africa as a whole over a three decade period before investigating the association between teenage childbearing and educational outcomes for children born to teenage mothers. We use birth history data from six nationally representative household surveys. We use regression analysis to assess the relationships between educational outcomes, being born to a teen mother, household socioeconomic status and maternal education.

This exercise with national cross-sectional data is more limited than the causal analyses referenced above. However, this is not to say that the results have no value. To the extent that teenage childbearing impacts contemporaneous household characteristics and maternal education, the estimates from the models which control for household socioeconomic status and maternal education will be underestimates of the causal impact of teenage childbearing. Similarly, estimates from the model excluding the household and maternal education controls will overestimate the impact of teenage childbearing. Thus, assuming that variables omitted from the specification do not have a significant impact on the teenage coefficient, the causal impact is likely to fall somewhere between the two estimates which we provide in our work.

Data, sample, definitions and rates of teenage childbearing

The choices of data and samples were constrained by the need to classify women as teenage mothers versus older mothers and children, as either born to a teenager or not. Birth history data meet these requirements. Birth histories include all children, not only co-resident mother-child pairs. This allowed us to classify women as teen mothers if their first birth was in their teens and hence assess trends in teenage childbearing over a longer period of time. The data span 14 years (1994-2008) and therefore allowed for estimates of teenage childbearing since the early 1960s. Our analysis of the outcomes of children born to teen mothers is restricted to co-resident mother-child pairs, with the birth history data allowing us to classify these children as born to a mother who gave birth in her teens or not.

¹ A method used frequently in the teen literature to control for selection into teenage childbearing (Geronimus et al., 1993, 1994; Turley, 2003; Francesconi, 2008)

Definition of teenage motherhood and being born to a teenage mother

The word 'teenager' refers to a person aged from 13 to 19, but a girl of 15 and a young woman of 19 who give birth, are unlikely to have similar circumstances. One of the strengths of our paper is that we can be very clear about the age of the teen mother at first birth. This is important because very young teen mothers and their children are especially vulnerable (Ardington et al. 2011; Ranchhod et al. 2011). We define teenage mothers broadly - as women who gave birth before their 20th birthday - and then compare the outcomes of children born to younger teen mothers (those who gave birth before age 18), older teenage mothers (those who gave birth at 18 or 19) and mothers who gave birth between 20 and 21 to the outcomes of children born to mothers who were over 21 at the birth of their first child.

All children born to women defined as teenage mothers are classified as children born to a teenage mother, whether or not the specific child was born to the mother during her teens. By classifying children in this way, all children born to a teen mother are assumed to be affected by the teen birth, not only the child born during the mother's teens. Turley (2003) notes that this definition tests a different hypothesis to one which defines only children born during their mother's teens as children of teenage mothers. The latter definition which he calls the 'maternal maturity' hypothesis assumes that only those children born during the mothers teens will be affected by the teen birth since the impact of the teen birth is related to the maturity of the mother at the time of the birth. He refers to the former definition, the one used in this paper, as the 'systematic difference' hypothesis since all children born to a mother who gave birth in her teens are assumed to be systematically affected.

The data and samples

The analysis used data from six South African national household surveys which contain full birth histories. These were, the October Household Surveys (OHS's) in 1994, 1995, 1997, 1998, the General Household Survey (GHS) in 2002 and wave 1 of National Income Dynamic Study (NIDS) conducted in 2008.

Each survey was based on a two stage sampling design, with households the primary sampling unit². In all but NIDS, individual information was gathered at the household level. Therefore, the household respondent was asked to list all live births for each woman in the household and provided information on each child's date of birth, vital status, date of death (when applicable) and household membership. This strategy is clearly vulnerable to reporting error. However, in 1994 and 95 information on whether the mother was present when the interview took place was collected. In each year over 70% of mothers were reported to be present at the interview, suggesting that this type of reporting error may be less prevalent than if the majority of mother's were absent. NIDS birth histories were collected from the mother herself.

The surveys were pooled and two datasets constructed – a women level dataset and a child level dataset. The women level dataset consisted of all women aged 20-49 with childbirth information. For those who had given birth, complete birth history information was required in order to classify mothers as teen versus older mothers. The child level dataset

² See Branson (2011) Appendix A for further details on survey differences and matching of children on the birth histories to household roster information.

included all children under age 20 listed on the birth histories of women in the women level dataset. Individual survey weights were scaled to sum to one within each survey, such that when pooled each survey received an equal weight.

In section 4 we analyse the relationship between being born to a teenage mother and children's educational outcomes. Educational outcomes are assessed for children of school going age i.e. 7-19. We require child level information on schooling and household socioeconomic status. We therefore used a subset of the children sample discussed above; namely, those children that are co-resident with their mothers at the time of the survey and could be matched to individual information on the household roster³.

Table 1 present sample size information for the women and the full child samples. Using age and survey year, the year a women was turned 20 was calculated. For the women dataset, sample sizes are presented by the year the women was age 20. For the children dataset, sample sizes are presented by the child's birth year. Sample sizes are large until the 2000s, after which the overlap of the surveys used (2002 and 2008) is poor.

Table 1: Sample information and teen childbearing percentages

Woman sample:						
Year woman turned 20	1980-84	1985-89	1990-94	1995-99	2000-04	2005-08
# women 20-49	21794	23806	27821	14374	4299	861
% teen mothers	29.7	30.7	26.1	23.3	26.1	23.6
% young teen mothers (<18)	14.0	14.9	12.3	10.4	10.5	9.7
% older teen mothers (18-19)	15.6	15.8	13.8	12.9	15.7	14.0
Child sample:						
Child's birth year	1980-84	1985-89	1990-94	1995-99	2000-04	2005-08
# of children on birth histories	43119	52252	53983	24278	6788	1399
% born to teen mothers	42.7	41.9	40.0	38.8	37.2	35.4
% born to young teens (<18)	21.8	20.7	18.5	16.6	14.7	10.8
% born to older teens (18-19)	20.9	21.2	21.6	22.2	22.4	24.5

Notes to Table 1: The women sample includes all women aged 20-49 with complete birth history data. This requires that information on the date of birth of each of her children be complete or that she had not given birth. The child sample includes all children under 20 on the birth histories of mothers 20-49 who can be defined as teen or older mothers. Birth history data from OHS 1994-95, 97-98, GHS 2002 and NIDS 2008 used.

³ See Branson (2011) appendix A for details of the matching procedure.

Table 2 gives the size of the co-resident child sample in each survey year, categorized by mother's age at first birth and population group. The last row of Table 2 shows that between 75% and 93% of children are co-resident with their mothers at the time of the survey, with co-residency higher for coloureds than Africans and decreasing over time. The second last row of the table gives the number of children that were excluded from the analysis because they could not be matched to household information. The sample is large enough to permit analyses where the variable of interest is teen mother versus older mother or where mother's age at first birth is divided into four age categories: under 18, 18-19, 20-21 and over 21. Note however, that sample sizes in 2008 are small which affected the precision of the estimates in that year.

Table 2 –Sample for children's educational outcomes analysis by population group and survey year

	African						Coloured					
	OHS 1994	OHS 1995	OHS 1997	OHS 1998	GHS 2002	NIDS 2008	OHS 1994	OHS 1995	OHS 1997	OHS 1998	GHS 2002	NIDS 2008
Mother's age at first birth category:												
<18	3341	4231	4052	2397	2583	498	936	614	429	313	363	78
18-19	3049	3590	4045	2384	2780	758	1122	767	627	409	486	172
Children born to teen mothers	6390	7821	8097	4781	5363	1256	2058	1381	1056	722	849	250
20-21	3105	3729	3662	2328	2553	667	1061	805	623	337	493	141
>21	5877	6831	5123	3055	4071	1007	2053	1456	821	534	823	226
Children born to older mothers	8982	10560	8785	5383	6624	1674	3114	2261	1444	871	1316	367
Matched co-resident children (child education sample)	15372	18381	16882	10164	11987	2930	5172	3642	2500	1593	2165	617
Unmatched co-resident children	222	480	1617	1087	348	13	127	88	181	138	56	15
% co-resident	89.4	92.0	83.6	79.5	78.8	75.1	92.2	93.2	88.7	89.7	89.2	83.7

Notes to Table 2: Coresident children by survey and mother's age at first birth category. The second last row presents the number of children that were said to be resident on the birth history but could not be matched to household roster information. The last row shows the percentage of the child sample who were resident with their mother's at the time of the survey.

Birth history data are not without their limitations. They are particularly vulnerable to reporting error. Older, non co-resident and illegitimate children are more likely to be omitted from birth histories than younger co-resident children (Potter, 1977). Given that children born to mothers in their teens are more likely to have these characteristics, this could result in an underestimate of teenage childbearing. Births which took place furthest from the survey date are more likely to be omitted. We therefore display estimates post 1980 only. An additional concern is that estimating levels of teenage childbearing from birth histories assumes that there is no differential mortality between teen and older mothers. This assumption cannot be interrogated with these data. Ardington et al. (2011) find that over a six year period, teen mothers in Kwazulu Natal are 57 percent more likely to have died than non-teen mothers. If mortality is higher among teen mothers, then our estimates would underestimate the true prevalence of teenage childbearing in South Africa.

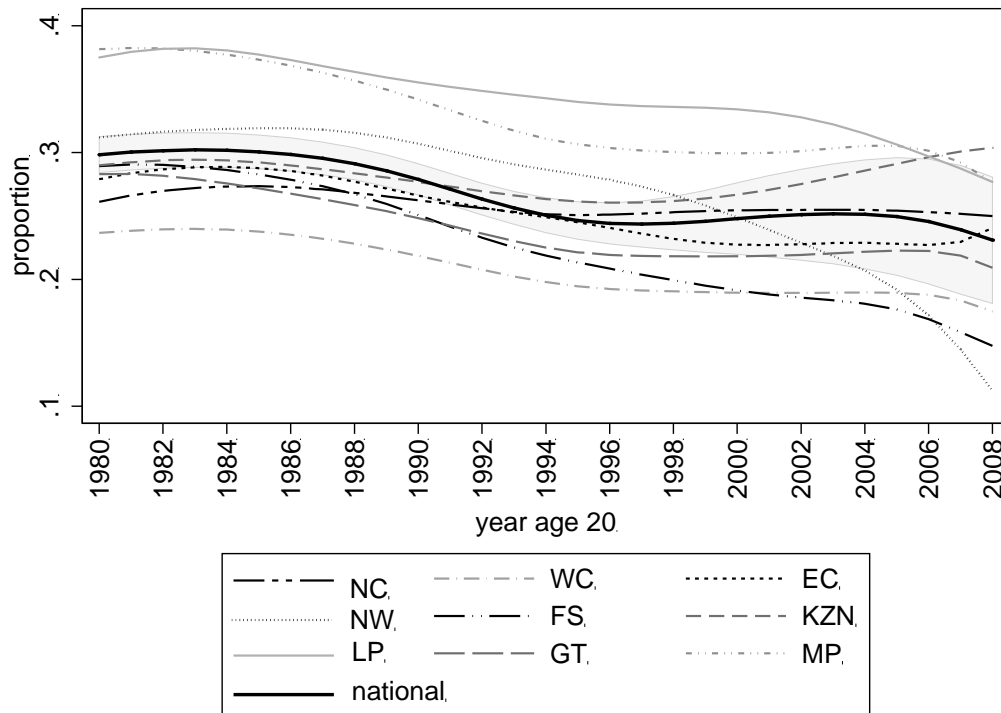
Levels and trends in teenage childbearing

Teenage childbearing has been decreasing over the last two decades. Figure 1 plots the proportion of women who gave birth during their teens by the year they turned 20. National and provincial estimates are presented. The greyed section represents the 95% confidence interval for the national estimates and shows that estimates post 2002 are less precise. This is a result of smaller sample size. Rows 3-5 of Table 1 present the corresponding point estimates to Figure 1, grouped into five year bands. In addition, estimates of childbearing to younger (under 18) versus older (18-19) teens are presented.

Teenage childbearing is high in South African by developed world standards (United Nations, 2008). Around a quarter of women gave birth before age 20. However, the majority of teen mothers gave birth in their late teens (18 and 19) and teenage childbearing has decreased. In 1985-89 over 30% of women gave birth during their teens. In 2004-08, the corresponding figure was 23%. Most of the decline took place in the late 80s and early 90s. The direction of the trend is consistent with that presented in Makiwane (2010) and Panday et al. (2009). Most of the decline can be accounted for by a decline in younger teenage childbearing. Table 1 shows that the percentage of women who gave birth before age 18 declined by a third (14% to 9.7%) between 1980-84 and 2005-08, while the percentage of women who gave birth at 18-19 remained more stable over the period (15.6% to 14.0%).

Over 35% of children are born to mothers who first gave birth in their teens. Table 1 shows that the proportion of children born to teens has also decreased over time, especially the proportion of children born to mothers who first gave birth before age 18. Over 40% of children born in the 1980s were born to teen mothers, 22% to young teens. This reduced to 35% by the mid 2000s, with only 10% born to women who first gave birth before age 18.

Figure 1: Trends in teenage childbearing by province



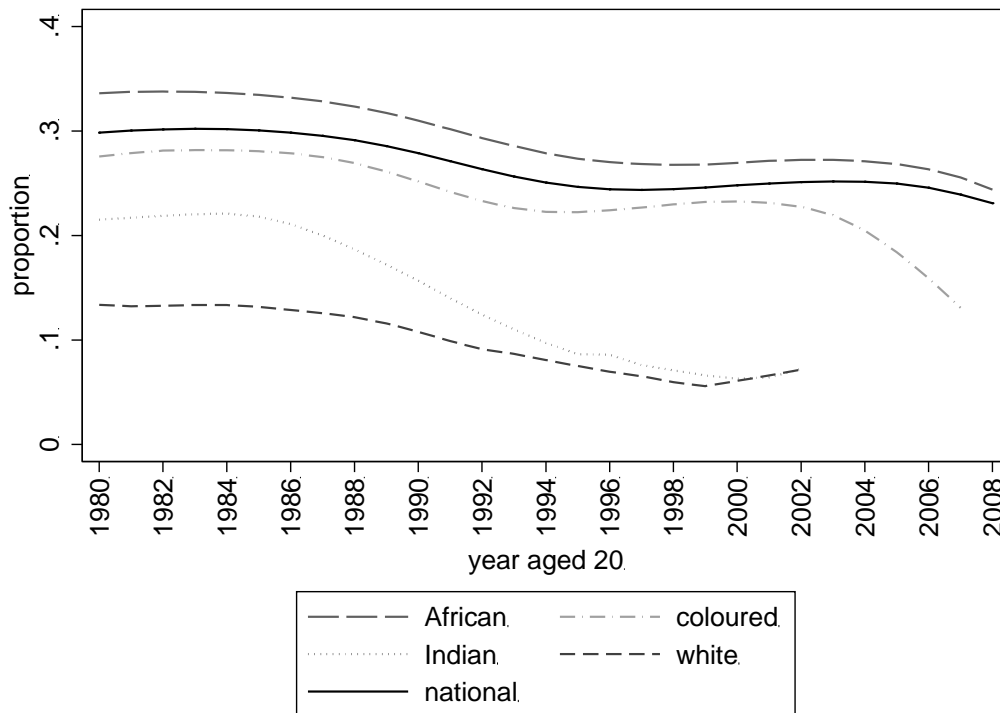
Notes to Figure 1: The figure plots the national and province proportions for women who gave birth in their teens by the year they were aged 20 using the women sample defined above. Western Cape (WC), Eastern Cape (EC), Northern Cape (NC), Free State (FS), KwaZulu-Natal (KZN), North West (NW), Gauteng (GT), Mpumalanga (MP) and Limpopo (LP)). The shaded section represents the 95% confidence band for the national estimates. Year aged 20 is defined as 20 minus age plus survey year. Estimates smoothed using a lowess smoother with a bandwidth of 0.4. Birth history data from OHS 1994-95, 97-98, GHS 2002 and NIDS 2008 used.

Figure 1 shows that there are large differences in levels and trajectories of teenage childbearing between the provinces. Mpumalanga and Limpopo, two provinces which are largely rural, have consistently higher levels of teenage childbearing than the other provinces. Most provinces show a decline in teenage childbearing over the last two to three decades with the exception of KwaZulu-Natal, which showed an increase and the North Cape where the level remained fairly constant over the period. The Western Cape had the lowest level of teenage childbearing until 2000, dipping below the 20% mark from the late 1990s onwards. Given the small samples post 2002, estimates at the province level in these years are unlikely to be precise.

Figure 2 presents the trend in teenage childbearing by population group. The shape of the African population group trend is similar to the national picture, but the level of teenage childbearing is slightly higher. During the 1980s, 34% of African twenty year olds gave birth to children in their teens. Since the early 1990s the level of teenage childbearing within the African population group has remained at around 30%. The level of teen childbearing for coloureds tracks the national trend at a slightly lower level until 2000, after which it

declines. The Indian population group exhibits a continuous and sharp decrease in teen childbearing from 1985 onwards. In 1985, 20% of Indian women gave birth in their teens, by 1995 this figure was down to 10%. Within the white population group, teenage pregnancy levels have remained low and fairly stable at around 10%, with marginal declines in the last two decades. Estimates post 2002 are unlikely to be precise given the reduced sample size from 2003 onwards.

Figure 2: Trends in teenage childbearing by population group



Notes to Figure 2: The figure plots the proportion of women who gave birth in their teens by the year they were aged 20 separately by population group using the women sample defined above. Year aged 20 is defined as 20 minus age plus survey year. Estimates are smoothed using a lowess smoother with a bandwidth of 0.4. Indian and white estimates post 2002 are excluded due to small sample size. Birth history data from OHS 1994-95, 97-98, GHS 2002 and NIDS 2008 are used.

In sum, these figures and table showed that a substantial proportion of South African women and children are affected by teenage childbearing and levels of teenage childbearing differ substantially between population groups and provinces, with higher prevalence among Africans and provinces where the population is largely rural. The proportion of women who gave birth during their teens has, however, decreased since the 1990s and much of the decrease is driven by a decline in births to women under 18. Given that young teen mothers are most vulnerable to poor outcomes (Ardington et al. 2011; Ranchhod et al. 2011), this shift is likely to have important implications for reducing the vulnerability of children born to teenage mothers over time.

The next section presents the analysis of the association between being born to a teenage mother and children’s educational outcomes. Figure 2 showed that levels of teenage

childbearing are low within the Indian and White population groups. This together with small Indian and white samples, motivated us to restrict the proceeding analysis to Africans and Coloureds. The analysis takes care to assess the association for different age groups of teenage mothers and to look for changes over time. In addition, maternal education and household resources are included to assess the extent to which they explain the association between teenage childbearing and children’s educational outcomes.

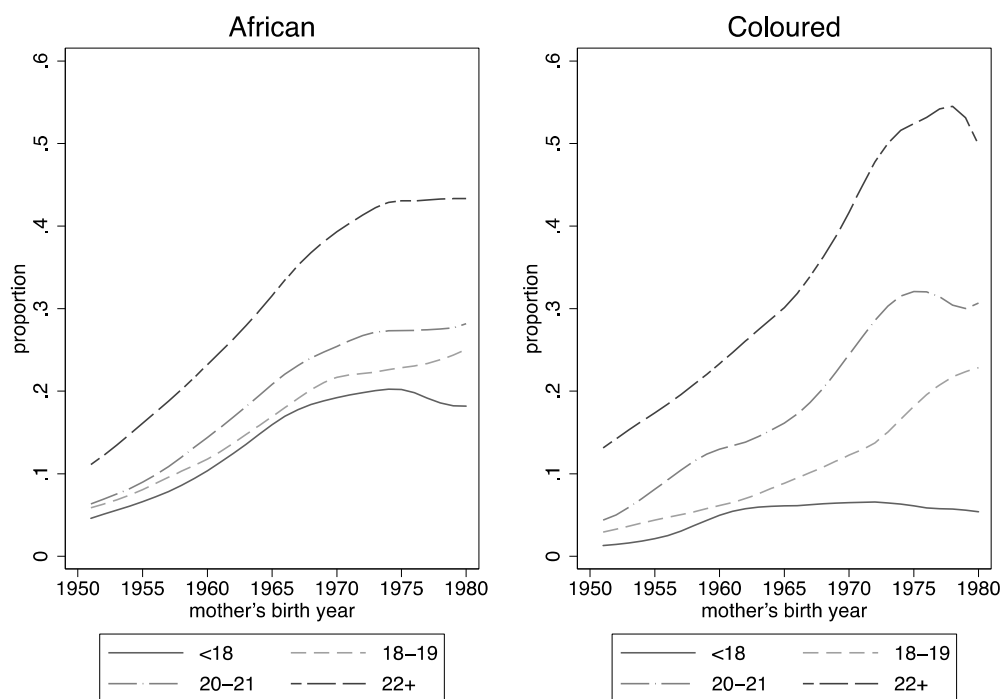
Education analysis

This section presents an analysis of the relationship between mother’s age at first birth and children’s educational outcomes. We start by comparing the education level of teen mothers and older mothers. Next we clarify the child outcome variables and models used in the analysis. The final section quantifies the association between teenage childbearing and children’s educational outcomes in a multivariate framework. Educational attainment and school dropout outcomes are assessed.

Teenage childbearing and maternal education levels

Ardington et al. (2011) and Ranchhod et al. (2011) document large educational deficits to teenage childbearing in two distinct sites in South Africa. While part of the deficit in educational attainment between teen mothers and older mothers can be attributed to pre childbirth characteristics, they attribute a significant proportion of the difference to the teenage birth itself. Figure 3 plots the proportion of women completing secondary school by mothers year of birth for mother’s who were young teens (<18), older teens (18-19), 20-21 and over 21 at the birth of their first child for African and coloured mothers.

Figure 3: Proportion of mothers completing matric by mother’s age at first birth category



Notes to Figure 3: The figure plots the proportion of women who completed matric who were under 18, 18-19, 20-21 or over 21 at the birth of their first child by the year they were born. The women sample defined above is used as the estimation sample. Estimates are smoothed using a lowess smoother with a bandwidth of 0.4. Data from OHS 1994-95, 97-98, GHS 2002 and NIDS 2008 used.

The pattern is clear; the longer mothers delayed their first birth the higher the rate of school completion. Over time the difference between the categories appears to have widened. For Africans, the proportion who complete school in the older childbearing category has widened compared to all other groups. For example, for mothers born in 1950, the difference between the oldest mothers and the youngest mothers is around 5%, for those born in 1980 it is over 20%. The difference between categories is even more distinct within the coloured group and has increased over time. The proportion of coloured young teen mothers who complete secondary school remains almost constant over time with the rate of increase over time increasing for each of the other categories of mother's age at first birth.

Children's educational outcomes

Two educational outcomes were assessed; highest education attained and school dropout. Educational attainment is an ordinal variable representing school grades (0-12)⁴. School dropout is an indicator variable taking on the value one if the child had not completed grade 12 and was not enrolled in school and zero otherwise.

Table 3 presents the mean level of educational attainment and dropout by mother's age at first birth category and child age categories. Children are grouped into age categories which broadly align with primary school (age 7-12), early secondary (age 13-15) and late secondary (age 16-19) school.

⁴ In the OHS 1994 and 1995 data, grades 1 through 3 were grouped together. These children were assigned grade one. The results reported below are not sensitive to whether these children are assigned grade 1, 2 or 3.

Table 3. Mean educational attainment and levels of dropout by mother's age at birth and child age categories

Highest education level									
Child's age group	All Children			African			Coloured		
	7-12	13-15	16-19	7-12	13-15	16-19	7-12	13-15	16-19
Mother's age at first birth									
<18	2.16	6.19	8.59	2.14	6.07	8.47	2.18	6.59	8.78
18-19	2.20	6.47	8.99	2.13	6.33	8.79	2.44	6.82	9.11
20-21	2.24	6.56	9.02	2.17	6.36	8.70	2.47	6.98	9.49
>21	2.31	6.70	9.29	2.23	6.41	8.77	2.39	7.01	9.63
Difference:									
>21 -<16	0.15	0.51	0.69	0.09	0.34	0.29	0.20	0.42	0.85

Dropout									
Child's age group	All Children			African			Coloured		
	7-12	13-15	16-19	7-12	13-15	16-19	7-12	13-15	16-19
Mother's age at first birth									
<18	0.10	0.04	0.17	0.10	0.04	0.14	0.12	0.06	0.43
18-19	0.09	0.03	0.14	0.09	0.03	0.11	0.08	0.06	0.32
20-21	0.08	0.03	0.12	0.09	0.03	0.10	0.08	0.04	0.26
>21	0.09	0.03	0.11	0.09	0.03	0.12	0.08	0.03	0.19
Difference:									
>21 -<16	-0.01	-0.02	-0.06	-0.01	-0.01	-0.03	-0.04	-0.03	-0.24

Notes to Table 3: The table presents the mean level of educational attainment and dropout by mother's age at first birth and child age categories. Weighted means are presented for the coresident children sample. Children are grouped into age categories which broadly align with primary school (age 7-12), early secondary (age 13-15) and late secondary (age 16-19).

Average educational attainment is lowest for children born to young teen mothers (under 18) and the difference between the groups increases with children's age. Overall, in the 7-12 age group the educational attainment difference between children born to mothers under 18 versus mothers over 21, is 0.15 of a grade. This increases to half (0.51) a grade for the 13-15 year olds and exceeds a third (0.69) of a grade for the 16-19 age group. The difference is largest within the coloured population group, where the aforementioned difference comes close to a full grade (0.85). There is less of a difference by mother's age at first birth category for African children. In addition, note that coloured children born to 20-21 year old mothers have higher education and lower dropout than children born to younger mothers but African children born to mothers aged 20-21 do not appear better off than children born to 18-19 year olds.

Similar evidence is presented for dropout; levels of dropout decline as the age of the mother at first birth increases. School dropout is far higher and the relationship with mother's age at first birth far stronger for coloureds than Africans; 43% of coloured children born to mother's under 18 dropped out of school before completing matric, compared to around

20% of children born to mother's over 21. For Africans, the similar comparison is 14% and 12%.

The table shows that a simple dichotomy of children born to mothers who gave birth before their twentieth birthday and those who gave birth at a later stage, obscures some important factors associated with teen childbearing. Children born to young teen mothers are particularly vulnerable to poor outcomes and, for coloureds, children whose mother's delayed childbearing into their early twenties had even better outcomes. This, in addition to the strong decline in the percentage of young teen births over time motivated us to include the specification that assesses the association between child outcomes and age of the mother at first birth.

The models

We estimate equations of the following two forms:

$$y_{ij} = \alpha + \beta T_{ij} + X'_{ij}\gamma + e_{ij} \quad (1)$$

$$y_{ij} = \alpha + \beta_1 M_{<18ij} + \beta_2 M_{18-19ij} + \beta_3 M_{20-21ij} + X'_{ij}\gamma + e_{ij} \quad (2)$$

y_{ij} is the educational outcome of child i in household j . In the first model, the child's outcome is modelled as a function of the mother's age at the birth of her first child where $T_{ij} = 1$ if child i 's mother ever gave birth in her teens and $T_{ij} = 0$ otherwise. In this model, β is the coefficient of interest and represents the association between having a teen mother and the outcome variable. In the second model, mother's age at first birth is split into four distinct categories; less than 18, 18-19, 20-21 and over 21. The model includes indicators for each of the first three categories. The reference category is children born to mothers who were over 21 at their first birth. In this case, the β_k 's are the coefficients of interest and represent the association between having a mother who first gave birth in age category k compared to one who delayed childbirth beyond age 21 and the outcome variable.

In addition to the variable(s) of interest, individual level controls (X) are included in both equations. The basic model without controls (X) includes child age dummy variables for each age, eight through 19 and an indicator for the gender of the child (male = 1). The reference category is therefore a seven year old female child. Models on the pooled data include survey year dummies. The regressions with explicit household controls include log per capita household expenditure (in all years except 1994 where this information was not available), indicators that the household has electricity and an internal piped water supply, the educational attainment of the household head and an urban dummy⁵. Given the rapid increase in educational attainment over time, an age standardised measure⁶ of mother's education is included in the regression as a control for maternal education. All models explicitly account for the survey design.

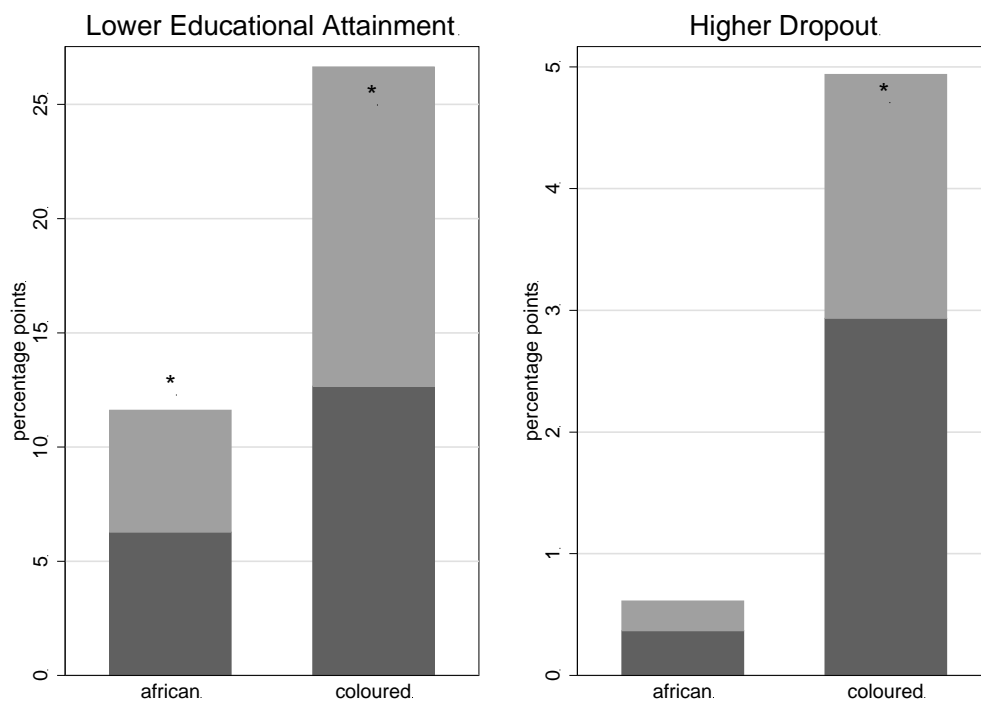
⁵ To reduce selection bias, missing values on the explanatory variables are coded as zero and missing indicator variables included in all regressions.

⁶ Within a survey year, the mothers of children born to teens will be younger. By subtracting the mean and dividing by the standard deviation, mother's education in the mother's birth year, mother's education is standardised.

The association between being born to a teen mother and children's schooling outcomes

Children born to teen mothers are behind their peers at school and are more likely to drop out before completing matric. Figure 4 presents the teen mother coefficients from the model 1 regression of educational attainment and school dropout for Africans and coloureds separately. Data from all survey years are pooled. The full bar represents the teen mother coefficient from the basic model including age, sex and year controls, the dark grey section represents the association after controlling for household socioeconomics. The * indicates that the teen mother coefficient is statistically significant.

Figure 4: Educational deficit of children born to teen mothers



Notes to Figure 4: The figure presents the teen mother coefficient from the regression for educational attainment and dropout. The full bar represents the teen mother coefficient from the basic model and the dark grey section represents the teen mother coefficient from the model including household controls. The basic model includes age, male and year dummies and the household model includes, in addition, controls for log per capita household expenditure (in all years except 1994 where this information was not available), indicators that the household has electricity and an internal piped water supply, the educational attainment of the household head and an urban dummy. The * indicates that the teen mother coefficient is statistically significant.

As expected from the descriptive figures, the strongest association between teen childbearing and children's education outcomes is found for coloured children. Children born to coloured teen mothers have a quarter of a year less education than children born to older mothers and are 5 percentage points more likely to drop out. The difference between the light and dark grey sections shows that a large portion of this association is a consequence of worse socioeconomic factors. Once household controls are taken into account, the association halves in size to an eighth of a grade and less than three percentage points with regards to drop out. The association is small within the African group but again about half of the measured difference can be attributed to differences in household socioeconomic status. African children born to teen mothers are 0.11 of a grade behind their peers born to older mothers and this association reduces to 0.06 of a grade

once household controls are taken into account. African children born to teens are not found to be more likely to drop out.

Table 4: Association between being born to a teenage mother and children’s educational outcomes by survey year for Africans and coloured

African														
	Educational attainment						Dropout							
	Basic		+HH controls		+Mother's educ	n	Basic		+HH controls		+Mother's educ	n		
	Teen		Teen		Teen		Teen		Teen		Teen			
	coeff		coeff		coeff		coeff		coeff		coeff			
OHS 1994	-0.120	**	-0.088	*	-0.103	**	15359	0.006		0.004		0.005		15359
OHS 1995	-0.133	***	-0.069	*	-0.087	**	18266	0.010	**	0.007	*	0.008	**	18266
OHS 1997	-0.123	***	-0.084	**	-0.076	**	16499	0.015	***	0.012	***	0.012	**	16443
OHS 1998	-0.126	***	-0.073	*	-0.075	*	9973	-0.001		-0.001		-0.001		9920
GHS 2002	-0.168	***	-0.092	***	-0.087	**	11902	0.011	**	0.007		0.007		11902
NIDS 2008	-0.042		0.036		0.058		2917	-0.006		-0.011		-0.013		2798

coloured														
	Educational attainment						Dropout							
	Basic		+HH controls		+Mother's educ	n	Basic		+HH controls		+Mother's educ	n		
	Teen		Teen		Teen		Teen		Teen		Teen			
	coeff		coeff		coeff		coeff		coeff		coeff			
OHS 1994	-0.252	***	-0.149	***	-0.124	**	5161	0.034	***	0.026	***	0.024	**	5161
OHS 1995	-0.249	***	-0.054		-0.041		3628	0.038	***	0.019	*	0.018	*	3628
OHS 1997	-0.191	**	-0.069		-0.038		2431	0.041	***	0.025	*	0.022		2429
OHS 1998	-0.274	***	-0.098		-0.074		1565	0.025		0.005		0.001		1563
GHS 2002	-0.339	***	-0.204	***	-0.188	***	2153	0.069	***	0.048	***	0.046	***	2153
NIDS 2008	-0.186	*	-0.200	*	-0.074		610	0.122	***	0.122	***	0.118	***	555

Notes to Table 4: Teen mother coefficient for each of the model specifications – the basic model, the model including household controls and the model including household controls and mother’s education presented for Africans and Coloureds separately. The basic model includes age and male dummies, the household model adds, in addition, controls for log per capita household expenditure (in all years except 1994 where this information was not available), indicators that the household has

electricity and an internal piped water supply, the educational attainment of the household head and an urban dummy and the mother's education model include an age standardised measure of mother's education. Estimates marked with three asterisks (***) are significant at the 1% level, those marked with two (**) are significant at the 5% level, and those marked with one (*) are significant at the 10% level.

Table 4 presents, for each survey year, the teen mother coefficients from the basic model, the model including household controls and the model including household controls and mother's education. As mentioned previously, to the extent that concurrent household characteristics and mother's educational attainment are impacted by the teen birth, the actual estimate is likely to fall somewhere between the basic model and the models including controls.

Focusing on the model including household controls, the association between being born to an African teen mother and worse educational attainment is small compared to the coloured coefficient and relatively stable between 1994 and 2002. In 2008 it becomes positive and insignificant. No clear pattern is evident for dropout. For coloureds, the teen mother deficit increases for both educational outcomes from 1995⁷ onwards. In 1995 coloured children born to teen mothers were 0.05 of a grade behind children born to older mothers and two percentage points more likely to dropout; by 2008 this had increased to a fifth of a grade and 12 percentage points. In addition, the percentage of the coloured teen coefficient explained by household socioeconomics declined over the period.

It is well established that parents and children's education is positively related. Yet, since teenage childbearing coincides with the completion of secondary schooling, the education of the teen mother is likely to be directly impacted by the birth (Ardington et al., 2011; Ranchhod et al, 2011). Thus while controlling for maternal ability (a characteristic exogenous to the timing of her initial childbearing) would reduce the selection effect, mother's educational deficit could, in addition, present an important channel through which the child's outcomes are affected. We could not disentangle this with these data. We were limited therefore to assessing the change in the teen mother coefficient once maternal education is included.

Including maternal education does not change the size of the teen mother coefficient significantly in most years. For coloureds, the size of the teen mother coefficient decreases in all years, while for Africans including a control for mother's education increases the teen mother coefficient in 1994, 1995 and 2008 and decreases it in 1997 and 2002. This suggests that for coloureds, part of the measured association between children's worse educational outcomes and being born to a teen mother can be explained by their mother's lower education, while the evidence is less clear for children born to African teens.

⁷ OHS 1994 does not include a household expenditure variable. Given that the teen coefficient is similar in 1994 and 1995 in the basic model, it is likely that the 1994 estimates in the household controls and mother's education models would have been similar to 1995 if we could control for this variable.

Table 5: Association between mother's age at birth and children's education outcome for Africans and coloureds

Educational Attainment						
	African			Coloured		
<i>Observations</i>	75,085	74,916	74,916	15,563	15,548	15,548
<i>Reference category : Children born to mother's over 21 at first birth</i>						
<18	-0.212***	-0.116***	-0.113***	-0.474***	-0.255***	-0.209***
	[0.029]	[0.027]	[0.028]	[0.063]	[0.061]	[0.057]
18-19	-0.082***	-0.034	-0.043*	-0.198***	-0.073	-0.046
	[0.025]	[0.024]	[0.024]	[0.049]	[0.048]	[0.046]
20-21	-0.077***	-0.045*	-0.056**	-0.124**	-0.029	-0.028
	[0.027]	[0.026]	[0.026]	[0.054]	[0.050]	[0.049]
HH controls		yes	yes		yes	yes
Mother's education			yes			yes
Dropout						
	African			Coloured		
<i>Observations</i>	74,855	74,688	74,688	15,504	15,489	15,489
<i>Reference category : Children born to mother's over 21 at first birth</i>						
<18	0.011***	0.007*	0.007*	0.077***	0.053***	0.048***
	[0.004]	[0.004]	[0.004]	[0.013]	[0.013]	[0.012]
18-19	-0.004	-0.006	-0.005	0.034***	0.017**	0.014*
	[0.004]	[0.003]	[0.003]	[0.008]	[0.008]	[0.008]
20-21	-0.007**	-0.007**	-0.006*	0.007	-0.004	-0.004
	[0.003]	[0.003]	[0.003]	[0.008]	[0.008]	[0.008]
HH controls		yes	yes		yes	yes
Mother's education			yes			yes

Notes to Table 5: The table presents coefficients and standard errors (in brackets) from regressions of highest educational attainment on indicators for mother's age at first childbirth category. The basic model includes age, male and year dummies, the household model adds, in addition, controls for log per capita household expenditure (in all years except 1994 where this information was not available), indicators that the household has electricity and an internal piped water supply, the educational attainment of the household head and an urban dummy and the mother's education model include an age standardised measure of mother's education. Estimates marked with three asterisks (***) are significant at the 1% level, those marked with two (**) are significant at the 5% level, and those marked with one (*) are significant at the 10% level.

Next we assess the relationship for children born to young teen mothers (less than 18), older teen mothers (18-19) and early twenties mothers (20-21) relative to mothers who delayed childbearing to beyond 21. Table 5 presents the association between children's education outcomes and timing of childbearing, for each of these age categories. The reference category is children born to mothers who were over 21 at the birth of their first child.

Children born to young teen mothers are most at risk of poor educational outcomes. In fact, the coefficient on educational attainment for children born to mother's under 18 is double the size of that presented in Figure 4. Children born to coloured young teen mothers are a quarter of a grade behind their peers, after controlling for household socioeconomic status. Similarly African children born to young teens are an eighth of a grade behind. Interestingly, once household socioeconomic status is controlled for, children born to mothers who were 18-19 at the birth of their first child are not significantly behind in their grades. For dropout, a similar, although less consistent picture is evident. African children born to young teens have the highest risk of dropping out and children born to 18-19 are no more likely to dropout than children born to mothers over 21. For coloureds, children born to both younger and older teens have a higher risk of dropping out, with children born to young teen mothers being most likely to drop out.

The results show that children born to teenage mothers are at risk of worse educational outcomes. While about half of this deficit can be explained by socioeconomic status, a significant deficit remains unexplained. The educational attainment deficit is larger for coloureds than Africans. In addition, the deficit has increased for coloureds over time, while it appears to have remained fairly stable, if not decreased for Africans. The age at which teenagers give birth is important. Children born to young teenage mothers are most at risk, while children born to mothers aged 18 and 19 do not appear to be particularly vulnerable to worse outcomes when compared to children born to mothers over 21 of similar socioeconomic status.

The shift between 2002 and 2008

One of the contributions of this paper is to document the change in the relationship between being born to a teenage mother and child educational outcomes between 1994 and 2008. Table 4 showed a decrease in the association between being the child of a teen mother and educational attainment between 2002 and 2008 for Africans. Children born to African teen mothers are no further behind in their grades when compared to children born to older mothers in 2008, while in 2002 they were 0.1 of a grade behind.

The years 2002-08 were a period of substantial social change, one in which educational attainment improved rapidly and state social support increased substantially in both coverage and amount. We investigate whether the difference between 2002 and 2008 represents a general trend by expanding the data used in the analysis to include data from the General Household Surveys between 2003 and 2007. These surveys do not include full birth histories but identified the mother of each child in the household. Thus while we cannot identify whether a child's mother ever gave birth in her teens, we can identify children whose mothers gave birth to them during their teens. The definition of having a teen mother is therefore different in this section; children must themselves be born during the mother's teens to be classified as a child of a teen mother. A similar definition of teen motherhood was constructed in the OHS 1995, 1997, 1998 and NIDS 2008 data to make estimates comparable over time.

Table 6: Educational attainment - Investigating the break between 2002 and 2008 using born to a teen mother where teen mothers defined as women who gave birth before the age of 20

Year	All			African only			Coloured only		
	Coefficient	Std Err.	Obs	Coefficient	Std Err.	Obs	Coefficient	Std Err.	Obs
OHS 1995	-0.153***	[0.039]	21070	-0.155***	[0.042]	17532	-0.087	[0.083]	3538
OHS 1997	-0.182***	[0.037]	18441	-0.186***	[0.040]	16063	-0.146	[0.107]	2378
OHS 1998	-0.180***	[0.050]	11513	-0.188***	[0.055]	9993	-0.13	[0.122]	1520
GHS 2002	-0.147***	[0.038]	14789	-0.144***	[0.041]	12716	-0.178**	[0.090]	2073
GHS 2003	-0.143***	[0.043]	17718	-0.121***	[0.046]	15371	-0.357***	[0.117]	2347
GHS 2004	-0.076*	[0.042]	17374	-0.061	[0.046]	15083	-0.272***	[0.091]	2291
GHS 2005	-0.085*	[0.046]	19401	-0.074	[0.050]	16435	-0.159*	[0.087]	2966
GHS 2006	-0.047	[0.043]	18572	-0.04	[0.048]	15755	-0.152	[0.130]	2817
GHS 2007	-0.090*	[0.050]	18905	-0.046	[0.043]	16016	-0.353***	[0.109]	2889
NIDS 2008	0.075	[0.068]	3803	0.08	[0.074]	3152	0.057	[0.169]	649

Notes to Table 6: Coefficients and standard errors (in brackets) from regressions of highest educational attainment on an indicator that child's mother was a teen at the child's birth, presented. Sample restricted to children aged 6 to 20. Regressions control for the child's age, sex, log per capita household expenditure, indicators that the household has electricity and an internal piped water supply, the educational attainment of the household head and an urban dummy. Estimates marked with three asterisks (***) are significant at the 1% level, those marked with two (**) are significant at the 5% level, and those marked with one (*) are significant at the 10% level.

Table 6 presents the teen coefficient from the model specification including household controls. The teen coefficient is negative, large⁸ and statistically significant until 2003, decreasing marginally between 1998 and 2003. Between 2003 and 2004 the size of the coefficient halves and it is no longer statistically significant in 2004. From 2004 to 2007 the coefficient is negative but small and insignificant.

⁸ Note that the teen mother coefficient is larger than that observed in Table 4. This is a result of the different definition of being born to a teen mother. In fact, with the exception of 2008, if the sample in the main analysis is restricted to firstborn children, the size of the teen mother coefficient increases in comparison to estimates using the full sample. Conversely, restricting the sample to children of higher birth order decreases the teen mother coefficient. This suggests that, while all children born to teen mothers appear to be at risk of worse educational outcomes, the child born during the mothers' teens is most severely affected. Thus, given that most children born to teen mothers are the firstborns the size of the teen mother coefficient in the main analysis could possibly be an underestimate of the true associations.

Conclusion

In this paper we use a series of nationally representative household surveys in order to investigate the trends in teen childbearing over the post-apartheid period. While the proportion of women who gave birth in their teens has decreased over the past few decades, 25% of women gave birth before aged 20 in 2008. Thus teenage childbearing remains high in South Africa. There are large differences between provinces and population groups. Africans and more rural provinces have higher teen childbearing levels. In addition, large proportions (35%) of children are affected by teenage childbearing. That being said the age composition of women giving birth in their teens has changed over time, with the proportion of young teen mothers decreasing substantially. Only 10 % of births in the mid 2000s were to mothers who first gave birth before age 18. Given that young teen mothers and their children are particularly at risk of poor outcomes, this represents a positive change.

Children born to teen mothers are at risk of lower educational attainment and are more likely to dropout of school. Children born to young teen mothers are particularly at risk. About half of the mean association can be explained by relative levels of poverty and maternal education. The relationship between teenage childbearing and educational attainment is much larger for coloureds than Africans. In addition, the association is increasing for coloureds and decreasing for Africans over time.

Much interest has been voiced in the media around the potential exploitation of the Child Support Grant (CSG) by teenage mothers (Weaver, 2008; de Vries, 2010). Makiwane (2010) shows that there is no evidence of an increase in teenage childbearing coinciding with the introduction of the CSG. What has not been investigated is whether the CSG has a protective effect for children born to teen mothers. In other research, the CSG has been found to be associated with increased school attendance, improved child health and nutrition and more money available for school fees and uniforms (Case et al, 2005; Aguero et al, 2007). While our data do not support an analysis of whether the decrease in association between teen childbearing and educational outcomes for Africans between 2002 and 2008 is related to the rollout and increased amount of the grant, this is something that would be interesting to investigate. It is possible that the CSG could have a protective role for the educational attainment of children born to teenage mothers. If this is the case, low take up of the CSG, especially among young mothers (Makiwane, 2011), would be a place for policy intervention.

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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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