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old-age pension programme in South Africa

by

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Unconditional cash transfers and children's educational outcomes: Evidence from the old-age pension programme in South Africa*

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Abstract: We use longitudinal data from three waves of South Africa's National Income Dynamics Study to estimate the effect of pension receipt in the household on children's educational outcomes in South Africa. We find that children who co-reside with a pensioner achieve better educational outcomes than those who do not, while controlling for a wide number of individual and household characteristics. In particular, we find that the sex of the pension recipient matters - the positive impact on a child's progression through school is greater if a female, rather than a male, receives the pension. We explore some of the possible mechanisms behind this, including differential school absenteeism rates and differential spending on non-fee schooling expenses.

Keywords: Social grants, education, South Africa

JEL Classification Codes: H55, I38, D13

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1 Introduction

Improving education has long been viewed as one of the most effective ways of encouraging growth and alleviating poverty in developing countries. Education enables greater productivity which improves access to employment opportunities. More specifically, Duflo (2012) shows how improving female education can lead to multiple positive externalities. Recent literature has assessed the potential for conditional and unconditional cash transfers to improve children's education outcomes by relieving adults of credit constraints (Attanasio et al., 2005; Adato and Bassett, 2009; Barrera-Osorio et al., 2011) . This has been particularly successful in the PROGRESA (later Oportunidades) programme: a conditional cash transfer scheme in Mexico, and Bolsa Escola (later Bolsa Familia) in Brazil.

This study seeks to explore whether unconditional cash transfers improve the educational attainment of school learners in South Africa, as measured by years of education achieved and rate of progression through school. In order to do so, we will make use of the Old Age Pension Programme (OAPP) as a cash transfer offered to eligible elderly South Africans. The exogeneity of the age-eligibility criterion of the OAPP can be exploited: with age informing pension receipt, an exogenous source of income to households is available. Analysis of whether the receipt of this income by households improves education levels of co-resident children can illuminate whether households are credit constrained. It appears that this is the case, particularly in female-eligible households where pension receipt is shown to improve education outcomes for girls.

The central research question of the study: does pension receipt improve co-resident children's education outcomes? A second question will look at whether the gender of the pension recipient affects the outcomes resulting from the OAPP, as well as whether girl or boy children stand to gain more from living with a pension recipient. While much of the literature has focused on household composition, labour supply and health outcomes, little has been done to assess the impact of the OAPP on children's education. This study contributes to the existing research by assessing how pension receipt alters education outcomes for co-resident children of recipients.

This study is organised as follows - Section 2 provides an overview of the literature incorporating intra-household resource allocation, education policy and analysis of the OAPP. Section 3 presents an overview of the OAPP, while a simple model of educational choice faced by adults investing in children's education is outlined in Section 4. Section 5 reports the data used and summary statistics for the sample of school children. The empirical methodology is given in Section 6.1 together with OLS regression analysis. This is followed by an extension into a fixed effects framework in Section 6.2, while potential mechanisms are highlighted in Section 7. Section 8 provides some concluding remarks.

2 Literature Review

Thinking about improving educational policy requires understanding the decision-making process which governs individuals' investment in education. This process generally involves two parties: adults, usually in the form of relatives, and learners themselves. Resident adults make schooling decisions for children in the household, and these are motivated by two primary factors. First, adults' value on education is based on individual-specific preferences. Second, education is an investment in a child's future earnings from which parents or relatives may derive positive utility. Thus, the adult's utility is a function of the child's schooling attainment and expected future earnings (Duflo, 2011).

On the other hand, children's desire to attain education is based on three factors. Children are motivated to enrol in school by the current utility that is provided to the family by sending children to school (Attanasio et al., 2005). Learners will also see education as an investment in future opportunities. Finally, children's schooling decisions depend on their ability and motivation, and school quality (Case and Deaton, 1999). This study will limit itself to the decision-making processes of adult relatives. Ultimately the decision by the adult is the most important. Without adult investment in education, a child will be unable to attend school, so the child's motivation is seen as a secondary factor in predicting schooling outcomes.

A number of policies have used the provision of cash transfers in an attempt to improve society's education outcomes. The most prominent contemporary example from a developing country is the PROGRESA/Oportunidades programme in Mexico. The programme aims to increase human capital accumulation through the provision of conditional cash transfers. These transfers are given to poor mothers conditional on their child's school enrolment and attendance. Behrman et al. (2005) find that the provision of these transfers increases educational attainment by 0.7 years, on average, and enables 21% more children to attend secondary school.

South Africa's oldest and most widely-studied cash transfer programme is Old Age Pension Programme (OAPP). Analysis of the impact of the OAPP has found that it affects household composition, labour supply, health status and educational outcomes (Burns et al., 2005). Pension receipt is seen to have different effects on employment in different studies. Bertrand et al. (2003) observe a decrease in the labour supply of prime-age individuals in response to the receipt of a pension by a co-resident. By contrast, Ardington et al. (2009) and Posel et al. (2006) find that prime-age individuals increase their labour supply in response to the receipt of pension income. Reasons given for this are lessening both the credit and childcare constraints on adult parents, thereby allowing them to migrate for work. Household composition has also been shown to change as the receipt of a pension increases household income (Edmonds et al., 2005).

Further studies have found improvements in education and health outcomes associated with pension receipt. Duflo (2000, 2003) finds large positive effects on the health and nutrition of children. Case (2004) finds that the impact can be wider reaching: health benefits can be

amplified for all household members if income is pooled. Pension receipt can improve the probability of school attendance in children. Rural children living with a pensioner are 8-10% more likely to attend school than those with elderly co-residents who are nearly age-eligible for pensions (Edmonds, 2006).

Another theme in the literature suggests that the efficiency of public transfers may depend on the gender of the recipient. If men and women make different decisions, providing one gender with increased resources can alter outcomes for households (Quisumbing and Maluccio, 2000). Edmonds (2006) observes increased school attendance of 18% for boys who live with a male pensioner, while no effect is found for girls. This is contrasted with the work of Duflo (2003) which finds that pensions received by women improve health outcomes for granddaughters. Burns et al. (2005) concur that female pensioners are more likely to distribute their pension income. If outcomes differ depending on the gender of the recipient, there may be room for policy to target a particular gender to bring about certain outcomes.

Research conducted on education outcomes in the South African context has suggested that households face credit constraints in supporting co-resident children's schooling. Arington et al. (2011) find household income to be a significant determinant of grade advancement amongst Grade 8 and 9 learners in the Cape Town metropolitan area. Branson et al. (2014) also find evidence of a relationship between school dropout and credit constraints using the National Income Dynamics Study (NIDS): a 10% increase in school fees is found to raise the probability of dropout by 5 percentage points, while an increase in household income of 10% is associated with a reduction in likelihood of dropout by 12 percentage points. These effects are found to be stronger for male children. Timæus et al. (2013) find that most educational disadvantages faced by African children in South Africa can be attributed to household poverty and limited education of the child's mother.

These findings support the hypothesis that household income is a significant determinant of children's education outcomes. This would suggest that the receipt of a cash transfer such as the pension would lessen this constraint, and would impact favourably on children's education. If pensions are able to improve education outcomes, it would demonstrate that a monetarily small transfer to the poor can have far-reaching consequences for the South African economy. There are a number of characteristics of the OAPP that are useful for economic analysis. These, along with a brief history of the programme, are outlined in the following section.

3 The Old-age Pension Programme

The Old-Age Pension Programme (OAPP) has been in place in South Africa since 1928. Only in 1993 was an equal, and non-contributory, amount granted to all pension-eligible South Africans.¹ The pension is granted on the basis of two criteria. The first is age: in 2008,

¹During apartheid, different means tests were applied to each population group. Benefits to whites were much greater than those to Africans and the general distribution of pensions was more efficient for whites' pensions

male recipients needed to be at least 65 and females at least 60. This changed to the age of 60 for both genders in 2010. Second, potential recipients are means-tested.² Since this policy targets the poorest households, it forms an important role in addressing the inequality and poverty brought about by apartheid (Lund, 1993). The pension in 2008 - the first year of the data used in this study - amounted to R940 per month. This is substantial, given that households with a pensioner in that year had a median household monthly income of R1 790.³

Based on its ability to reach the poor, Case and Deaton (1998) term the transfer a ‘social pension’. For households in lower income quintiles, remittances and social pensions form a far larger share of household income than in richer households (Leibbrandt et al., 2000, 2013). Further, it is noted that the receipt of a pension is associated with increased household size and changes in household composition (Edmonds et al., 2005). The majority of recipients form part of multi-generation households. Thus, the effects of the pension extend beyond the direct recipient, allowing for the transfer of income to co-residents in general, and children in particular.

Three important attributes of the OAPP make it particularly useful for analysis. The use of the pension to evaluate educational outcomes can alleviate some endogeneity concerns as it is a source of unearned income (Bertrand et al., 2003; Duflo, 2000, 2003; Case and Deaton, 1998). This assumes that behaviour in the time prior to pension receipt is not affected by anticipation effects. Second, neither the activities of the children, nor their presence influences pension eligibility on the basis of age. Thus, there is no incentive to change household composition or household activities to become pension eligible (Edmonds, 2006). Additionally, it is common for grandparents to reside in the same house as their grandchildren in African households in South Africa. This means that pension receipt is likely to have some effect on co-resident grandchildren.

Pension provision in South Africa has an interesting gender dimension. Case and Deaton (1998) find that the pension reaches three times more women than men, though the ratio had dropped to about 2 by 2011, partially driven by an equalisation of the age eligibility criterion for women and men. Comparing outcomes on the basis of the gender of the recipient can illuminate the different decision-making processes undergone by men and women. Before turning to the data and analysis sections, it is useful to formalise the process by which decisions about educational investment are made. The following section presents a simple household model of education choice.

(Lund, 1993). These factors culminated to reduce the extent of the reach of the pension to African households in South Africa during the apartheid period.

²Eligible recipients income and assets need to be sufficiently low to be granted a pension.

³This number is total monthly household income in 2008 that excludes imputed rent from owner-occupied housing, and income from subsistence agricultural activities.

4 A Model of Educational Choice

A simple model of educational choice is constructed in order to understand the decision-making process facing adults when choosing to invest in a child's education. This will provide a framework in which the effect of pension income on co-resident children's education outcomes can be assessed.

Adult utility is a positive function of the consumption of all (non-educational) goods and services ($f(\mathbf{g})$), the child's expected future earnings (y), various taste shifter variables (\mathbf{z}), and a negative function of the cost associated with schooling the child (S):

$$U(\mathbf{g}, y, S, \mathbf{z}) = f(\mathbf{g}) + k \ln(y) - h(S) + c(\mathbf{z})$$

Adults expect to receive or benefit from proportion k of the child's future income. The cost of schooling is given by function $h(S)$ which is inclusive of both explicit and implicit costs. Explicit costs are likely to include school fees, textbooks and stationery, uniforms and transport, while implicit costs are the forgone wages which a child could have earned in employment. The final term $c(\mathbf{z})$ is a vector of individual preferences and characteristics.⁴ Each component of the adult's utility function is decomposed as follows:

$$h'(S) = r + \phi(S)$$

$$c(\mathbf{z}) = p + qS$$

$$\ln(y) = a + bS$$

Each additional year of schooling, $h'(S)$, is shown to have a fixed and variable cost component (Duflo, 2011).⁵ Similarly, the taste shifter variables are allowed to vary for different number of years of schooling. It may be the case that some individuals recognise higher educational attainment as being more important than others. Finally, the logarithm expected income, $\ln(y)$, is comprised of two parts. The first part (a) can be viewed as a minimum wage, or the wage associated with zero education. The second part (b) is the return to each additional year of schooling.

The objective function can be written as follows. Note that all income is spent on schooling, $h(S)$, or other goods, $f(\mathbf{g})$ which are purchased at prices given by vector \mathbf{p} .

⁴These may include the adult's background, education, age, race, location and various community variables (Attanasio et al., 2005).

⁵This reasoning by Duflo (2011) suggests that schooling costs follow a parabolic functional form such that each additional year of education is more expensive than the previous one for $r, \phi, S > 0$. This seems sensible given that both monetary and opportunity costs rise with increased schooling.

$$\begin{aligned} \max U(y, S, \mathbf{z}) &= f(\mathbf{g}) + k \ln(y) - h(S) + c(\mathbf{z}) \\ \text{s.t.} \quad h(S) + \mathbf{p}\mathbf{g} &= m \end{aligned}$$

Taking the first order condition of utility with respect to years of schooling gives:

$$\begin{aligned} \frac{\partial U}{\partial S} &= kb - r - \phi S + q = 0 \\ S^* &= \frac{kb - r + q}{\phi} \end{aligned}$$

The optimal amount of the child's schooling is increasing in the proportion of expected income benefiting the adult (k); the returns to education (b) and the adult's preferences towards an additional year of schooling (q). Schooling is decreasing in both fixed (r) and incremental (ϕ) costs to schooling. This suggests that schooling outcomes are driven by three major components: income or access to credit to cover costs to schooling; expectations around returns to education and the extent to which adults will benefit from those returns; and the adult's regard for education. Although public schooling is provided for free to children in South Africa, findings by Ardington et al. (2011) and Branson et al. (2014) support the hypothesis that households face credit constraints in enabling co-resident children access to education. Specifically, Ardington et al. (2011) find that grade advancement in post-secondary education is strongly positively associated with household income. This suggests that despite free access to schooling, credit constraints are present in selecting the optimal amount of schooling S^* .

According to this model, an increase in income, as in the case of pension receipt, relaxes the budget constraint by increasing m . If education is a normal good, then one would anticipate a resultant increase in investment in education. If this is found, it would suggest that part of children's failure to obtain higher levels of education is due to credit constraints.

Although the model provides some simple results that can be tested empirically, we relax two of the underlying assumptions: first that the utility function is identical for different genders insofar as men and women face the same utility maximisation problem, and second that the expectations of and attitudes towards the education of boys and girls are the same. If child schooling decisions differ for males and females post pension receipt, then the first assumption does not hold. This would suggest that men and women have different preferences over optimal schooling S^* for co-resident children. If it is found that spending on education varies by the gender of the child, then the second assumption also fails.

5 Data and Descriptive Statistics

We use data from the first three waves of the National Income Dynamic Study (NIDS) in our analysis. NIDS began in 2008 and is a nationally representative data set that contains individual- and household-level information. The richness of questions asked in NIDS allows for detailed analysis of children’s education outcomes. The link between pension receipt and children’s education will be initially explored through the provision of various summary statistics, as in Duflo (2003). Table 1 presents the baseline (wave 1) percentage of elderly age cohorts receiving a state pension by gender. The table confirms that pension receipt amongst the elderly is high. Receipt by age-eligible men is 66% compared to age-eligible females at 75%. This is even higher for age-eligible Africans: take-up is 83% for African men and 89% for African women. It appears that the age criterion is fairly strictly enforced: 14.70% of men between the ages of 60 and 64 do receive a pension although they are not old enough. This statistic is lower for women between 55 and 59 years of age at 8.83%.

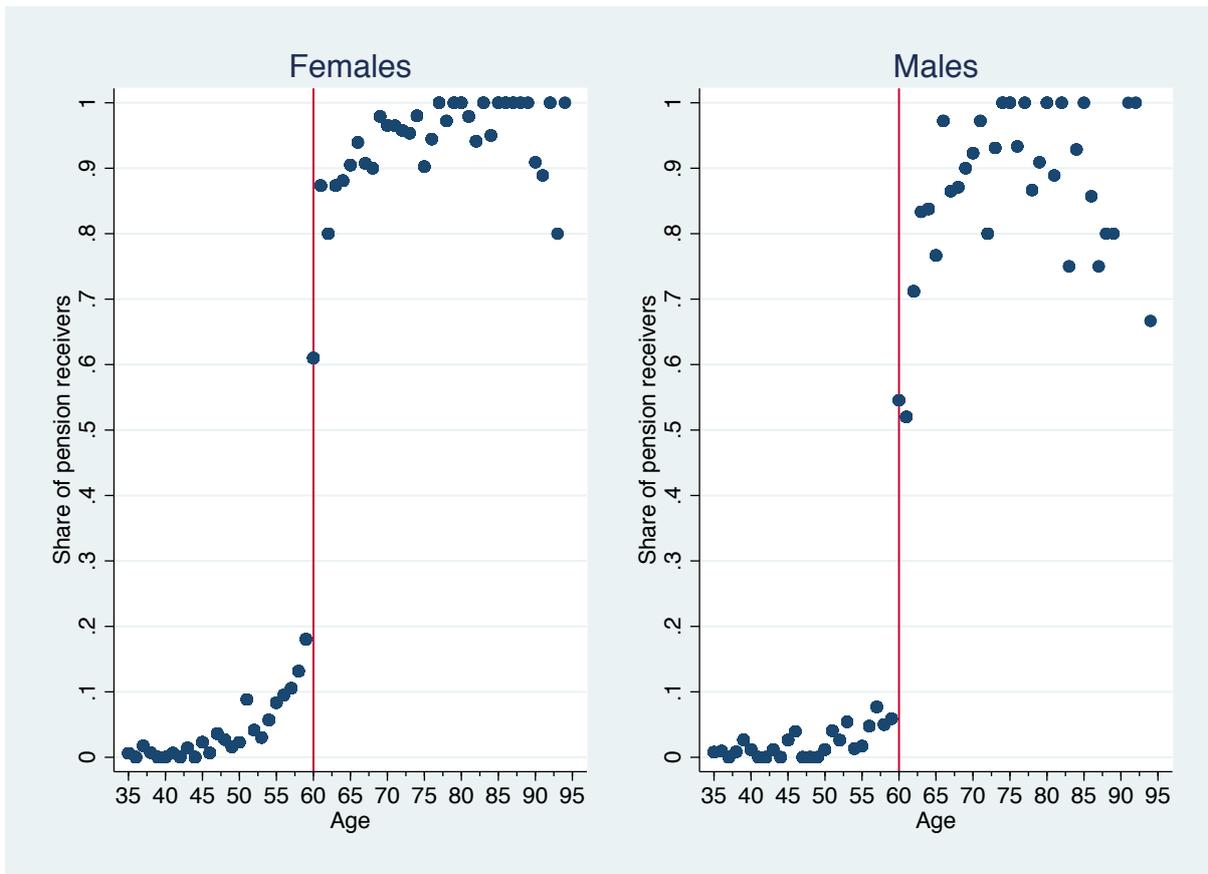
Table 1: Proportion of pension receipt by age cohort

	Share receiving pension (%)	
	Full sample	African only
Men by age (years)		
50-54	2.44	1.59
55-59	5.71	5.72
60-64	14.70	18.08
65 and over	66.29	82.81
Women by age (years)		
50-54	4.45	5.20
55-59	8.83	10.10
60 and over	75.22	89.25

Source: Own calculations from NIDS wave 1 (2008). Observations weighted using calibrated weight.

Figure 1, below, complements the previous table by showing the relationship between pension eligibility and take-up over the 35 to 95 age range for women and men in 2010/2011. The red line at age 60 is the eligibility cut-off, and was equal for women and men in the third wave of NIDS. The discontinuity at the cut-off is very clear, with pension take-up rising sharply as the eligibility criterion is reached. More females than males report receiving the pension early - approximately 20% and 8% of 59 year old female and male panel members, respectively. These patterns are important to keep in mind for the empirical part of this study, where pension receipt is instrumented by pension eligibility.

Figure 1: Share of Africans receiving the old age pension by sex and age



Source: Own calculations from NIDS wave 3 (2010/2011).

Table 2 presents the changes in the proportion of African children who live with a pension-receiving adult over the three waves of data. Both between waves 1 and 2, and waves 2 and 3, about 85% of African children experiences no change in the number of co-residing pensioners in the household. The respective proportion for African children living with either a woman or a man aged at least 60 is about 90%. 4.01% of African children experiences a loss of at least 1 co-residing pension between wave 1 and wave 2, and this figure increases to about 10% between waves 2 and 3. The rates for adding and losing female pensioners are always higher than those for men, and are closer to the overall rates because of the higher number of female pension recipients relative to men in all three waves.

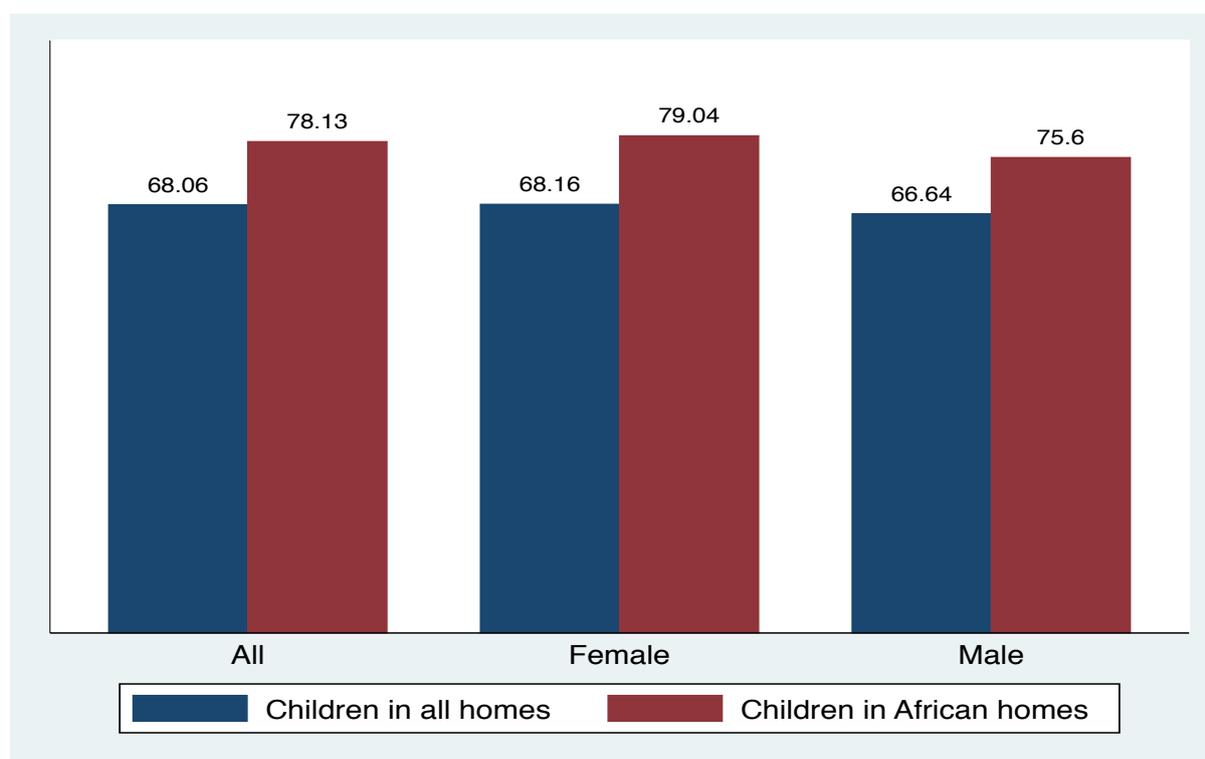
Table 2: Changes in share of African children in pension-receiving households between waves

		% of African children living with					
		a pension-receiver who is			someone over age 60 who is		
Wave	Δ	<i>Either sex</i>	<i>Female</i>	<i>Male</i>	<i>Either sex</i>	<i>Female</i>	<i>Male</i>
		1 to 2	-1	4.01	4.16	2.64	3.67
	0	85.57	86.72	91.93	90.29	91.81	94.66
	1	10.42	9.12	5.44	6.04	5.49	2.50
2 to 3	-1	9.65	8.68	4.44	6.24	5.70	3.07
	0	84.95	86.79	92.14	89.29	90.80	95.27
	1	5.40	4.53	3.42	4.47	3.50	1.66

Source: Own calculations using balanced panel of African children across waves 1, 2 and 3 of NIDS.

Figure 2 adjusts the focus from children co-residing with pensioners to pensioners co-residing with children, and we see that a high proportion of pension recipients reside with children. Amongst African recipients, 78% have children living in their households. The probability of having children in the household is higher for female pensioners: 79% of female African pension recipients live with at least one child while the figure stands at 75% for male African recipients. Given that a majority of recipients are shown to be residing with children, there is scope for pension receipt to impact the outcomes of these co-resident children in various ways.

Figure 2: Probability of a child living in a pension recipient's home



Source: Own calculations from NIDS wave 1 (2008). Observations weighted using calibrated weight.

Since this study aims to analyse the impact of pension receipt on education outcomes of children, the sample is restricted to children aged between 7 and 19. While there is no legal upper (or lower) limit on one's age to attend school, most school learners fall within this age interval. All analysis is restricted to the balanced panel which consists only of children successfully interviewed in all three waves of NIDS. Analysis is further restricted to the African subsample for two reasons. First, the sample sizes and pension uptake rates of other race groups are not sufficiently large to allow for the necessary inter-temporal variation that we require for identification. The relatively low sample sizes of the non-African population groups is further diminished by far higher attrition rates relative to Africans (De Villiers et al., 2013). Second, the African income distribution is far to the left of the other racial groups, and so the marginal benefit of an injection of cash into the household is likely to be higher for this group. The analysis of individuals restricted to this panel allows for us to identify and understand the trends presented by this cohort of individuals. We construct and use a panel weight for members of the balanced panel that adjusts the wave 1 calibrated weight to account for selective attrition between waves.

Table 3 presents descriptive statistics at the household level restricted to this sample of panel members. Descriptive statistics are shown for the full sample in column 1, for children living in non-pension receiving households in column 2 and for those in pension receiving households in column 3. Column 4 is restricted to households where the pension recipient is female while column 5 is for those households where the recipient is male.

Children in pension-receiving households face a very different home environment from those in non-receiving homes. Household income per capita and employment are higher in non-recipient households, while household size and number of children are lower. Household income per capita in real 2008 rands in households without a pensioner present is R629 compared to R458 in pension recipient households. On average the number of adults employed in non-recipient homes is 0.49 which is double that in recipient households at 0.24. Household size and number of children stand at 6.46 and 3.74 in non-recipient households compared to 8.74 and 4.89 in recipient households, respectively. Higher per capita income and employment combined with fewer co-resident children and smaller households is likely to provide a better foundation for child residents in non-recipient households than their recipient counterparts. These children may not only have access to more resources, but are also likely to encounter less competition for these resources. The proportion of pension recipient households based in tribal authority areas is 72% compared to 57% amongst non-recipient households. This is accounted for by pension-recipient households being less likely to reside in urban formal areas. Again, this suggests that children in pension-recipient households have less access to resources and face greater challenges in furthering their education.

The comparison of females and males living in recipient households also presents some interesting insights. Fathers in male pension-receiving homes are more educated than those in male recipient households with an average of 8.03 years of education. Fathers are residents in

Table 3: Characteristics of households containing children of school-attending age

<i>Household characteristic</i>	<i>Household Type</i>				
	<i>All</i>	<i>No pension received</i>	<i>Pension received</i>	<i>Female recipient</i>	<i>Male recipient</i>
Mother's years of education	5.51 (4.93)	5.12 (4.85)	6.48 (4.99)	6.56 (4.95)	6.26 (5.21)
Father's years of education	7.16 (4.95)	6.99 (4.91)	7.60 (5.03)	7.61 (5.06)	8.03 (4.79)
Rural residence	0.05 (0.22)	0.05 (0.23)	0.05 (0.21)	0.05 (0.22)	0.05 (0.22)
Tribal authority residence	0.61 (0.49)	0.57 (0.50)	0.72 (0.45)	0.71 (0.45)	0.69 (0.46)
Urban formal residence	0.23 (0.42)	0.26 (0.44)	0.14 (0.35)	0.13 (0.34)	0.13 (0.34)
Urban informal residence	0.11 (0.31)	0.11 (0.32)	0.09 (0.29)	0.11 (0.31)	0.13 (0.34)
Father is a resident	0.50 (0.50)	0.51 (0.50)	0.47 (0.50)	0.40 (0.49)	0.80 (0.40)
Mother is a resident	0.93 (0.25)	0.94 (0.23)	0.90 (0.29)	0.90 (0.30)	0.92 (0.27)
Household size	7.11 (3.37)	6.46 (2.93)	8.74 (3.84)	8.80 (3.95)	8.88 (3.23)
Real HH income per capita	580.15 (1017.78)	628.82 (1163.73)	457.87 (464.57)	451.33 (456.28)	457.09 (376.40)
Number of children	4.07 (2.19)	3.74 (1.96)	4.89 (2.51)	4.94 (2.58)	5.02 (2.54)
Number of adults employed	0.42 (0.68)	0.49 (0.70)	0.24 (0.56)	0.25 (0.59)	0.17 (0.43)
Number of Observations	2526	1655	871	757	284

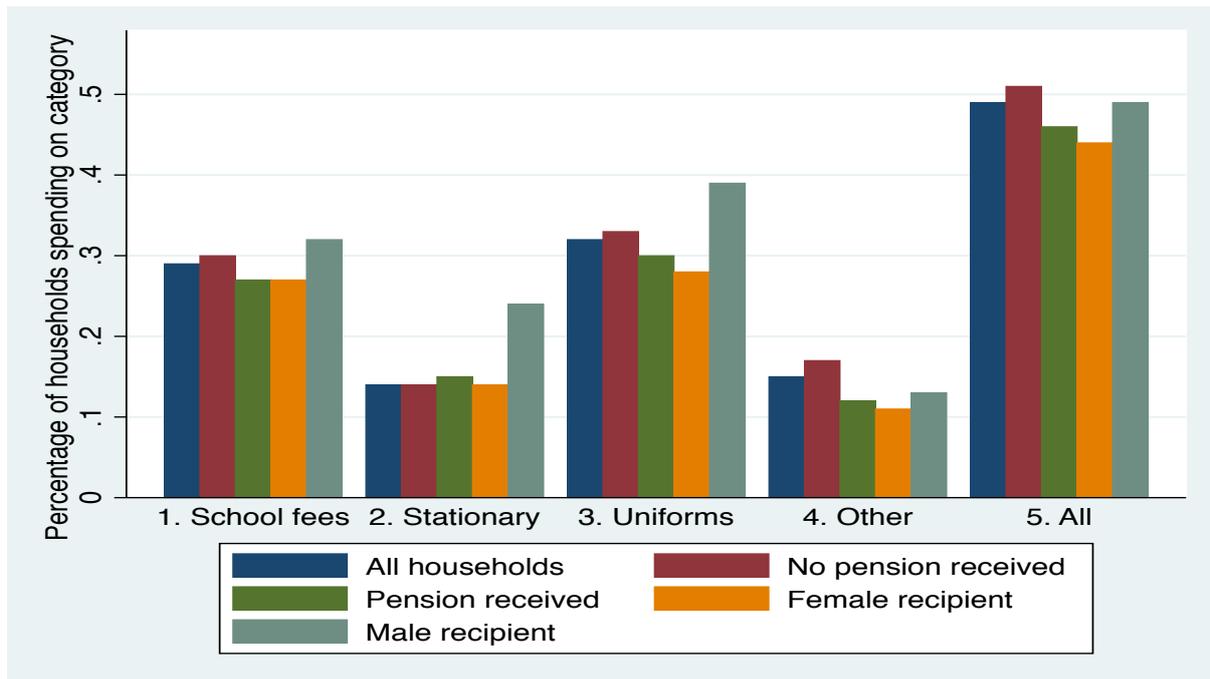
Source: Own calculations using balanced panel of Africans across waves 1, 2 and 3 of NIDS.

Note: Panel weights used for all calculations. Standard errors in parentheses.

40% of female recipient homes compared to 80% in male recipient households while mothers being residents is consistent at 90% in female-recipient households and 92% in male-recipient households. Household size and per capita income are similar in each household type, and the number of adults employed is lower in male-pension recipient households.

To allow for a better understanding of how differences in household per capita income may affect education, we look at the probability of households bearing certain education-related costs. Figure 3 shows a comparative bar chart for different areas of spending on education in the first wave of NIDS; school fees; stationery, uniforms and other expenses. Finally a catch-all dummy variable is constructed to indicate if a household has spent in at least one category in the past 30 days.

Figure 3: Probability of education expenditure by household type

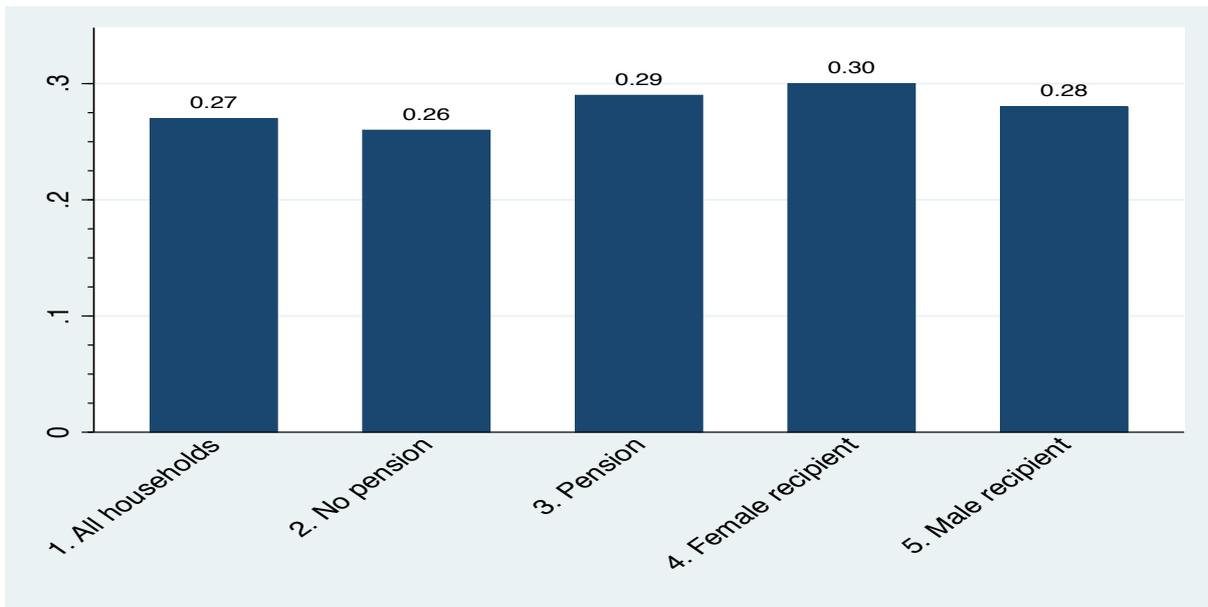


Source: Own calculations from the balanced sample. Observations weighted using panel weights.

The most common spending items are uniforms and school fees in all households. Non-recipient households are more likely to have spent on school fees, stationery and uniforms. This complements the findings from Table 3 that non-recipient households are better resourced. Male recipient households have a higher probability of spending on all categories. This suggests that male recipient homes may be able to provide more resources to co-resident children than their female recipient counterparts. However, one should note that these data only provide information as to the probability of spending rather than the monetary amount, and the results should be interpreted with this in mind.

Figure 4 compares grade repetition trends across household types in wave 1. Differing grade repetition rates have been found to be responsible for much of the educational gap between population groups in South Africa (Anderson et al., 2001). Other findings highlight the fact that repeating grades early on in a school career is a significant determinant in repeating grades later on in ones schooling career and in school dropout (Branson et al., 2014). Grade repetition can be associated with a lack of ability or motivation as well as inadequate support within the household. The probability of grade repetition is 26% for non-recipient households, compared to 29% in recipient households. Male recipient households have co-resident children who are more likely to have repeated a grade than those in female recipient homes.

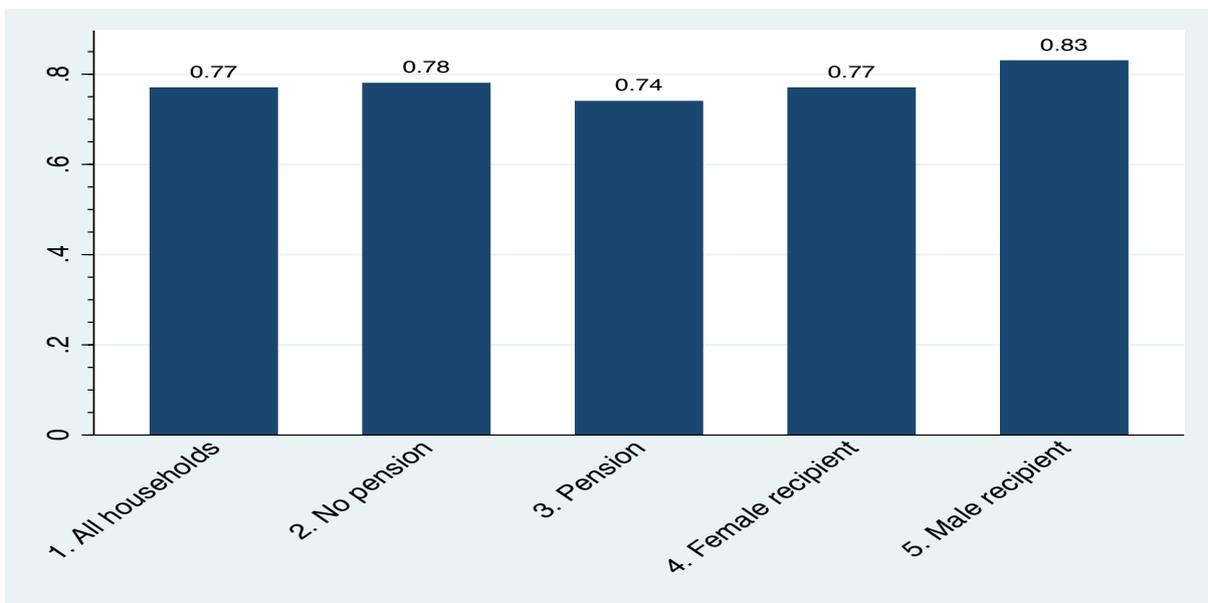
Figure 4: Probability of grade repetition by household type



Source: Own calculations from the balanced sample. Observations weighted using panel weights.

School absenteeism trends in Figure 5 contrast these findings. Children in recipient households have a marginally lower average record of absenteeism (0.74 days in the past month) compared to children in non-recipient households (0.78 days in the past month), though this difference is not statistically significantly different from zero.

Figure 5: Days absent from school in past month



Source: Own calculations from the balanced sample. Observations weighted using panel weights.

6 Results

6.1 OLS Regressions

The summary statistics indicate that pension-receiving households are larger, have less per capita income and have lower levels of adult-resident employment compared to households that do not have a pension recipient. This suggests that children in these households receive less support, particularly financially. Spending on education items was fairly high in all households, suggesting that aiding children in their schooling is costly. These two factors point to the potential for pension receipt to have an impact on children's education outcomes. In this section, the impact of pension receipt on co-resident children's outcomes will be assessed via OLS regression. We retain the African balanced sample used in the previous section.

A series of regressions is presented in Table 4 in order to account for variables affecting education outcomes of children. The panel weight is used in all regressions, and standard errors are robust to heteroskedasticity and account for the sample design. The regressions are based on variations of the following estimating equation:

$$edu_{ij} = \beta_0 + \alpha_1 R_j + \beta_1 age_{ij} + \gamma \mathbf{E}_j + \lambda \mathbf{X}_j + \psi \mathbf{F}_j + \mu_{ij} \quad (1)$$

where edu_{ij} is the years of education for individual i in household j . The coefficient of interest is α_1 on the dummy variable R_j which takes on a value of one if there is a pension recipient in the household and zero otherwise. The sign and statistical significance of this coefficient will provide evidence for how pension receipt affects co-resident children's education *ceteris paribus*. The age of each child is controlled for in age_{ij} . \mathbf{E}_j is a vector of variables for elderly co-residents in the household, specifically with categories for elderly men and women between the ages of 50-54 and 55-59 are included as well as a category for men aged 60-64. \mathbf{X}_j is a vector of household characteristics: number of members in age cohorts 0-4, 5-9, 10-14, 15-19, 20-24 and 25-49; household size; per capita household income, province and area of residence. A dummy variable for whether the household has spent on education in the past 30 days is also included. Four family characteristics are included in \mathbf{F}_j : mothers education, fathers education, mother being a resident and father being a resident.

By controlling for the presence of elderly individuals, we have attempted to manufacture a counterfactual to having a pensioner insofar as these individuals are likely to be similar to pensioners in most ways except in their receipt of a pension. Additionally, the inclusion of household characteristics (\mathbf{X}_j) attempts to control for household heterogeneity facing child co-residents. Columns 1 – 3 in Table 4 are variations of regression (1): column 1 excludes household characteristics (\mathbf{X}_j); column 2 excludes elderly co-residents (\mathbf{E}_j); column 3 includes all variables in (1). Columns 5 – 7 are extensions of 1 – 3 where pension receipt is split by gender.

A concern with this approach is the potential endogeneity of pension receipt. If there is a systematic difference between individuals who elect to take up the pension and those who fail to do so, then the estimates given in (1) will be biased (Bertrand et al., 2003; Case and Deaton, 1998). This would be the case if, for example, take-up failure is driven by a lack of motivation or knowledge of the pension programme itself. This would result in estimates being biased upwards as increased awareness and motivation are likely to be associated with improved home environments for co-resident children and thereby affect their educational outcomes positively. By contrast, it may be the poorest individuals who ensure that they take up their pensions. This would bias estimates downwards. In either case, the use of pension receipt as an explanatory variable holds endogeneity concerns, and may not yield an unbiased estimate of α_1 .

The potential presence of endogeneity is addressed through the use of an instrumental variable. Actual pension receipt is instrumented with age-eligibility for a pension, as in Bertrand et al. (2003) and Duflo (2000, 2003). In order for the instrument to be appropriate, it should be valid and it should pass the exclusion restriction. The validity of the instrument is motivated by Table 1 - take-up by age-eligible candidates is very high, meaning there is a correlation between the potentially endogenous regressor (pension receipt) and the exogenous instrument (pension eligibility). For our African subsample, take-up is 83% for males and 88% for females. A first-stage regression of age eligibility as a determinant of take-up yielded a correlation coefficient of 0.84 with a t-statistic of 71.30. These results emphasise that there is a strong, positive relationship between pension eligibility and take-up, so the instrument is valid. Second, following the argument presented by Bertrand et al. (2003) and Duflo (2000), age is exogenous. Individuals are unable to manipulate their age so as to become age eligible and thereby affect their treatment status. Therefore it is hypothesised that the only way that pension eligibility influences children's education outcomes is through its impact on pension take-up. Given that eligibility is determined on the basis of age, which is exogenous, we argue that the exclusion restriction holds, and so an instrumental variable approach is viable.⁶ In columns 4 and 8, the results of two-stage least squares regressions are reported where the presence of an age-eligible co-resident is used to instrument for the presence of an actual recipient.

⁶Strictly pension eligibility is determined on the basis of both age and income. However, income is endogenous so including it as an eligibility criterion would likely bias the results. For this reason, age is the only determinant used to identify eligible individuals.

Table 4: Effect of household pension receipt on co-resident children's years of education

Independent variable	OLS Regression							
	Dependent variable: Years of education							
	(1)	(2)	(3)	(4) ^a	(5)	(6)	(7)	(8) ^b
<i>All children</i>								
Pension-receiving household	-0.151** (0.067)	-0.072 (0.076)	-0.044 (0.070)	0.060 (0.100)				
Female recipient					-0.159** (0.075)	-0.094 (0.085)	-0.054 (0.083)	-0.033 (0.104)
Male recipient					-0.053 (0.128)	0.015 (0.124)	0.036 (0.126)	0.266** (0.131)
Observations	2526	2526	2526	2526	2526	2526	2526	2526
<i>Girls only</i>								
Pension-receiving household	-0.130 (0.081)	-0.071 (0.076)	-0.079 (0.077)	-0.003 (0.117)				
Female recipient					-0.134 (0.092)	-0.078 (0.082)	-0.077 (0.086)	-0.071 (0.107)
Male recipient					-0.011 (0.143)	0.041 (0.147)	0.045 (0.152)	0.255 (0.190)
Observations	1249	1249	1249	1249	1249	1249	1249	1249
<i>Boys only</i>								
Pension-receiving household	-0.177* (0.102)	-0.069 (0.111)	-0.014 (0.106)	0.117 (0.147)				
Female recipient					-0.197* (0.105)	-0.124 (0.114)	-0.053 (0.115)	0.018 (0.150)
Male recipient					-0.057 (0.155)	0.051 (0.154)	0.078 (0.152)	0.240 (0.149)
Observations	1277	1277	1277	1277	1277	1277	1277	1277
<i>Control Variables</i>								
Individual characteristics ^c	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics ^d	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Family characteristics ^e	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Presence of older members ^f	Yes	No	Yes	Yes	Yes	No	Yes	Yes

Source: Own calculations using balanced panel of Africans across waves 1, 2 and 3 of NIDS.

Heteroskedasticity-corrected standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

^a Household pension receipt is instrumented with age eligibility for pension receipt.

^b Male and female pension receipt are instrumented with male and female age eligibility for pension receipt.

^c Child's age and race (white) omitted.

^d Number of members by cohorts: 0-4, 5-9, 10-14, 15-19, 20-24, 25-49; household size and real monthly income per capita; area of residence (urban formal omitted); dummy for spending on education; mother is a resident; father is a resident.

^e Mother's education; father's education; mother is a resident; father is a resident.

^f Presence of elderly members by age and gender: 50-54 and 55-59 for men and women, and 60-64 for men.

Columns 1 and 5 show negative and statistically significant results for children in pension recipient households on years of education. When household and family characteristics are controlled for, all of the coefficients become insignificant. Controlling for elderly individuals in the home in columns 3 and 7 has little effect on any of the results. This suggests that when family and household characteristics are controlled for, pension receipt is no longer a significant determinant of years of education in the current specification.

A comparison of columns 3 and 7 with 4 and 8 demonstrates whether endogenous pension take-up was biasing the results. The coefficients in columns 4 and 8 generally increase in magnitude when pension take-up is instrumented with pension eligibility. This suggests that endogeneity in pension receipt was biasing the results in columns 3 and 7 downwards. The use of an IV yields one statistically significant result: on average, children in male recipient households are found to gain an additional 0.266 years of education compared to otherwise similar children. This result is significant at the 5% level. That this coefficient is significant while the coefficient on pension take-up (which is endogenous), is greater in magnitude suggests that unobservables linked to male pension take-up are negatively correlated with children's education outcomes. This finding is also economically significant: if male pension receipt is able to boost children's education by a quarter of a year, on average, then the provision of pensions would be shown to hold broader implications than only raising living standards of pension recipients.

That the exogenous receipt of pension income increases years of education in male-recipient households suggests that an increase in income can increase schooling attained. At a primary school level, this may mean that the probability of grade repetition is reduced. At a high school level, increased income may result in lower dropout rates. One way to see if income is driving this positive result is to analyse the data on household expenditure on education. We ran a regression of the likelihood of household expenditure on education with pension receipt as the primary regressor of interest with all of the controls in (1). However, none of the results were found to be statistically significant.

6.2 Longitudinal Estimators

Although an instrumental variable was used in Section 6.1, concerns about unobserved heterogeneity persist. If age is the factor informing pension eligibility which then affects children's years of education through its effect on pension take-up, then the central claim to the exclusion restriction is that the only way an elderly person's age affects children's education outcomes is through his or her pension take-up. While age cannot be manipulated (and was therefore argued to be exogenous), it seems plausible that age may be linked to unobservables which affect children's education. If this is the case, then the exclusion restriction may fail. In particular, one would need to argue that individuals aged 50–59 differed from those 60 and above. This is possible: for example, older individuals may experience poor health and resultantly become less attentive as they age. If less attentive grandparents are less well-equipped to motivate their grandchildren to attend school then age may be linked to children's education in an avenue other than via pension receipt. This line of discussion suggests that it may prove useful to explore alternative identification strategies.

The use of fixed effects estimation enables us to remove unobserved time-invariant heterogeneity. Unobserved heterogeneity is particularly pertinent in this study of children's educational outcomes. Personal characteristics of a child which affect his or her educational

attainment, such as natural ability or motivation, are difficult to measure accurately, though they may plausibly be assumed to remain constant over time. Many characteristics and complexities of the household environment are also unobserved. There is limited data on how adults in the household support co-resident children in their schooling activities, both financially and emotionally. The interpersonal dynamics among members of the household are also difficult to identify. Moreover, we are unable to observe the value placed on education by adults in the household as well as the perceived returns to education. All of these unobservable factors, at both the individual and household level, make it difficult to infer rigorously a causal link between male pension receipt and improved education outcomes for male co-resident children observed in Section 6.1. These concerns highlight that the findings in Table 4 should be treated with caution and furthermore suggest scope for methods which can eliminate some of this unobserved heterogeneity. Because many of these unobservables, such as children's motivation and ability and adults' value placed on education and perceived returns to education, are likely to remain fixed over time, the use of panel estimation techniques can remove the potential bias that they exert on the results.

We exploit the longitudinal nature of the NIDS data set to construct a fixed effects model as follows:

$$edu_{ijt} = \beta_0 + \alpha_1 R_{jt} + \beta \mathbf{H}_{jt} + \gamma \mathbf{E}_{jt} + \psi \mathbf{F}_{jt} + \mu_{ij} + \epsilon_{ijt} \quad (2)$$

This model is identical to that in (1) with the exception that the error has been split into two parts: the time invariant error at the individual level (α_{ij}) that accounts for the individual and household characteristics of person i , and the error varying over time (ϵ_{ijt}), which is assumed to be purely random. It is likely at least some of the unobservable factors discussed above remain fixed over time.⁷ The demeaned equation estimated in our fixed effects model is shown in equation (3):

$$educ_{ij} = \alpha_1 \bar{R}_j + \beta \bar{\mathbf{H}}_j + \gamma \bar{\mathbf{E}}_j + \psi \bar{\mathbf{F}}_j + \bar{\epsilon}_{ij} \quad (3)$$

As can be seen in (3), the use of fixed effects eliminates the time invariant error. Because time-invariant errors, α_{ij} and δ_j , remain constant over time, their average will equal to their original value so that they do not appear in the time-demeaned equation Wooldridge (2012). This means that any fixed unobserved heterogeneity at both the individual and household level is eliminated so that α_1 can be identified. For this reason, a fixed effects model appears to be the most suitable way to identify whether pension receipt leads to altered education outcomes

⁷Adults' preferences for children's education and beliefs regarding returns to education should remain constant and will be included in δ_j . Meanwhile children's motivation and ability should also remain fixed and will be contained in α_{ij} .

for co-resident children.

We control for all variables from (1) which do change over time: presence of elderly members in the household by age and gender (\mathbf{E}_j): 50-54 and 55-59 for men and women and (\mathbf{H}_j) as a vector of household characteristics such as composition by cohorts 0-4, 5-9, 10-14, 15-19, 20-24 and 25-49, household size and household per capita income. With mother's and father's education remaining constant, (\mathbf{F}_j) includes only whether the mother and father being are residents. This model is extended to include a gender component insofar as the effects of changes in male and female pensioners at the household level are assessed.

The results of the fixed effects model restricted to the balanced panel sample are presented in Table 5. The dependent variable is the number of years of education. Pension recipients are split by gender. The explanatory variables used mirror those of Abel (2013). Column 1 uses a dummy variable indicating whether a pension recipient is living in the household or not. Column 2 uses a dummy variable indicating whether an eligible pensioner is living in the household. Columns 3 and 4 use the total number of pensioners as explanatory variables. Specifically, Column 3 controls for the number of pension recipients living in the household while Column 4 includes a control for the number of eligible pensioners living in the household.

The removal of time invariant unobserved heterogeneity brings about significant changes in the effect of pension receipt on educational attainment for co-resident children. In column 1, having a pensioner in the household is shown to have a positive and significant effect on children's years of education. However, there is a concern that pension recipient may be endogenous: even after eliminating the time invariant unobservables, there may be idiosyncratic errors which are correlated with pension take-up and children's years of education. This is likely why all coefficients on male pension recipients become insignificant in column 2: once pension receipt is instrumented with pension eligibility, only coefficients on female pensioners remain significant at any of the conventional levels. Girl children living with a female pensioner gain 0.575 additional years of education on average compared to otherwise similar peers. Boy children gain 0.392 additional years on average. Both results are significant at the 5% level.

Columns 3 and 4 hold a slightly different interpretation as the total number of pensioners is used as an explanatory variable rather than a dummy variable. Again, the use of total pension recipients yields positive and statistically significant results. The coefficients on male pensioners become insignificant when we use the number of eligible pensioners in the households. This is likely driven by the removal of some time variant heterogeneity when pension eligibility is used rather than receipt which was biasing the OLS results upwards. In column 4, we see that having a female pension-recipient in the household is associated with achieving more years of education on average *ceteris paribus*. Girl co-resident children gain 0.615 additional years of education on average for each additional eligible pensioner in the household compared to otherwise similar children. This result is smaller but still positive for boy co-resident children at a gain of 0.388 additional years of education for each additional female eligible pensioner. Both results are significant at the 5% level.

Table 5: Effect of household pension receipt on co-resident children's years of education - Fixed effects estimation

<i>Fixed Effects Regression</i>				
Independent variable	Dependent variable: Years of Education			
	Pension receipt (dummy)	Pension eligible (dummy)	Pension receipt (total)	Pension eligible (total)
<i>All children</i>				
Female recipient	0.298*** (0.111)	0.496*** (0.139)	0.258** (0.101)	0.510*** (0.130)
Male recipient	0.621*** (0.137)	0.180 (0.155)	0.614*** (0.133)	0.178 (0.151)
Observations	2526	2526	2526	2526
<i>Girls only</i>				
Female recipient	0.344** (0.170)	0.575*** (0.209)	0.296* (0.153)	0.615*** (0.201)
Male recipient	0.575*** (0.186)	0.045 (0.231)	0.577*** (0.183)	0.043 (0.228)
Observations	1249	1249	1249	1249
<i>Boys only</i>				
Female recipient	0.236* (0.140)	0.392** (0.178)	0.204 (0.129)	0.388** (0.163)
Male recipient	0.658*** (0.202)	0.285 (0.207)	0.642*** (0.194)	0.282 (0.198)
Observations	1277	1277	1277	1277
<i>Control Variables</i>				
Individual characteristics	Yes	Yes	Yes	Yes
Household characteristics ^a	Yes	Yes	Yes	Yes
Household characteristics ^b	Yes	Yes	Yes	Yes
Presence of elderly members ^c	Yes	Yes	Yes	Yes

Source: Own calculations using balanced panel of Africans across waves 1, 2 and 3 of NIDS.

Heteroskedasticity-corrected standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

^a Number of members by cohorts: 0-4, 5-9, 10-14, 15-19, 20-24, 25-49; household size and real monthly income per capita; number of adults employed in household.

^b Mother is a resident; father is a resident.

^c Presence of elderly members by age and gender: 50-54 and 55-59 for men and women, and 60-64 for men.

The use of fixed effects estimation allows us to eliminate time invariant heterogeneity at the individual and household level. Once this heterogeneity has been removed, female pension recipients are shown to allocate additional resources to both girl and boy co-residents which sees an increase in their educational attainment and likelihood of progressing through school at the expected rate. This provides evidence for giving cash transfers to women in an attempt to redistribute household resources to girls. The results for male pensioners are positive but not statistically significant when eligibility is used instead of receipt as an explanatory variable.

7 Potential mechanisms

Living with a female pensioner is seen to have a positive and significant effect on the years of education attained by both boy and girl children. However, this result does not illuminate the mechanism through which this result operates. We will restrict ourselves to the consideration of direct channels through which receipt of a pension could influence children's schooling.

The most obvious avenue would be via increased expenditure on schooling expenses. Figure 3 showed that a relatively large percentage of households spend money on children's education, particularly via spending on uniforms and school fees. However, too few households provided full information on the actual amounts of education expenditure in the NIDS surveys for us to use this form of the expenditure data. Because of this, we are unable to identify whether pension receipt positively affects schooling via an increase in either the probability or amount of education expenditure at the household level.

An alternative mechanism may be that the receipt of a pension improves school attendance rates of children. This could happen for a number of reasons: the demand for children to spend time at home may lessen or child health and nutrition may improve. Grandparents may be able to seek better nutrition or healthcare so as to improve their health so that they do not need to be cared for as often. Similarly, cooking or cleaning time may be reduced because more income is available. These would decrease the demand for help by children in the home so that they would be more likely to attend school. Alternatively, the receipt of additional pension income may allow for improved nutrition and healthcare of children so that their rate of absenteeism declines. Given that there is absenteeism data for 89% of the balanced panel, we were able to estimate the effect of living with a pensioner on days absent from school in the past 30 days. A fixed effects estimation is used with the same control variables as specified in (4). The results are presented in Table 6.

This analysis yields a few statistically significant results, particularly on the explanatory variables where eligibility is used as an instrument for receipt. Having a pensioner in the household reduces the number of days a girl child is absent from school by 0.7 days in a 30-day period, on average. This result is driven by the effect of having a male pensioner in the home: girls living with male pensioners miss 1.3 fewer days of school. This result remains robust when we control for the total number of eligible pensioners in the household. Gaining a male pensioner is associated with an average reduction in days absent from school of 1.2 amongst girl children when compared to otherwise similar individuals. This result is significant at the 10% level. While this does not account for the positive and significant coefficients found on female pensioners in Table 5, it provides evidence for positive implications on children's education as a result of pension receipt.

Further research may wish to extend analysis as to potential mechanisms through which schooling outcomes of co-resident children are affected by pension receipt. For example, it may be the case that pension receipt alters labour supply as has been analysed in various bodies of research (for example Bertrand et al. (2003); Ardington et al. (2009); Abel (2013)). This may affect children's educational outcomes in a number of ways. If adults are able to search for and find work as a result of the pension receipt, that may further increase household income and thereby increase spending on education. However, if instead labour supply is reduced in response to pension receipt, this effect would work in the opposite direction. Increases in household income may also improve mental health and reduce likelihood of depression which

Table 6: Effect of household pension receipt on co-resident children's absenteeism from school in the past month

<i>Fixed effects regressions</i>				
Independent variable	Dependent variable: Days absent from school in past month			
	Pension Receipt (dummy)	Pension Eligibile (dummy)	Pension Receipt (total)	Pension Eligibile (total)
<i>All children</i>				
Recipient	-0.086 (0.355)	-0.359 (0.289)	-0.156 (0.236)	-0.380* (0.217)
Female recipient	0.231 (0.221)	-0.347 (0.248)	0.228 (0.189)	-0.243 (0.236)
Male recipient	-0.926 (0.586)	-0.753 (0.492)	-0.891 (0.572)	-0.707 (0.478)
Observations	2257	2257	2257	2257
<i>Girls only</i>				
Recipient	-0.678 (0.606)	-0.699* (0.389)	-0.388 (0.392)	-0.576* (0.301)
Female recipient	0.074 (0.288)	-0.365 (0.296)	0.095 (0.236)	-0.307 (0.288)
Male recipient	-1.352 (0.998)	-1.275* (0.684)	-1.290 (0.976)	-1.167* (0.658)
Observations	1106	1106	1106	1106
<i>Boys only</i>				
Recipient	0.546* (0.324)	0.009 (0.442)	0.120 (0.242)	-0.228 (0.325)
Female recipient	0.362 (0.343)	-0.467 (0.449)	0.363 (0.300)	-0.284 (0.401)
Male recipient	-0.390 (0.408)	-0.172 (0.663)	-0.385 (0.399)	-0.171 (0.652)
Observations	1151	1151	1151	1151
<i>Control Variables</i>				
Individual characteristics	Yes	Yes	Yes	Yes
Household characteristics ^a	Yes	Yes	Yes	Yes
Household characteristics ^b	Yes	Yes	Yes	Yes
Presence of elderly members ^c	Yes	Yes	Yes	Yes

Source: Own calculations using balanced panel of Africans across waves 1, 2 and 3 of NIDS.

Heteroskedasticity-corrected standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

^a Number of members by cohorts: 0-4, 5-9, 10-14, 15-19, 20-24, 25-49; household size and real monthly income per capita; number of adults employed in household.

^b Mother is a resident; father is a resident.

^c Presence of elderly members by age and gender: 50-54 and 55-59 for men and women, and 60-64 for men.

would improve the household environment for co-resident children and thereby potentially improve their motivation and emotional stability.⁸

Future research could also explore the impact of schooling characteristics on education such as school quality, class size or distance travelled to schools. For example, it may be the case that higher income enables households to move closer to higher quality schools. The analysis of migration could illuminate whether this is the driver of a higher number of years of education amongst children with grandmothers receiving pensions. The extensive collection of expenditure data in NIDS could also allow for the identification of which changes in expenditure patterns are driving improvements in education. This would be possible if future waves

⁸ Ardington et al. (2009) find that socioeconomic status is positively correlated with mental health: poorer individuals with less income and fewer assets are more likely to be depressed. This is particularly prevalent amongst older African women. Seeing that pension receipt increases income, it may reduce mental health problems.

of NIDS have a higher proportion of responses for aforementioned expenditure items. It may also be useful to look at food or medical expenditure to assess whether improved nutrition or health care enables children to perform better. These types of undertakings would not only be able to confirm the differences in years of education depending on having a pensioner in the household, but would also be able to illuminate the reasons for these observed outcomes.

8 Conclusion

Education outcomes for school-age children in South Africa were analysed using data from the National Income Dynamics Study in 2008, 2010 and 2011/2012. The longitudinal nature of the data set enabled us to use a fixed effects estimator to assess how having a pensioner in the household affects co-resident children's years of education (controlling for age and other covariates). The provision of cash transfers via the Old Age Pension Programme was found to have positive implications for the educational attainment of both boy and girl co-resident children when pension recipients are female. Having a female pensioner in the household resulted in girls obtaining 0.6 additional years of education on average compared to otherwise similar girl children. Meanwhile boy children achieve 0.4 more years of education on average *ceteris paribus*. That the results are fairly similar for boys and girls suggests that grandmothers value education equally across gender of their grandchildren. Since only the coefficients on female pensioners remain significant when eligibility is used rather than age, there is some evidence that male and female recipients of additional income may have different preferences over the allocation of those resources. In line with work a decade ago by Duflo (2003), women are shown to be more generous insofar as access to pension income benefits co-resident children.

However, when potential avenues for this result were explored, male pensioners were also found to benefit co-resident children. Girls living with a male pensioner miss 1.3 fewer days of school each month on average *ceteris paribus*. While this does not explain the findings discussed above, it suggests that pension receipt has positive implications for child schooling regardless of gender. Further analysis could provide insight into alternative mechanisms through which pension receipt affects co-resident children's years of education. Proposed ideas include migration to areas closer to better schools, labour supply responses by co-resident adults or improvement in mental health as a result of additional income. Such research would advance our understanding of the positive effect we have found pension receipt to have on children's education outcomes in the South African context.

9 Bibliography

- Abel, M. (2013), Unintended labour supply effects of cash transfer programmes: Evidence from South Africa's old age pension, SALDRU Working Papers 114, Southern Africa Labour and Development Research Unit, University of Cape Town.
- Adato, M. and Bassett, L. (2009), 'Social protection to support vulnerable children and families: the potential of cash transfers to protect education, health and nutrition', *AIDS Care* **21**(S1), 60–75.
- Anderson, K. G., Case, A. and Lam, D. (2001), 'Causes and consequences of schooling outcomes in South Africa: Evidence from survey data', *Social Dynamics* **27**(1), 37–59.
- Ardington, C., Branson, N., Lam, D. and Leibbrandt, M. (2011), 'Explaining the persistence of racial gaps in schooling in South Africa', *African Population Studies* **25**(2), 509–543.
- Ardington, C., Case, A. and Hosegood, V. (2009), 'Labor Supply Responses to Large Social Transfers: Longitudinal Evidence from South Africa', *American Economic Journal: Applied Economics* **1**(1), 22–48.
- Attanasio, O., Gomez, L. C., Heredia, P. and Vera-Hernandez, M. (2005), The short-term impact of a conditional cash subsidy on child health and nutrition in Colombia, Report summary: Familias 3, Institute for Fiscal Studies.
- Barrera-Osorio, F., Bertrand, M., Linden, L. L. and Perez-Calle, F. (2011), 'Improving the Design of Conditional Transfer Programs: Evidence from a Randomized Education Experiment in Colombia', *American Economic Journal: Applied Economics* **3**(2), 167–195.
- Behrman, J. R., Sengupta, P. and Todd, P. (2005), 'Progressing through PROGRESA: An Impact Assessment of a School Subsidy Experiment in Rural Mexico', *Economic Development and Cultural Change* **54**(1), 237–75.
- Bertrand, M., Mullainathan, S. and Miller, D. (2003), 'Public policy and extended families: Evidence from pensions in South Africa', *The World Bank Economic Review* **17**(1), 27–50.
- Branson, N., Hofmeyr, C. and Lam, D. (2014), 'Progress through school and the determinants of school dropout in South Africa', *Development Southern Africa* **31**(1), 106–126.
- Burns, J., Keswell, M. and Leibbrandt, M. (2005), 'Social assistance, gender, and the aged in South Africa', *Feminist Economics* **11**(2), 103–115.
- Case, A. (2004), Does money protect health status? Evidence from South African pensions, in D. A. Wise, ed., 'Perspectives on the Economics of Aging', University of Chicago Press, pp. 287–312.

- Case, A. and Deaton, A. (1998), 'Large cash transfers to the elderly in South Africa', *The Economic Journal* **108**(450), 1330–1361.
- Case, A. and Deaton, A. S. (1999), 'School inputs and educational outcomes in South Africa', *The Quarterly Journal of Economics* **114**(3), 1047–1084.
- De Villiers, L., Brown, M., Woolard, I., Daniels, R. C. and Leibbrandt, M. (2013), National Income Dynamics Study Wave 3 User Manual, Technical report, Southern Africa Labour and Development Research Unit, University of Cape Town.
- Duflo, E. (2000), 'Child health and household resources in South Africa: Evidence from the Old Age Pension Program', *American Economic Review* **90**(2), 393–398.
- Duflo, E. (2003), 'Grandmothers and Granddaughters: Old-age pensions and intrahousehold allocation in South Africa', *World Bank Economic Review* **17**(1), 1–25.
- Duflo, E. (2011), 'Lecture 11: Education choice with distorted beliefs', '<http://pooreconomics.com/sites/default/files/A%20PDF%20of%20the%20lecture%20slides%20s.13.pdf>'. [Online; accessed 24 March 2013].
- Duflo, E. (2012), 'Women Empowerment and Economic Development', *Journal of Economic Literature* **50**(4), 1051–1079.
- Edmonds, E. V. (2006), 'Child labor and schooling responses to anticipated income in South Africa', *Journal of Development Economics* **81**(2), 386–414.
- Edmonds, E. V., Mammen, K. and Miller, D. L. (2005), 'Rearranging the Family?: Income Support and Elderly Living Arrangements in a Low-Income Country', *Journal of Human Resources* **40**(1), 186–207.
- Leibbrandt, M., Finn, A. and Woolard, I. (2013), Post-apartheid changes in South African inequality, in J. C. Gornick and M. Jäntti, eds, 'Income inequality: Economic disparities and the middle class in affluent countries', Stanford University Press, chapter 17, pp. 459–486.
- Leibbrandt, M., Woolard, C. and Woolard, I. (2000), 'The contribution of income components to income inequality in the rural former homelands of South Africa: A decomposable Gini analysis', *Journal of African Economies* **9**(1), 79–99.
- Lund, F. (1993), 'State social benefits in South Africa', *International Social Security Review* **46**(1), 5–25.
- Posel, D., Fairburn, J. A. and Lund, F. (2006), 'Labour migration and households: A reconsideration of the effects of the social pension on labour supply in South Africa', *Economic Modelling* **23**(5), 836–853.

Quisumbing, A. R. and Maluccio, J. A. (2000), Intrahousehold allocation and gender relations, FCND Brief 84, International Food Policy Research Institute (IFPRI).

Timæus, I. M., Simelane, S. and Letsoalo, T. (2013), 'Poverty, race, and children's progress at school in South Africa', *The Journal of Development Studies* **49**(2), 270–284.

Wooldridge, J. (2012), *Introductory econometrics: A modern approach*, Cengage Learning.

A First-stage F-statistics

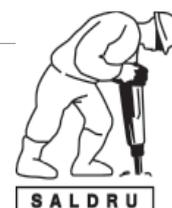
Table 7: First-stage F-statistics from IV regressions in Table 4

	Table 4 Column 4	Table 4 Column 8
Independent variable		
<i>All children</i>		
Pension-receiving household	108.69	
Female recipient		143.36
Male recipient		34.35
<i>Girls only</i>		
Pension-receiving household	142.53	157.4
Female recipient		36.32
Male recipient		
<i>Boys only</i>		
Pension-receiving household	138.99	105.54
Female recipient		33.88
Male recipient		

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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