The Impact of the South African Old Age Pension on the Educational Attainment of Children

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Abstract

The South African old age pension is the largest cash transfer in the country and its reach extends far beyond the intended beneficiaries, having a significant impact on other household members. Given the prevalence of three and skip generational households in the country the effect that the pension has on children co-residing with pensioners is significant. While the improvement in health status of children is well-documented, the impact on educational attainment is less so. Using 2008 NIDS data this study exploits the age eligibility criteria of the pension to determine what effect the pension has on the educational attainment of co-resident children. The results indicate a strong gender dimension in the impact of the pension, with reference to both the recipient as well as the child. More specifically male pension income has a statistically significant, positive impact on the educational attainment of boys. However, young boys living in households with both a male and a female pensioner have significantly lower educational attainment. Older girls are negatively impacted by the presence of a female pensioner, resulting in lower educational attainment, while older girls benefit from living with pensioners of both sexes. There is no significant impact of the pension on the educational attainment of young girls or older boys. These findings provide a nuanced picture of the impact of the pension on unintended child beneficiaries, which is useful in any social welfare policy debate.

Acknowledgments

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1. Introduction

In the face of persistently high unemployment and difficult economic conditions, the South African social security system plays a crucial role in providing income support and alleviating poverty. In total these cash transfers, all unconditional, reach over 15 million South Africans – over a quarter of the population - and constitute roughly 3.5% of GDP[1]. The optimal design of cash transfers is a hotly debated topic with little consensus on whether or not they should be conditional or unconditional. By far the largest of these cash transfers is the state old age pension, which is non-contributory and subject to a means test and age eligibility requirement. The relevant policy issue regarding the pension is whether or not it still makes sense for South Africa to target R30.06 billion monthly of social spending towards the elderly[2]. With the appropriateness of and need for the state pension under question any significant findings regarding the impact the grant has on children will emphasize not only the efficiency of the cash transfer but also the wide sphere of its influence.

For most of the post-apartheid period there was an unambiguous gender dimension in the impact of the pension, with respect to both pension recipients as well as unintended beneficiaries in the household. It is important to understand the full implications of the pension with respect to these gender differences in order to fully evaluate the impact of this substantial social grant. This study seeks to do that within the context of educational attainment of children who co-reside with pension recipients. Evidence regarding a positive impact of a welfare grant on educational attainment is useful and important in the South African context, where grade failure and grade repetition are major inhibitors to successful progress through school. The effect of the pension on the health status of children is unambiguous, as indicated by Duflo and Ambler[3], and while there is evidence regarding the effect the grant has on educational attainment, it is outdated. Two studies that do explore this topic do so in the context of examining a broader question where the educational component is not the primary focus[4]. Furthermore both make use of data that is more than 12 years old.

Using data from 2008 this paper will investigate the impact that pension receipt has on the schooling of co-resident grandchildren in rural African households. This particular segment of the South

[1] National Budget Review , 2012
[2] National Budget Review , 2012
[3] Duflo, 2003; Ambler, 2011
[4] Edmonds E. V., 2006; Hamoudi & Thomas, 2005

African population represents those for whom pension income is most significant, as well as those who struggle most in terms of educational attainment. The paper will begin in section 2 with a review of the background to the pension, as well as current educational attainment in South Africa. Section 3 will follow with an outline of the methodology employed, while section 4 will discuss the data and preliminary findings. The analysis and key results will be outlined in section 5, followed by robustness checks in section 6. The study will conclude with the implications and discussion in section 7.

2. Background to the Pension and Educational Attainment

2.1 The South African Old Age Pension

The South African state old age pension is one of the most far reaching and comprehensive in the developing world[5]. It is one of the principal grants of all those comprising the extensive social welfare system provided by the state. The pension is non-contributory and subject to an age eligibility requirement, which is currently 60 for both males and females, as well as a means test. Considering current demographic trends in South Africa, such as the large population of school-age youth, early mortality due to HIV/AIDS, high unemployment levels, and the prevalence of migrant labour, pension income has become central to survival strategies of many households[6].

The pension was first introduced in 1928 as financial support for poor elderly whites. In 1944 the pre-apartheid state broadened the reach to include other race groups, although the size of the grant varied greatly by race. In theory whites received four times as much as Africans and twice as much as Indians and coloureds, while in practice the variance was as large as whites receiving 16 times as much as rural Africans and six times as much as Indians and coloureds[7]. Over the years leading up to the abolishment of apartheid the racial disparity in the size of the pension reduced, with the size of pensions for Africans more than doubling in the 1980s while it declined by 40% for whites (in real

[5] Burns, Keswell, & Leibbrandt, 2005
[6] Burns, Keswell, & Leibbrandt, 2005
[7] Devereux, S, 2001, as cited in Burns, Keswell, & Leibbrandt, 2005

terms). During the transition period out of apartheid from 1990 -1994 the *Social Assistance Act of 1992* called for racial equality in pension payments, that being achieved in 1993[8]. At this stage take up of the pension amongst elderly Africans was 80%, with the maximum benefit amounting to R370 – an amount equal to twice the median per capita income in rural areas[9]. By 2007 the pension had risen to R700 per month for each eligible person; a figure still representing more than twice the median monthly per capita income of Africans[10]. Prior to 2008, the age eligibility requirement for men was 65 years, and from 2008 this requirement was in the process of being equalised to that of women, as the constitution of the country stipulates equality between men and women. In 2008 the eligibility age for men was reduced from 65 to 63, and eventually to 60 in 2010. In 2008 eligible pensioners were receiving a maximum of R940 a month.

By 2011 the old age pension was renamed the "older persons grant". The individual means test requires a maximum earning of R44 880 per year or asset ownership not exceeding R752 400 if the elderly applicant is single (roughly $6 233 and $104 500 respectively). Eligibility for married couples is limited to a combined income not greater than R89 760, and joint asset ownership less than R1 504 800 (roughly $12 466 and $209 000 respectively)[11]. The maximum amount receivable is currently R1 140 per month, and if the pensioner is older than 75 the maximum amount is R1 160 (about $159 per month). The total number of recipients in 2011 was 2 678 554, making the pension the social grant with the second largest number of beneficiaries following the child support grant, while it is the largest by expenditure[12]. This amounts to an average monthly outlay of about R3 billion ($424 million) which is subsidised by the country's progressive tax system.

Of those aged 60 and older, about 66% are African and 22% white. The white population is over-represented and the African population is under-represented in this age cohort relative to their weighting in the whole population. This is largely due to differences in life expectancy. Pension receipt is chiefly concentrated in the African population however, as the means test screens out most elderly white people. Thus while only 1% of age eligible whites receive the state pension, take up in the age-eligible African population is over 80%[13].The majority of these pensioners reside in rural areas as part of the legacy of apartheid's geographic segregation. Recipients are also mostly female, with the pension reaching three times as many women as men[14]. This is due in part to the previous age eligibility differential between men and women, as well as the longer life expectancy of

[8] Burns, Keswell, & Leibbrandt, 2005
[9] Duflo, 2003
[10] Keswell, 2004
[11] South African Government Services, 2011
[12] South African Social Security Agency, 2011; National Budget Review , 2012
[13] Burns, Keswell, & Leibbrandt, 2005
[14] Case & Deaton, 1998

women. Although, given the recent equalization in gender age eligibility it is possible that this disparity may decrease somewhat.

The pension also has an obvious gender trend in terms of its impact on unintended beneficiaries in the household. This feature is well documented in the literature, as is the unambiguous impact on reducing household poverty, particularly among rural African households[15].

2.2 Findings Regarding the Widespread Impact of the Pension

There is a rich literature on the impact of the South African state old age pension, not only on the recipients themselves but also on the children and adults who co-reside with them. Earlier works such as that by Case & Deaton investigate the redistributive consequences of such a large cash transfer as well as the behavioural effects, specifically on the allocation of income to food, schooling, transfers, and savings[16]. Using data from the national household survey of South Africa[17] the authors found that despite the simplicity of the targeting indicator (age) the pension is effective in reaching the poorest households and those with children. Furthermore, pension income is spent in much the same way as other income, while the gender of the household head has an impact on the allocation of spending with females spending less on tobacco and alcohol.

The differential spending by gender picked up by Case & Deaton is highlighted by Duflo who evaluates the impact of the pension on children's nutritional status and further, whether or not the gender of the recipient affects that impact[18]. Duflo's findings, using the same 1993 data set, indicate that pension income received by women has a positive impact on anthropometric measures (weight for height and height for age) of young girls, but little effect on that of boys. Male pension income did not have any such effect on children's health status.

Ambler continues the trend of investigating gender differences in the impact of the pension and focuses on decision making within the household, using 2008 data[19]. As in Duflo the age discontinuity in pension eligibility is exploited, and the findings indicate that eligible females are 12 –
16 percentage points more likely to be the primary decision-makers for expenditures than almost-

[15] Burns, Keswell, & Leibbrandt, 2005
[16] Case & Deaton, 1998
[17] Carried out jointly by the World Bank and the Southern Africa Labour and Development Research Unit
[18] Case & Deaton, 1998; Duflo, 2003
[19] Ambler, 2011

eligible females[20]. There is no effect for pension eligible males. It is at least in part through this increase in female decision making that Ambler claims the pension benefits other members of the household. In examining this Ambler echoes Duflo in finding that in 2008, as in 1993, female pension eligibility leads to improved nutritional outcomes for girls, as well as to increased durable goods ownership[21].

The impact of the pension in South Africa also extends to labour supply, although the evidence is mixed. On the one hand some findings indicate that the pension allows women to migrate in search of work as they can leave young children with the elderly, particularly women[22]. Some findings on the other hand suggest that the unemployed tend to attach themselves to the elderly in order to benefit from their pension income. This results in working-age people moving to rural areas where there is even less chance of finding employment[23]. Furthermore Bertrand, Mullainathan and Miller find that there is a significant reduction in employment and labour supply of prime working-age individuals who live in three generational households that contain a pension eligible person[24]. Additionally these effects have a strong gender element with the negative labour supply effect being larger when the pension eligible person is female rather than male, and the effect is largest for working-age males. More recent works suggest, however, that this negative response of labour supply is conditional on negative shocks occurring in rural areas, as well as the exclusion of temporary migrant labourers. When these non-resident migrant workers are included as household members the negative labour supply disappears[25]. Again, working-age females are more likely to be migrant workers in pension eligible households, particularly when the pensioner is female. Furthermore, Keswell finds that the employment elasticity for working-age individuals in pension eligible households is positive and significant after controlling for negative household shocks, although only when the pension recipient is female[26]. Ambler indicates that male - but not female - personal income does not increase at the age of pension eligibility. This is an indication that the accompanying documented withdrawal from the labour force cancels out the additional pension income for males only. Further investigation is required as there is a similar withdrawal from the labour force for females, so it is puzzling why the apparent cancelling out effect occurs for one gender and not the other. Ambler thus goes on to show that it is due to the higher pre-pension earnings of males over females which results in the pension income representing an increase in what females were earning prior to eligibility, while for males it is rather a replacement.

These findings underpin the gender differential in the impact of the pension, not only in reference to the pensioner but also the unintended beneficiaries. This gender effect is reflected in the evidence on the impact of the pension on the educational attainment of grandchildren. This evidence is

[20] Duflo, 2003
[21] Duflo, 2003
[22] Edmonds, Mammen, & Miller, 2005
[23] Klasen & Woolard, 2009
[24] Bertrand, Mullainathan, & Miller, 2003
[25] Posel, Fairburn, & Lund, 2006
[26] Keswell, 2004

however limited, and the two papers which do explore this topic (Edmonds and Hamoudi &Thomas) do so in the context of examining a larger question[27].

In a paper exploring permanent income-based decision responses to anticipated additional income, Edmonds examines the schooling responses of grandchildren to the anticipated income of the state old age pension[28]. Of interest for this analysis, the study examines the response of school attendance as well as schooling attainment to the anticipated pension income. It does so by comparing the schooling attainment of children in households that are eligible for the pension to children in households that are nearly eligible. The paper employs a regression discontinuity design, exploiting the age eligibility requirement for receipt of a state pension. The sample in Edmonds is restricted to rural, African children living in African headed households with an elder between the ages of 50 and 75. Using data from the 1999 Survey of the Activities of Youth in South Africa Edmonds finds that there appears to be large changes in schooling when a male elder becomes pension eligible for the social pension. Schooling attendance of children 13 – 17 rises, while completed schooling appears to be increasing in the time a child has lived with a pension eligible male[29]. Furthermore, boys generally have lower schooling attendance rates and lower school completion rates in households that are nearly eligible than in households that are eligible for pension receipt. In terms of educational attainment each additional year of exposure to a pension eligible male increases attainment and primary school completion rates for boys, while no such effects are found for girls or for pension eligible females. Edmonds notes that in general schooling appears to be more sensitive to pension income for boys than girls, especially with male pension eligibility[30].

In their paper looking at the South African old age pension Hamoudi & Thomas explore the importance of treating household structure and living arrangements as endogenous for re-interpretation of the existing findings in the literature regarding the impact of the pension[31]. As an example illustrating this they draw on the impact of the pension on co-resident children's educational attainment. The sample includes 6 to 19 year olds who live with an elder between the ages of 50 and 75, drawn from the Demographic and Health Survey conducted in 1998. The sample is also stratified into young boys and girls (6 – 12) and older boys and girls (13 – 19). The grade in which the child is currently enrolled (or was last enrolled) translated into the number of years of schooling necessary to attain that grade is used as the measure of educational attainment.

[27] Edmonds, 2006; Hamoudi & Thomas, 2005
[28] Edmonds, 2006
[29] Edmonds, 2006
[30] Edmonds, 2006
[31] Hamoudi & Thomas, 2005

Consistent with Edmonds' findings the results indicate that both the presence of a pension eligible person in the household, as well as pension income, is positively associated with children's educational attainment[32]. They find however that a pensioner in the household benefits young girls more than young boys. Interestingly, when distinguishing between male and female pensioners, they find that young girls' improved educational attainment is even greater when the pensioner is male. However, for older children the findings are the opposite, with older boys benefitting from living with a male pensioner while older girls achieve lower education levels. Among older children male pension income is associated with positive educational outcomes among boys, and significantly different negative outcomes among girls, while female pension income has roughly the same zero or negative effect on both older boys and girls. Among younger children however female pension income has a positive or zero effect on girls and a significantly different negative or zero impact on boys. While generally consistent with other findings, the results of Thomas & Hamoudi are more nuanced and provide a more detailed picture[33].

Hamoudi & Thomas also highlight the shortcomings of using the age eligibility requirement as a perfect predictor of pension receipt in examining pension impact, as is common in the literature[34]. They argue that take-up is not universal, and go on to highlight the number of instances where individuals fall short of eligibility but still report receiving a pension. The authors thus claim that the age eligibility rule cannot be relied upon to identify the causal effect of the pension in regression discontinuity or "intention to treat" type designs. As such they implement an instrumental variables framework using the age eligibility rule as the instrument for pension receipt.

The regression specification employed in Edmonds will form the basis of the identification strategy in this paper while the insights from Hamoudi & Thomas will be drawn upon as well. More specifically while the regression discontinuity approach will form the foundation of this study the sensitivity of the findings will also be tested by using an instrumental variables approach. At this point the state of educational attainment in South Africa is worth reviewing in order to motivate the choice of dependent variables.

[32] Edmonds, 2006
[33] Hamoudi & Thomas, 2005
[34] Hamoudi & Thomas, 2005

2.3 An Overview of Educational Attainment

Education is perceived to be the vehicle for transforming a greatly unequal society into a more egalitarian one[35]. While South Africa has made significant progress toward equity in education, where 'equity' is defined as equal treatment of persons of all races, the country has been less successful in promoting 'equity' when it is defined either as equal educational opportunity for students of all races, or as educational adequacy[36]. Thus research into educational attainment in South Africa must begin with a discussion on the lasting impact of apartheid on the country's educational system. From 1948 to 1994 legislation enforced racial segregation such that levels of income, employment, housing, health, education, and virtually every aspect of life were vastly different across race groups. The resultant inequality is a long lasting legacy of apartheid, with largely Africans stuck at the lower end of the scale and whites dominating the upper end. This racial disparity is as apparent in schooling outcomes as anywhere else, and while there is essentially no gender gap in schooling, racial gaps in education persist, although they are declining[37].

The gap has been shown to be as large as three grades in completed schooling between Africans and whites, and Africans have lower numeracy and literacy skills than other racial groups[38]. One important reason for this disparity is the extreme variance in school quality and spending on educational infrastructure during apartheid. At the height of apartheid for every R1 spent on white pupils, spending on Indian and coloured pupils was 76 cents and 48 cents respectively while per capita expenditure on African pupils was only 19 cents[39]. While there has been substantial redress in the fiscal allocation of educational spending, and the current constitution of South Africa guarantees access to education for all, schooling still carries a cost. This includes direct costs such as tuition fees, as well as indirect costs of uniforms, text books, and transport[40]. Furthermore there is an opportunity cost attached to attending school for older pupils in the form of foregone wages. Evidence indicates that school fees are negatively correlated with delayed progress through school, suggesting that children that attend poorer quality schools, as signified by lower school fees, are more likely to fail and repeat grades[41].

[35] van der Berg, 2007
[36] Fiske & Ladd, 2004
[37] Anderson, Case, & Lam, 2001
[38] Anderson, Case, & Lam, 2001; Anderson, 2003
[39] Bhorat & Oosthuizen, 2009
[40] Anderson, 2003
[41] Anderson, Case, & Lam, 2001

South Africa has almost universal primary school enrollment, with these rates remaining high into the teenage years. Findings from the Western Cape indicate that progress though school differs markedly by race with over 80% of white students progressing through secondary school at the normal rate of one grade per year, and only about 40% of coloured and less than 30% of African students doing so[42]. While dropping out of school is one reason for this difference, it has been shown that high rates of grade repetition amongst African learners play a major role. After failing a grade however, African students are less likely to drop out of school than coloured students. Thus while African students have particularly high rates of grade repetition, they also have high enrollment rates late into the teenage years[43]. Further research suggests that these findings are reflected at the national level, with the racial gap being largely attributed to a high rate of grade repetition amongst Africans, yet little or no difference in enrollment rates across racial groups[44].

Policymakers rely chiefly on the proportion of high school students passing their grade 12 examinations to measure educational outcomes, an indicator with serious limitations. For example it is possible that schools respond to the pressure to demonstrate higher grade 12 pass rates by discouraging students from continuing to grade 12[45]. This would then result in increased grade repetition as well as higher drop-out rates. While enrollment figures remain high across all racial groups in South Africa, Africans are more likely to fail and repeat grades than any other racial group and as a result they progress through school more slowly. Grade repetition can have a significant influence on final educational attainment, and has been shown to predict subsequent school failure in both the US and South Africa. Thus grade repetition is a particularly important educational attainment measure as it is both an indicator of previous failure and a predictor of subsequent failure and even drop out[46].

Even after controlling for school fees, pupil/teacher ratios, teacher salary level, and province, schools containing mostly white pupils have a 25 percentage point higher grade 12 pass rate on average than mostly black schools[47]. This suggests that the difference lies in family background and/or the ability of schools to translate school resources into educational attainment. While there are many factors contributing to low achievement at school that extend well beyond the control of schools, including poverty, malnutrition, poor employment prospects for secondary school graduates, and the HIV/AIDS pandemic, the role of the family is certainly important. Teasing out the

[42] Lam, Ardington, & Leibbrandt, 2011; Lam, Ardington, & Leibbrandt, 2006
[43] Lam, Ardington, & Leibbrandt, 2011
[44] Branson & Lam, 2009; Anderson, Case, & Lam, 2001
[45] Fiske & Ladd, 2004
[46] Anderson, Case, & Lam, 2001; Department of Education, 2011
[47] van der Berg, 2007

relationship between family structure and schooling attainment is not straightforward, however this study will explore one aspect of it, namely the impact of pensioners on the progress through school of co-resident children.

3. Methodology

The methodology employed in this paper begins by following that of Edmonds, while including some valuable insights from Hamoudi & Thomas to provide a more extensive account as well as a robustness check[48]. The basic estimation follows a regression discontinuity design exploiting the age eligibility rule of the pension. Since take up of the pension may be an endogenous household decision, using the age eligibility rule rather than actual take up eliminates any potential problems regarding systematic differences between pension and non-pension households. Specifically, a person's date of birth is uncorrelated with any important individual characteristics, thus any differences in behaviour or outcomes between persons living in pension eligible and nearly-eligible households can be causally attributed to receipt of the pension.

The underlying identification assumption of this approach is that the only difference between households that are nearly pension eligible and those that are pension eligible is the pension income itself. Thus any differences in educational attainment between children residing in the two different households can be attributed to the pension[49]. For such an approach, the sample is limited to households containing an elderly resident between the ages of 50 – 75, thus the effect of an age eligible pensioner is identified by comparing the effect of an elderly person who is near but below eligible age to a person who is age eligible. The sample is further limited to rural households with an African head and African children. This is consistent with the sample of interest in Edmonds. This particular sample is chosen as the pension is most effective in targeting rural Africans, and the impact on these poorer households is of most interest in the context of social welfare[50]. Furthermore concerns regarding educational attainment, and more specifically grade repetition, are considerably more focused on the African population.

[48] Edmonds, 2006; Hamoudi & Thomas, 2005
[49] Duflo, 2003
[50] Burns, Keswell, & Leibbrandt, 2005

The basic regression specification is as follows:

$$Y_{ij} = \alpha_0 + \alpha_1 EM_1 + \alpha_2 EB_1 + \beta_1 MPHH_i + \beta_2 FPHH_i + \beta_3 PBHH_i + \gamma_1(AMij) + \gamma_2(AFij) + \varepsilon_{ij}$$

Where Y_{ij} is one of two outcome variables measuring educational attainment for child *i* in household *j*. For the initial model the dependent variable measuring educational attainment is the number of years a child has repeated at school. This measure considers not only the number of grades that have been repeated, but also the number of times a grade has been repeated. For this dependent variable the age of the child is also controlled for. A plausibility check resulted in a number of observations being removed from the sample as given the current grade and age of the child it was not possible for them to have repeated as many grades as indicated. This resulted in the highest number of years having been repeated limited to five (See Appendix A).The second measure of educational attainment used, years above correct age for grade, is a more complete measure of educational attainment as it takes into account not only the number of years a child has repeated, but also the possibility that they started school at a late age (older than 6). The variable measures how many years older a child is than the correct age for their current grade, had they begun school at the correct age and not repeated any grades. Thus the greater the gap between current age and correct age the slower the progress through has been. Again, this variable required careful plausibility checks as the variable in the data measuring the year a respondent first enrolled in grade 1 was not particularly well answered (See Appendix A). It is clear that these two measures of educational attainment are strongly related, and thus one would expect the findings to be consistent.

The explanatory variables in the model reflect for the most part those employed by Edmonds[51]. The first, *EM*, is an indicator for the presence of an elderly male aged 50-75 in the household, while *EB* is an indicator of both a male and female elderly person aged 50 -75 in the household. The omitted category is an elderly female aged 50-75. *AM* and *AF* are third order polynomial expansions in the age of the eldest male and eldest female in the household. Polynomials control for trends in the variable that determines treatment (age) and their inclusion is a standard method in regression discontinuity models. Polynomials allow for a more flexible regression model and are an important and useful way of assessing the robustness of the regression discontinuity estimates of the treatment effect[52]. A third order polynomial has been used due to its high level of flexibility,

[51] Edmonds E. V., 2006
[52] Lee & Lemieux, 2010

although for the most part the findings are robust to the alternative inclusion of either linear or quadratic age trends (See Appendix B).

Of greatest interest here are the variables *MPHH*, *FPHH*, and *BPHH*. These are the indicators for whether or not the household contains a pension eligible male, female, or both. The β coefficients on these variables indicate the impact that the presence of a pension eligible elderly person in the household has on the educational attainment of any children living in the household. The coefficient β_1 indicates the impact of a pension eligible male in the household, while β_2 indicates the impact if the pension eligible person is female rather than male. The β_3 coefficient gives the impact of having both a male and female pension eligible person in the household. Thus $\beta_1 + \beta_2 + \beta_3$ gives the change in educational attainment when moving from no eligible persons to both a male and female eligible person in the household. With respect to the decrease in the age eligibility of men in 2008, the age eligibility rule applied here was kept at 65. Due to the time it takes for news of legislation changes to filter into the elderly community, as well as the lengthy application process, it is likely that at the time of the interview the majority of male pensioners were still 65 and older, with few 63 and 64 year olds already receiving the monthly grant. In the data there are 39 instances of a male aged 63 or 64 reporting pension receipt, while in the specific sub-sample of the data used in this paper there are only 4 and 5 incidences of 63 and 64 year old males respectively reporting pension receipt.

While much of the literature on the impact of the pension on household members other than recipients points to female pensioners having the greatest impact on positive outcomes, Edmonds find that the impact of living with a male rather than a female pensioner is significant in positively affecting grandchildren's educational outcomes. Thus the impact of both male and female pensioners will be considered in this context. As highlighted in Hamoudi & Thomas it is possible that no treatment effects are found when using the full sample of children, ages 6-19, as the relationship between educational attainment and pension receipt may differ depending on the age of the child[53]. For example children of different ages may be providing different services in the home which may affect their progress through school. As such, the sample is divided by age into younger (6-12) and older children (13-19) as well as by gender. This results in a total of nine sets of regressions being estimated: the full sample of children, all boys, all girls, all young children, all older children, young boys, young girls, older boys, and older girls. Teasing out the results in this way allows for a more nuanced picture of the impact the pension has on the educational attainment of grandchildren. Standard errors are clustered at the age of the oldest male - the age of the oldest female throughout, and all regressions make use of survey post-stratification weights[54].

[53] Hamoudi & Thomas, 2005
[54] Edmonds E. V., 2006

4. Data and Preliminary Findings

4.1 NIDS

The National Income Dynamics Study (NIDS)is the first nationally representative panel study in South Africa to document the changes over a number of years in the income, expenditures, assets, access to services, education, health and other dimensions of well being of some 7 305 households[55]. The first wave of this intensive effort of the South African Presidency to track and follow the life changes of about 28 000 people was been conducted by the Southern African Labour and Development Research Unit (SALDRU). While the second wave of the panel will be available for public release at the beginning of 2012, the approach in this paper is cross-sectional with the data coming from the first wave which was conducted in 2008. The baseline questionnaires include information on all members of the household: those who were resident at the time of the interview, as well as those that were non-resident, with residents at the time providing the base sample of individuals who will be followed over time[56]. The target population for NIDS is private households and residents in workers' hostels, convents, and monasteries in all nine provinces. Other collective living quarters, such as prisons and old age homes, were excluded. Households were selected through a stratified, two-stage cluster sample design. In the first stage, 400 Primary Sampling Units (PSUs) were randomly selected from a "Master Sample" from Statistics South Africa of 3000 PSUs. Stratification in the Master Sample is at the district council (DC) level, with 53 DCs[57].

The survey includes information on households as well as individuals. Different questionnaires were administered to adults over the age of 15, and children 15 and under. A few 15 year olds were inadvertently included in the adult questionnaire, although this does not impact on this study as the age criteria encompasses respondents of both the adult and child questionnaire. Certain groups were underrepresented in the sample and thus it is appropriate to use post stratification weights in the regression analysis to provide a nationally representative analysis.

[55] Leibbrandt, Woolard, & de Villiers, 2009
[56] Leibbrandt, Woolard, & de Villiers, 2009
[57] Leibbrandt, Woolard, & de Villiers, 2009

4.2 Preliminary Findings

Table 1: National Mean Summary Statistics for all Households in 2008

	African	Coloured	Asian/Indian	White	Rural	Urban
	1	2	3	4	5	6
Number of pensioners	1 949 698	256 586	91 386	235 178	1 356 228	1 178 287
Household income	3 796	6 805	19 280	21 838	2 778	8 241
Rural	18 573 021	438 141	453 436	128 812	n/a	n/a
Years child is above correct age for grade	1.018	0.711	0.346	0.705	1.113	0.827

Author's own calculations using NIDS and weighted to be nationally representative

Table 1 presents relevant national mean statistics for all households in South Africa. Of the elderly who are receiving a state pension 77% are African, and this is due in large part to the fact that on average African households earn almost one sixth of what white households earn. The majority of pension recipients also live in rural areas, and in all, more than half of state pensioners are Africans residing in rural areas. Furthermore rural households earn on average only a third of what urban households do, and 95% of these poor rural households are African. In terms of educational attainment rural children are on average 1.113 years too old for their current grade while urban children are 0.827 years too old on average. Examining these educational measures by race reveals that Africans progress through school more slowly than any other population group, with African children being on average 1.113 years too old and white children being only 0.827 years too old on average[58].

With this in mind it is easy to see that African children residing in rural areas are of particular interest in the context of the impact of pension income on educational attainment. This subsample is of particular interest due to the effectiveness of the pension in targeting rural Africans, as well as the high instances of grade failure and repetition for rural African learners. This subsample comprises 7 634 individuals residing in 1 128 households. Of these, 2 547 are children of school-going age, of which 1 270 are boys and 1 277 are girls. In total there are 1 456 children residing in households receiving the pension. Summary statistics for the measures of interest for this specific sample are reported in Table 2.

[58] Author's own calculations using NIDS and applying weights to get nationally representative figures. Figures for the total number of years failed are not included as these would be skewed by the age distribution of children within each category.

Table 2: Mean Summary Statistics for Rural African Households with an Elder aged 50 - 75

	All Households	Pension Households	Non-pension Households
	1	2	3
Households:			
Household income (R's)	2 753	3 098	2 369
Household pension income (R's)	n/a	898	n/a
Household size	7.55	7.8	7.26
Households with school-aged children	92.15%	92.21%	92.08%
Number of young children in household (6-12)	1.375	1.408	1.33
Number of older children in household (13-19)	1.406	1.401	1.412
Highest grade of household head	4.85	3.99	5.83
Children:			
Years above correct age for grade (boys)	1.34	1.33	1.35
Years above correct age for grade (girls)	0.91	0.97	0.83
Passed grade in 2007	88.09%	87.98%	88.22%
Currently enrolled	93.88%	95.27%	92.30%
Parent pays educational expenses	57.98%	48.98%	68.46%
Grandparent pays educational expenses	26.26%	36.40%	14.50%

Author's own calculations using NIDS and weighted to be nationally representative for the sample population

Pension households earn roughly R729 more than non-pension households on average, and this amount is almost equivalent to the average pension income received by pensioner households which is R898. Pension households are also slightly larger than non-pensioner households with an average of 7.8 residents. Roughly 92% of both pensioner and non-pensioner households contain at least one child of school going age, with pension households having slightly more younger children on average than non-pension households. However, non-pension households have slightly more older children on average than pensioner households. These differences in household composition with respect to children are marginal, and the importance of this will be discussed further in the robustness check on the endogeneity of household composition. A sizable difference is, however, observed between the highest grades attained by household heads, with pensior household heads having attained almost 2 grades lower than non-pension household heads at just below grade 4.

For the children residing in these households current enrollment rates are very high, with children residing in pension households having a slightly higher rate on average. Roughly 88% of children residing in both pension and non-pension households passed the year in 2007. With respect to the number of years above the correct age for grade a child is there is a rather large difference between the averages for boys and girls, with boys being 1.34 years too old and girls only 0.91 years too old. The difference in this measure between boys residing in pension and non-pension households is

negligible, while for girls those residing in pension households are slightly more behind than those in non-pension households. This variable measuring educational attainment is one of the key variables of interest in this study and will be examined further in the analysis section. For 49% of children living in pension households the parents are primarily responsible for payment of school related expenses, and for 36% of children grandparents are responsible. For children residing in non-pension households the figures are quite different with parents being primarily responsible for schooling expenses of 68% of children and grandparents only 15%. This is a likely indication that at least some pension income is going towards the schooling expenses of grandchildren. As these preliminary findings show, there is a strong prevalence of children of school going age living with elderly people. Thus exploring whether or not the additional income received by pension households has an impact on the schooling of children is a worthwhile exercise.

5. Analysis

The aim of the paper is to examine the impact that the state old age pension has on educational attainment of children co-residing with pension recipients. The empirical findings paint a complex picture with a strong gender differential, with respect to both pensioners and children, as well as in the age of the child. Graphs of the relationship between pensioner eligibility and the progress through school of children can be found in Appendix C. While an examination of these graphs does not provide any visual evidence of an obvious discontinuity in attainment at the age of pension eligibility, the regression results may be more informative. Tables 3 and 4 presents the results for the base specification as outlined in the methodology. This includes controls for the presence of a male aged 50 – 75, both a male and female aged 50 – 75, third order polynomials in the age of the eldest man as well as the oldest woman, and most importantly indicators for the presence of a pension eligible male, female, and the presence of both a male and female.

Table 3: Years Failed By Children and Pension Eligibility of Older Adults in Rural African Households

	All children 6 - 19	All boys 6 - 19	All girls 6 - 19	Young children 6 - 12	Older children 13 - 19	Young boys 6 - 12	Young girls 6 - 12	Older boys 13 - 19	Older girls 13 - 19
	1	2	3	4	5	6	7	8	9
Elder male	0.120	0.231	0.070	0.047	0.177	0.013	0.151	0.453*	-0.068
	(0.115)	(0.160)	(0.153)	(0.142)	(0.150)	(0.215)	(0.118)	(0.232)	(0.235)
Elder male & female	-0.061	-0.109	-0.018	-0.047	-0.080	-0.083	-0.059	-0.160	0.028
	(0.088)	(0.134)	(0.121)	(0.083)	(0.115)	(0.149)	(0.100)	(0.191)	(0.169)
Female pensioner	0.108	0.074	0.137	-0.019	0.237	-0.001	-0.081	0.108	0.432***
	(0.089)	(0.141)	(0.083)	(0.075)	(0.174)	(0.123)	(0.088)	(0.248)	(0.157)
Male pensioner	-0.033	-0.247*	0.071	-0.121	0.026	-0.261*	0.000	-0.221	0.146
	(0.082)	(0.129)	(0.120)	(0.097)	(0.115)	(0.155)	(0.127)	(0.215)	(0.198)
Both m & f pensioners	0.013	0.223	-0.250**	0.187*	-0.160	0.321**	-0.016	0.092	-0.523***
	(0.098)	(0.147)	(0.118)	(0.110)	(0.152)	(0.138)	(0.129)	(0.253)	(0.174)
Eldest male	-0.004	0.007	-0.007	-0.014	0.009	-0.022	-0.003	0.045	-0.011
	(0.011)	(0.025)	(0.012)	(0.010)	(0.021)	(0.019)	(0.009)	(0.063)	(0.021)
Eldest male^2	0.000	-0.000	0.000	0.000	-0.000	0.001	-0.000	-0.002	0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)
Eldest male ^3	0.000	0.000	-0.000	-0.000	0.000	-0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Eldest female	0.014	0.018	-0.004	0.029	-0.004	0.038	-0.013	-0.019	0.026
	(0.032)	(0.028)	(0.052)	(0.026)	(0.051)	(0.031)	(0.054)	(0.049)	(0.069)
Eldest female^2	-0.000	-0.000	0.000	-0.001	0.000	-0.001	0.000	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Eldest female^3	0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.123	-0.171	0.180	-0.076	0.704	0.067	0.285	0.140	0.407
	(0.507)	(0.391)	(0.871)	(0.378)	(0.732)	(0.395)	(0.902)	(0.769)	(1.073)
Observations	2,436	6,783	6,837	7,363	7,355	629	576	624	607
R-squared	0.113	0.111	0.147	0.070	0.060	0.073	0.107	0.054	0.105

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses are clustered at the age of the oldest man - age of the oldest woman
All regressions also control for age of the child, and are weighted with survey post stratification weights

The dependent variables are total number of years failed and years above correct age for grade respectively. Column 1 of Table 3 shows the results for all children aged 6 - 19, and revels that none of the three variables indicating pension eligibility in the household are significant. This is not a surprising finding given the very slight difference found in the summary statistics, as well as the evidence presented by Hamoudi & Thomas[59]. Columns 2 – 9 follow with subsets of the sample, broken down by gender and age of the child: column 2 is only boys, column 3 only girls, column 4 young children (6 - 12), column 5 older children (13 – 19), column 6 young boys, column 7 young girls, column 8 older boys and finally column 9 older girls. Breaking up the sample in this way provides a more accurate picture by allowing for a differential impact of the pension by age and gender of the child.

For boys of all ages a male pension recipient in the household has a significant impact on years failed, reducing the number of years failed by 0.247 over boys residing in households without a male pensioner. For girls however the impact is only significant if there is both a male and female pensioner in the household, with this then reducing the number of years failed by a quarter of a year. The findings for young children indicate that residing in a household with both a male and a female pensioner increases rather decreases the number of years failed by 0.187. This increase in the average number of years failed when there is both a male and a female pensioner resident is mirrored in the findings for young boys with a significant increase in total years failed of 0.321 years. This is somewhat mitigated however as the presence of a male pensioner alone significantly decreases the number of years failed by 0.261 years. This results in a total average increase of 0.060 years failed for young boys who live in a household with both a male and female pensioner. For older girls the effect is quite different with the presence of a female pensioner increasing the number of years failed by 0.432 years on average, while having both a male and a female pensioner in the household serves to decrease the average number of years failed by more than half a year. Together this results in an overall decrease of 0.091 years in the average number of years failed by older girls living in households with both a male and a female pensioner. There is no significant impact of residing with a pensioner on the number of years failed for older children, young girls 6 - 12, or older boys 13 - 19.

While the dependent variable measuring the number of years above the correct age for grade of a child captures grade repetition as well as late enrollment, one would expect the results to be similar to the above. Table 4 presents the findings for this second specification, with the columns 1 – 9

[59] Hamoudi & Thomas, 2005

indicating the same subsamples as in Table 3. Again, in column 1 for the full sample of all children, there is no significant effect of the presence of a pensioner on the gap between current age and correct age for grade. However, the presence of a resident male pensioner brings boys of all ages closer to the correct age for their current grade by 0.823 years on average. This is close to a full year, and considering that boys are on average 1.34 years too old for their current grade this impact is a large one. A resident male pensioner also decreases the number of years a young child is above the correct age for their grade by 0.398 years on average. However this effect is negated when there is both a male and a female pensioner present, with the effect being an average increase of 0.433 years in the age gap. Thus for young children co-residing with pensioners of both sexes the overall impact is a 0.035 average increase in the number years above the correct age for grade. This finding is mirrored for young boys with the male pensioner effect being a decrease of 0.694 years on average in the age difference, and the impact of the presence of both a male and a female pensioner being an average increase of just over half a year. Thus overall for young boys residing in households with pensioners of both sexes the average impact is an increase of 0.152 years in the number of years older they are than the correct age for their current grade. The effect for older girls is quite different with a co-resident female pensioner significantly increasing the age gap by 0.738 years on average. This is a significantly large impact, which is however largely mitigated when there is both a male and a female pensioner present in the household which decreases the age gap on average by 0.729 years. The overall impact of co-residing with both a male and a female pensioner is thus an average increase of 0.054 years in the gap between current age and the correct age for their grade. There are no significant effects of pension receipt on progress through school for older children, young girls 6-12, and older boys 13-19. This lack of significance mirrors what was found with the total number of years failed dependent variable.

As expected the results of the two specifications are largely similar, and for the most part they reflect those found by Edmonds[60]. Male pension income has a statistically significant, positive impact on the educational attainment of boys. The average number of years failed is about a quarter of a year less than boys who do not reside with a male pensioner, and they are almost a year closer to being the correct age for their grade on average. While Edmonds finds no significant impact for girls or for female pensioners, the findings here indicate that girls fail about a quarter of a year less on average when benefitting from pension income from both a male and a female pensioner.

[60] Edmonds E. V., 2006

Table 4: Years Above Correct Age for Grade of Children and Pension Eligibility of Older Adults in Rural African Households

	All children 6 - 19	All boys 6 - 19	All girls 6 - 19	Young children 6 - 12	Older children 13 - 19	Young boys 6 - 12	Young girls 6 - 12	Older boys 13 - 19	Older girls 13 - 19
	1	2	3	4	5	6	7	8	9
Elder male	-0.020	0.177	0.103	-0.158	-0.185	-0.347	0.177	0.074	-0.380
	(0.285)	(0.513)	(0.233)	(0.258)	(0.413)	(0.404)	(0.220)	(0.786)	(0.429)
Elder male & female	0.005	-0.093	0.068	-0.052	-0.004	0.033	-0.127	-0.492	0.333
	(0.154)	(0.233)	(0.172)	(0.149)	(0.285)	(0.246)	(0.138)	(0.395)	(0.341)
Female pensioner	0.144	0.197	0.040	-0.001	0.517	0.106	-0.135	0.324	0.783***
	(0.204)	(0.284)	(0.168)	(0.104)	(0.369)	(0.145)	(0.149)	(0.478)	(0.294)
Male pensioner	-0.289	-0.823***	0.071	-0.398**	-0.408	-0.694**	-0.167	-0.784	-0.058
	(0.207)	(0.265)	(0.243)	(0.163)	(0.257)	(0.285)	(0.136)	(0.487)	(0.455)
Both m & f pensioners	0.109	0.361	-0.201	0.433***	-0.241	0.542***	0.224	0.152	-0.729**
	(0.196)	(0.239)	(0.224)	(0.162)	(0.316)	(0.189)	(0.180)	(0.500)	(0.325)
Eldest male	0.041	0.117*	0.021	-0.011	0.072*	-0.023	0.016	0.055	0.032
	(0.026)	(0.064)	(0.020)	(0.019)	(0.040)	(0.042)	(0.020)	(0.146)	(0.030)
Eldest male^2	-0.001	-0.003	-0.000	0.000	-0.002	0.001	-0.000	-0.001	-0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)
Eldest male ^3	0.000	0.000	0.000	-0.000	0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Eldest female	-0.058	-0.026	-0.165*	0.049	-0.062	0.060	0.032	-0.115	-0.026
	(0.058)	(0.068)	(0.087)	(0.042)	(0.068)	(0.044)	(0.123)	(0.072)	(0.101)
Eldest female^2	0.001	0.001	0.003	-0.001	0.001	-0.001	-0.000	0.003	-0.000
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Eldest female^3	-0.000	-0.000	-0.000	0.000	-0.000	0.000	0.000	-0.000*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.753**	0.572	3.570***	0.035	1.956**	0.430	-0.411	2.261	2.113
	(0.880)	(1.212)	(1.330)	(0.550)	(0.841)	(0.605)	(1.992)	(1.617)	(1.453)
Observations	2,145	6,642	6,687	7,260	7,094	577	525	497	473
R-squared	0.012	0.032	0.014	0.017	0.029	0.027	0.022	0.043	0.036

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses are clustered at the age of the oldest man - age of the oldest woman
All regressions are weighted with survey post stratification weights

The subsamples of children based on gender and age found in columns 4 – 9 of Tables 3 and 4 reflect the Hamoudi & Thomas approach of teasing out the impact on specific subsets of children[61]. Overall their results indicate that the presence of a female pensioner results in better educated young girls and poorer educated young boys, while a co-resident male pensioner results in higher educational attainment for older boys and lower educational attainment for girls. There is no significant impact found for the presence of a female pensioner. Their findings for young boys are mirrored here, while there is no significant impact on young girls or older boys of a co-resident pensioner. A key difference, as can be seen in column 9 of Tables 3 and 4, is that a female pensioner appears to have a large, negative impact on older girls, resulting in lower educational attainment.

6. Robustness Checks

6.1 Instrumental Variables Regression Analysis

The evidence discussed thus far regarding the impact of the pension identifies the impact using a regression discontinuity design which compares outcomes in eligible households to nearly eligible households. I showed that the underlying assumption is that these households are similar in all respects, and that any difference is due to the pension. Another very important assumption is that all age eligible elderly people do actually receive the pension. This seems plausible given the magnitude of the grant, the accessibility, as well as the fact that there is little stigma attached to it. The data however suggests that this may not be the case. Hamoudi & Thomas find that take up is not in fact universal among those who are eligible, and in fact some elderly people who are not yet eligible receive the transfer[62]. This evidence suggests that the regression discontinuity design so often applied will understate the true impact of the pension.

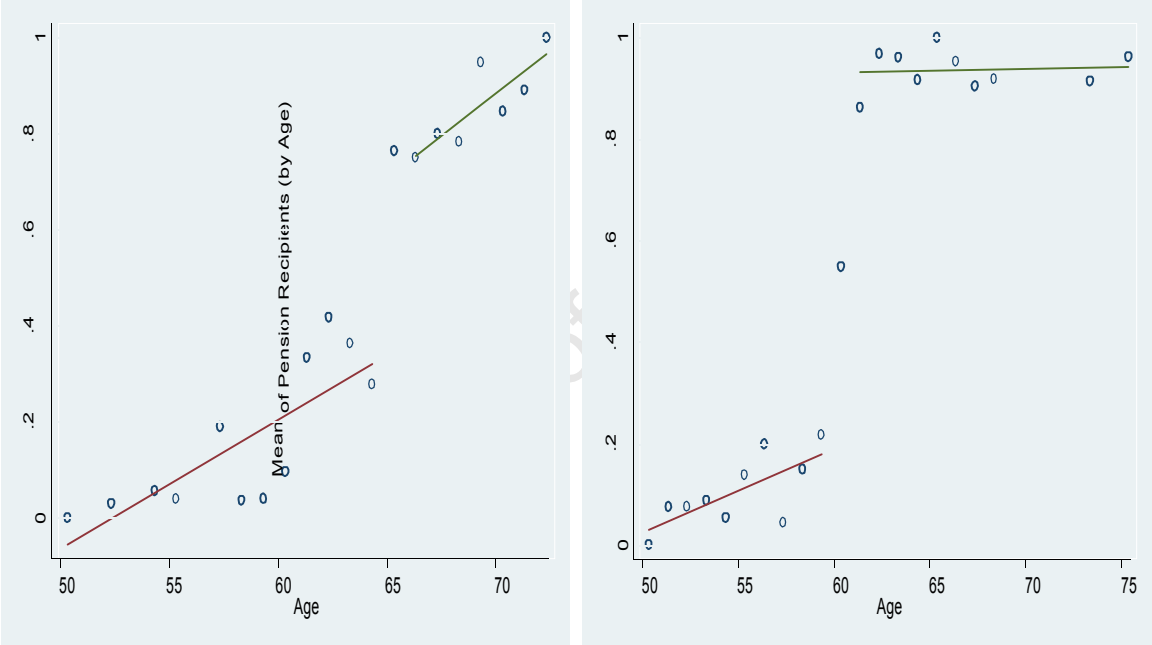
Figures 1 & 2 indicate the discontinuity in reported pension receipt at the age of eligibility for elderly males and elderly females respectively. The plots illustrate the higher take up of the pension by

[61] Hamoudi & Thomas, 2005
[62] Hamoudi & Thomas, 2005

women than by men. It is also clear from these plots that there are some elderly people who are reporting pension receipt while they are not yet eligible, and that some eligible elders are not reporting receipt of the pension. While some of this could be due to reporting error in the data, it is also likely that there are indeed ineligible people receiving the pension and eligible people who do not receive it. There are reported instances where elderly men were allowed to collect pension income prior to eligibility as a result of the difference in male and female eligibility. Either way the case can be made that while pension eligibility is a good predictor of receipt, it is not a perfect one.

Figures 1 & 2: Reported Pension Receipt by Age of Pensioner

1. Male Pensioners **2. Female Pensioners**



Thus, in addition to a regression discontinuity approach which assumes that pension eligibility does perfectly predict pension receipt, an instrumental variables specification will be employed. In this framework the age eligibility rule will be used as an instrument for pension receipt. It is a suitable instrument as date of birth is highly correlated with pension receipt while uncorrelated with any unmeasured characteristics. The other explanatory variables remain the same as in the regression discontinuity, as do the two dependent measures of educational attainment.

Tables 5 and 6 present the estimates for the IV regressions, where columns 1 – 9 indicate the same subsamples as for the regression discontinuity approach. For the total number of years failed the

most robust findings appear to be those for older girls and all girls, where female pension receipt has a significantly negative impact on educational attainment, while the presence of both a male and female pensioner mitigates this. The IV results for the number of years above the correct age for grade a child is closely reflect those of the regression discontinuity design, with the only real difference being that the effect size as measured by the IV framework is greater. This finding underpins the point that a regression discontinuity design can under estimate the true impact of the treatment[63]. In general the findings are thus robust to either a regression discontinuity or instrumental variables approach.

6.2 The Endogeneity of Household Composition

It is widely understood that the interpretation of the evidence regarding the impact of the pension on household members other than the pensioner depends on the type of relationship between household composition and the pension. There is evidence that households alter their structure when the elderly become pension eligible, with working-age women departing, and the presence of young children under 5 and young women of child-bearing age increasing[64].

Hamoudi & Thomas use fixed characteristics of adult height and educational attainment in testing the endogeneity of household composition. The evidence presented indicates that pension eligibility is not only associated with changes in the age and gender composition of the household, but also in the distribution of human capital as indicated by those fixed characteristics[65]. Since these characteristics are fixed these changes reflect the selectivity of household composition based on those characteristics. If household members sort themselves into households on the basis of characteristics that are not controlled for in the model, then comparing any outcomes between pension eligible and nearly eligible households captures not only the direct effect of the pension, but also the effects of these changes on living arrangements. The concern with this endogeneity is that new children enter the household once it becomes a pension eligible residence and make it appear that schooling outcomes change even when in reality they do not. In order to ascertain if this is indeed the case there are two measures to be considered: firstly is there any evidence that children move into a household within two years of it becoming an eligible household, and secondly is eligibility a significant determinant of household size and structure.

[63] Hamoudi & Thomas, 2005
[64] Edmonds, Mammen, & Miller, 2005
[65] Hamoudi & Thomas, 2005

Table 5: Years Failed By Children and Pension Eligibility of Older Adults in Rural African Households (IV)

	All children 6 - 19	All boys 6 - 19	All girls 6 - 19	Young children 6 - 12	Older children 13 - 19	Young boys 6 - 12	Young girls 6 - 12	Older boys 13 - 19	Older girls 13 - 19
	1	2	3	4	5	6	7	8	9
Female pensioner	0.165	0.109	0.187*	-0.023	0.325	-0.008	-0.110	0.117	0.610***
	(0.133)	(0.238)	(0.109)	(0.137)	(0.233)	(0.321)	(0.120)	(0.329)	(0.220)
Male pensioner	-0.053	-0.391	0.083	-0.153	-0.004	-0.409	-0.009	-0.360	0.174
	(0.141)	(0.267)	(0.188)	(0.161)	(0.204)	(0.475)	(0.166)	(0.341)	(0.374)
Both m & f pensioners	-0.012	0.241	-0.316**	0.241	-0.252	0.430	-0.014	0.039	-0.739***
	(0.133)	(0.233)	(0.142)	(0.153)	(0.200)	(0.279)	(0.154)	(0.333)	(0.231)
Elder male	0.109	0.209	0.062	0.039	0.159	-0.009	0.158	0.440*	-0.082
	(0.115)	(0.164)	(0.158)	(0.140)	(0.155)	(0.211)	(0.119)	(0.240)	(0.248)
Elder male & female	-0.044	-0.055	-0.016	-0.029	-0.064	-0.029	-0.063	-0.131	0.047
	(0.089)	(0.152)	(0.122)	(0.079)	(0.121)	(0.174)	(0.099)	(0.208)	(0.187)
Eldest male	-0.005	0.005	-0.008	-0.014	0.006	-0.026	-0.002	0.045	-0.017
	(0.011)	(0.026)	(0.013)	(0.011)	(0.021)	(0.019)	(0.010)	(0.063)	(0.023)
Eldest male^2	0.000	-0.000	0.000	0.000	-0.000	0.001	-0.000	-0.002	0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)
Eldest male ^3	0.000	0.000	-0.000	-0.000	0.000	-0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Eldest female	0.021	0.028	0.000	0.039	-0.000	0.059	-0.020	-0.021	0.036
	(0.036)	(0.040)	(0.053)	(0.038)	(0.054)	(0.059)	(0.061)	(0.052)	(0.073)
Eldest female^2	-0.000	-0.001	-0.000	-0.001	0.000	-0.001	0.000	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Eldest female^3	0.000	0.000	0.000	0.000	-0.000	0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.217	-0.276	0.114	-0.205	0.661	-0.244	0.391	0.193	0.447
	(0.547)	(0.524)	(0.869)	(0.507)	(0.762)	(0.760)	(0.987)	(0.765)	(1.102)
Observations	2,436	6,783	6,837	7,363	7,355	629	576	624	607
R-squared	0.115	0.105	0.147	0.057	0.053	0.049	0.093	0.041	0.075

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses are clustered at the age of the oldest man - age of the oldest woman

All regressions also control for age of the child, and are weighted with survey post stratification weights

Table 6: Years Above Correct Age for Grade of Children and Pension Eligibility of Older Adults in Rural African Households (IV)

	All children 6 - 19	All boys 6 - 19	All girls 6 - 19	Young children 6 - 12	Older children 13 - 19	Young boys 6 - 12	Young girls 6 - 12	Older boys 13 - 19	Older girls 13 - 19
	1	2	3	4	5	6	7	8	9
Female pensioner	0.209	0.251	0.054	0.028	0.627	0.255	-0.188	0.337	0.954**
	(0.318)	(0.531)	(0.231)	(0.187)	(0.497)	(0.423)	(0.207)	(0.674)	(0.397)
Male pensioner	-0.456	-1.468**	0.083	-0.536*	-0.777	-1.197	-0.214	-1.310	-0.250
	(0.348)	(0.642)	(0.366)	(0.274)	(0.481)	(0.861)	(0.183)	(0.800)	(0.826)
Both m & f pensioners	0.087	0.270	-0.241	0.527**	-0.339	0.561*	0.271	0.010	-0.895**
	(0.263)	(0.396)	(0.278)	(0.220)	(0.386)	(0.303)	(0.226)	(0.614)	(0.431)
Elder male	-0.043	0.228	0.106	-0.188	-0.219	-0.326	0.171	0.048	-0.389
	(0.294)	(0.550)	(0.239)	(0.261)	(0.424)	(0.415)	(0.230)	(0.803)	(0.449)
Elder male & female	0.069	0.079	0.060	0.014	0.088	0.226	-0.105	-0.378	0.376
	(0.177)	(0.322)	(0.175)	(0.166)	(0.304)	(0.335)	(0.143)	(0.396)	(0.385)
Eldest male	0.038	0.124*	0.021	-0.014	0.066	-0.021	0.017	0.046	0.024
	(0.027)	(0.068)	(0.021)	(0.021)	(0.041)	(0.045)	(0.021)	(0.150)	(0.032)
Eldest male^2	-0.001	-0.003	-0.000	0.000	-0.002	0.000	-0.000	-0.001	-0.000
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)
Eldest male ^3	0.000	0.000	0.000	-0.000	0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Eldest female	-0.050	-0.016	-0.164*	0.079	-0.061	0.113	0.016	-0.123	-0.014
	(0.068)	(0.091)	(0.091)	(0.055)	(0.076)	(0.081)	(0.137)	(0.081)	(0.106)
Eldest female^2	0.001	0.001	0.003	-0.001	0.001	-0.002	-0.000	0.003	-0.000
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
Eldest female^3	-0.000	-0.000	-0.000	0.000	-0.000	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.680	0.346	3.542**	-0.383	2.030**	-0.411	-0.089	2.514	1.976
	(1.016)	(1.503)	(1.398)	(0.684)	(0.913)	(1.056)	(2.205)	(1.642)	(1.525)
Observations	2,145	6,642	6,687	7,260	7,094	577	525	497	473
R-squared			0.014				0.004		0.014

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses are clustered at the age of the oldest man - age of the oldest woman

All regressions are weighted with survey post stratification weights

The findings from examining the effect of pension eligibility on household composition are reported in Table 7. The presence of a female pensioner in the household is not significant in explaining household structure in any way, and neither is it significant in determining the probability of a child moving into a household within two years of the household becoming pension eligible. The only age cohorts for whom the presence of a male pensioner in the household is a significant determinant are male infants, aged 0 – 5, and female adults, aged 25 – 49. Neither of these age cohorts are of school going age and are thus not of concern in this context. Interestingly, the presence of a male pensioner in the household has a negative effect on the probability of a child moving into a household within two years of it becoming pension eligible.

While these checks do not directly address the issue of co-resident selectivity based on unobservable characteristics which cannot be controlled for, they do show that pension eligibility is not a strong determinant in how African rural households arrange themselves. This is in line with what was suggested by the largely similar summary statistics for household composition of pensioner and non-pensioner households.

Table 7: The Effect of Pension Eligibility on Household Composition

	Households with a…	
	Women aged 50 - 75	Man aged 50 - 75
	1	2
Dependent Variable:		
Household size	0.634	1.131
	(0.431)	(0.867)
Number of:		
Boys 0 - 5	0.115	0.359**
	(0.078)	(0.168)
Girls 0 - 5	-0.074	0.047
	(0.074)	(0.106)
Boys 6 - 14	0.053	0.181
	(0.086)	(0.130)
Girls 6 - 14	0.104	0.013
	(0.111)	(0.175)
Young men 15 - 24	0.031	-0.103
	(0.154)	(0.208)
Young women 15 - 24	-0.056	0.282
	(0.116)	(0.278)
Men 25 - 49	0.156	0.023
	(0.124)	(0.129)
Women 25 - 49	0.148	0.271*
	(0.091)	(0.155)
Children moving in within 2 years of household becoming pension eligible	-0.018	-0.045*
	(0.025)	(0.025)

Each cell is the coefficient on pension eligibility for females (1) and males (2) in a separate regression. Regressions are weighted with survey post stratification weights. All regression include a third order polynomial in the age of the oldest woman (man) and control for the presence of a man (woman) aged 50 - 75 and a pension eligible man(woman).
*** p<0.01, ** p<0.05, * p<0.1 and Standard errors in parentheses.

7. Implications and Discussion

Using a nationally representative 2008 data set this paper has explored the relationship between pension income and the progress through school of children living in recipient households. As is common in the pension literature the age eligibility rule has been exploited in order to identify the effect of the pension. African children residing in African headed, rural households were identified as most at risk of poor schooling outcomes, as well as living in households most dependent on the additional income provided by the pension. The use of the specific subsample of children co-residing with an elderly person between the ages of 50 and 75 allows one to infer that it is indeed the income from the pension that has an impact on educational attainment rather than just the influence of having a grandparent in the household. Problems of selectivity in household structure associated with pension receipt potentially complicate the inference of child outcomes, and this has been explored directly in the empirical work. After accounting for all of these complexities, there are some key results that are evident[66].

It is clear from the direction of the impact on the separate male and female pensioner indicators, as well as the indicator for both a male and a female pensioner, that both boys and girls benefit from the pension income of male pensioners, while the presence of a female pensioner appears to reduce educational attainment. While this is not what would necessarily be expected given the findings in the literature on health outcomes and labour impacts, it is suggested in both Edmonds and Hamoudi & Thomas that male pension income has an unambiguous and positive impact on the educational attainment of co-resident children[67]. As indicated by the findings in this study, that pattern still holds 10 years on. A key change however appears to be in the negative impact that a female pensioner has on the progress through school of older girls. It is possible that this is due to increased responsibilities in the home for older girls in terms of housework and caring for younger children in pensioner households. This may have arisen in part due to working-age females leaving young children at home in order to search for employment, and the additional responsibility being shared by the pensioner and the older girls. Furthermore, increases in schooling attainment for boys may reflect their relative lagging behind girls in age for current grade.

Overall the findings in this study support the notion that the state old age pension benefits more than just the intended elderly beneficiary in the household. In any deliberations over the importance or relevance of this social welfare grant the widespread impact within the household of this monthly

[66] Hamoudi & Thomas, 2005
[67] Edmonds E. V., 2006; Hamoudi & Thomas, 2005

assistance cannot be ignored. The results also reflect the strong gender dimension of the pension, with respect to both pensioners and children. While the gender differential between boys and girls may reflect, at least in part, the relatively poorer educational attainment of boys, the gender of the recipient has a very real bearing on the educational attainment of children[68]. Furthermore, by teasing out the results, it has been shown that different age cohorts of children are affected differently by pension income. This finding could be useful in formulating effective policies aimed at specific child age cohorts. For example older girls may benefit from some extra support as they appear to be disadvantaged by co-residing with a female pensioner. While the results of this study are specific to rural African households, it is exactly this subset of South Africans who would be most affected by any changes in the current pension legislature. With recent legislation extending the age eligibility criteria for the child support grant to 18 it will be interesting to see what impact this has on the effect of the old age pension on educational outcomes of older children[69].

[68] Fiske & Ladd, 2004
[69] Child Support Grant, 2011

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9. Appendix

A: Data Quality

Looking at the year respondents started school

In the adult and child NIDS questionnaires the questions asking about the year the respondent first attended school, w1_a_h5 and w1_c_c7, had a relatively high response rate for children (76.1%) and a moderate response rate for adults (41%)[70]. While focusing on child respondents, in analysis using this question, it is noted that 138 observations for children should be set to missing as they indicate a school starting age that is less than four or greater than 11. Furthermore it is cautioned that this variable is best suited to analysis on those under the age of 20. On closer inspection however, this variable is more problematic than that. Having set the implausible starting ages (under four or older than 11) to missing there are still a number of implausible values. Going by the year the respondent first enrolled in school, there are about 50 respondents who are currently in a grade that is not possible given the number of years they have been at school. For example respondents reportedly started school in 2007 or 2008 but are already currently enrolled in Grade 4 or 5. Observations for which the current grade enrolled in is two or more above the grade that is possible given the number of years spent at school were also set to missing. For example if a respondent is currently enrolled in grade 10 and they first enrolled in grade 1 in 2000 they were set to missing as it is implausible that after only 8 years at school they are in grade 10.

Looking at grade repetition

There are some inconsistencies in the number of years people have apparently failed and how old they are now and what grade they are currently enrolled. For example some children have repeated grades 10 times but are currently enrolled in grade 10 and are 17 years old – this is not possible. On closer inspection of those respondents whose total number of years failed was great than five (for people >14 years old) and four (for those <15 years old) there is obviously some error: given the current grade and age of the respondent, it is not possible for them to have failed that many years. Observations with implausible figures for number of years failed based on their current grade and age were set to missing. In total 54 observations were set to missing, resulting in five being the most

[70] Branson & Lam, 2009

number of grades repeated in the sample. It is interesting to note that the vast majority of observations that were set to missing were coded as failing Grade 3 three times for three of the grade repetition questions (in other words grade 3 was repeated nine times in total).

In the NIDS discussion paper on the educational measurement questions in the dataset these questions regarding grade repetition are discussed[71]. A potential shortfall highlighted is that the structure of the questions only allows for respondents to have repeated four grades, and that there could be respondents who have repeated more than that. It is possible however for these grades to have been repeated numerous times. As discussed above however, it appears that for those who have repeated years at school more than five times the answers are not plausible anyway. Thus the concern regarding the structure of the grade repetition question may not be a serious one.

B: Robustness to Polynomial Specification

Tables 8 – 11 report the regression estimates for different specifications of the model in order to test the sensitivity of the results to the use of alternative polynomials in the age of the eldest man and eldest woman. For the most part the key results are robust to these tests.

[71] Branson & Lam, 2009

Table 8: Years Failed By Children and Pension Eligibility of Older Adults in Rural African Households (2nd order)

	All children 6 - 19	All boys 6 - 19	All girls 6 - 19	Young children 6 - 12	Older children 13 - 19	Young boys 6 - 12	Young girls 6 - 12	Older boys 13 - 19	Older girls 13 - 19
	1	2	3	4	5	6	7	8	9
Elder male	0.121	0.173*	0.082	0.148	0.074	0.158	0.147*	0.197	0.004
	(0.088)	(0.104)	(0.120)	(0.104)	(0.121)	(0.177)	(0.088)	(0.169)	(0.178)
Elder male & female	-0.071	-0.133	-0.016	-0.080	-0.060	-0.135	-0.054	-0.123	0.001
	(0.077)	(0.105)	(0.111)	(0.079)	(0.103)	(0.148)	(0.096)	(0.147)	(0.155)
Female pensioner	0.098	0.054	0.139*	-0.051	0.258*	-0.055	-0.076	0.152	0.398***
	(0.079)	(0.119)	(0.075)	(0.061)	(0.152)	(0.103)	(0.070)	(0.212)	(0.136)
Male pensioner	-0.036	-0.222*	0.076	-0.116	0.032	-0.295**	0.002	-0.178	0.142
	(0.080)	(0.128)	(0.119)	(0.093)	(0.117)	(0.148)	(0.123)	(0.203)	(0.197)
Both m & f pensioners	0.014	0.233	-0.252**	0.174	-0.147	0.320**	-0.016	0.156	-0.522***
	(0.094)	(0.146)	(0.116)	(0.108)	(0.150)	(0.134)	(0.126)	(0.258)	(0.171)
Eldest male	-0.005	-0.013	-0.005	-0.004	-0.006	-0.006	-0.003	-0.024	-0.005
	(0.004)	(0.008)	(0.005)	(0.004)	(0.008)	(0.008)	(0.004)	(0.016)	(0.009)
Eldest male^2	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Eldest female	0.007	0.010	-0.003	-0.004	0.014	-0.005	-0.008	0.020	0.003
	(0.012)	(0.010)	(0.017)	(0.011)	(0.016)	(0.016)	(0.014)	(0.017)	(0.022)
Eldest female^2	-0.000	-0.000	0.000	0.000	-0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.034	0.083	0.149	0.263	0.642	0.416	0.207	0.483	0.638
	(0.356)	(0.344)	(0.537)	(0.341)	(0.510)	(0.509)	(0.458)	(0.590)	(0.693)
Observations	2,436	6,783	6,837	7,363	7,355	629	576	624	607
R-squared	0.112	0.110	0.147	0.068	0.059	0.069	0.107	0.051	0.105

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses are clustered at the age of the oldest man - age of the oldest woman

All regressions also control for age of the child, and are weighted with survey post stratification weights

Table 9: Years Failed By Children and Pension Eligibility of Older Adults in Rural African Households (1st order)

	All children 6 - 19	All boys 6 - 19	All girls 6 - 19	Young children 6 - 12	Older children 13 - 19	Young boys 6 - 12	Young girls 6 - 12	Older boys 13 - 19	Older girls 13 - 19
	1	2	3	4	5	6	7	8	9
Elder male	0.101	0.157	0.086	0.162*	0.033	0.180	0.178**	0.153	-0.017
	(0.084)	(0.102)	(0.109)	(0.095)	(0.118)	(0.159)	(0.079)	(0.162)	(0.165)
Elder male & female	-0.046	-0.099	-0.021	-0.096	-0.005	-0.149	-0.092	-0.052	0.030
	(0.071)	(0.098)	(0.092)	(0.070)	(0.099)	(0.133)	(0.079)	(0.141)	(0.138)
Female pensioner	0.081	0.038	0.136*	-0.049	0.214	-0.054	-0.067	0.117	0.361***
	(0.074)	(0.112)	(0.076)	(0.059)	(0.137)	(0.100)	(0.065)	(0.198)	(0.137)
Male pensioner	-0.007	-0.121	0.108	-0.101	0.073	-0.224**	-0.003	-0.010	0.204
	(0.074)	(0.098)	(0.102)	(0.085)	(0.111)	(0.100)	(0.108)	(0.188)	(0.160)
Both m & f pensioners	0.033	0.260*	-0.243**	0.170	-0.102	0.313**	-0.029	0.218	-0.482***
	(0.090)	(0.144)	(0.114)	(0.108)	(0.140)	(0.136)	(0.125)	(0.262)	(0.164)
Eldest male	-0.002	-0.002	-0.002	-0.003*	-0.001	-0.001	-0.003*	-0.004	0.000
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.005)	(0.003)
Eldest female	-0.002	-0.002	-0.001	0.001	-0.004	-0.001	0.005	-0.002	-0.007
	(0.003)	(0.005)	(0.004)	(0.003)	(0.005)	(0.005)	(0.003)	(0.008)	(0.006)
Constant	0.169	0.262	0.071	0.103	1.053***	0.238	-0.148	0.783*	0.823**
	(0.192)	(0.253)	(0.225)	(0.167)	(0.336)	(0.276)	(0.185)	(0.443)	(0.347)
Observations	2,436	6,783	6,837	7,363	7,355	629	576	624	607
R-squared	0.112	0.108	0.146	0.068	0.057	0.068	0.106	0.046	0.103

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses are clustered at the age of the oldest man - age of the oldest woman

All regressions also control for age of the child, and are weighted with survey post stratification weights

Table 10: Years Above Correct Age for Grade of Children and Pension Eligibility of Older Adults in Rural African Households (2nd order)

	All children 6 - 19	All boys 6 - 19	All girls 6 - 19	Young children 6 - 12	Older children 13 - 19	Young boys 6 - 12	Young girls 6 - 12	Older boys 13 - 19	Older girls 13 - 19
	1	2	3	4	5	6	7	8	9
Elder male	-0.247	-0.299	-0.127	-0.053	-0.505*	-0.219	0.113	-0.356	-0.452
	(0.168)	(0.282)	(0.154)	(0.186)	(0.256)	(0.273)	(0.157)	(0.459)	(0.338)
Elder male & female	0.059	-0.081	0.193	-0.088	0.065	-0.027	-0.148	-0.232	0.311
	(0.139)	(0.215)	(0.161)	(0.143)	(0.253)	(0.235)	(0.128)	(0.358)	(0.324)
Female pensioner	0.191	0.207	0.174	-0.035	0.597*	0.040	-0.162	0.522	0.757***
	(0.182)	(0.254)	(0.144)	(0.094)	(0.327)	(0.118)	(0.112)	(0.426)	(0.282)
Male pensioner	-0.300	-0.687**	0.079	-0.391**	-0.345	-0.722**	-0.208	-0.805	-0.052
	(0.200)	(0.289)	(0.241)	(0.154)	(0.265)	(0.299)	(0.127)	(0.510)	(0.453)
Both m & f pensioners	0.145	0.440*	-0.173	0.421***	-0.182	0.544***	0.241	0.291	-0.709**
	(0.196)	(0.236)	(0.230)	(0.160)	(0.310)	(0.186)	(0.175)	(0.512)	(0.320)
Eldest male	0.013	0.015	0.009	-0.001	0.025*	-0.011	0.005	0.006	0.017
	(0.009)	(0.017)	(0.007)	(0.007)	(0.015)	(0.012)	(0.008)	(0.033)	(0.013)
Eldest male^2	-0.000	-0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Eldest female	-0.011	0.014	-0.051*	0.014	-0.002	0.014	0.005	0.026	-0.040
	(0.021)	(0.030)	(0.026)	(0.015)	(0.023)	(0.016)	(0.028)	(0.038)	(0.030)
Eldest female^2	0.000	-0.000	0.000*	-0.000	-0.000	-0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.476**	1.089	2.236***	0.402	1.733**	0.840	0.131	1.675	2.369**
	(0.661)	(0.967)	(0.844)	(0.501)	(0.707)	(0.581)	(0.892)	(1.288)	(0.943)
Observations	2,145	6,642	6,687	7,260	7,094	577	525	497	473
R-squared	0.010	0.024	0.011	0.016	0.026	0.026	0.021	0.036	0.035

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses are clustered at the age of the oldest man - age of the oldest woman

All regressions are weighted with survey post stratification weights

Table 11: Years Above Correct Age for Grade of Children and Pension Eligibility of Older Adults in Rural African Households (1st order)

	All children 6 - 19	All boys 6 - 19	All girls 6 - 19	Young children 6 - 12	Older children 13 - 19	Young boys 6 - 12	Young girls 6 - 12	Older boys 13 - 19	Older girls 13 - 19
	1	2	3	4	5	6	7	8	9
Elder male	-0.253	-0.383	-0.011	-0.094	-0.572**	-0.255	0.122	-0.458	-0.409
	(0.164)	(0.271)	(0.152)	(0.171)	(0.257)	(0.258)	(0.135)	(0.439)	(0.322)
Elder male & female	0.061	0.001	0.057	-0.042	0.119	0.023	-0.151*	-0.107	0.258
	(0.124)	(0.193)	(0.146)	(0.116)	(0.237)	(0.206)	(0.087)	(0.329)	(0.313)
Female pensioner	0.200	0.169	0.266*	-0.048	0.550*	0.009	-0.142	0.434	0.816***
	(0.171)	(0.241)	(0.150)	(0.095)	(0.287)	(0.119)	(0.110)	(0.392)	(0.259)
Male pensioner	-0.388**	-0.805***	0.001	-0.388***	-0.479*	-0.562**	-0.266**	-0.813*	-0.089
	(0.189)	(0.230)	(0.228)	(0.147)	(0.254)	(0.233)	(0.122)	(0.465)	(0.369)
Both m & f pensioners	0.126	0.484**	-0.256	0.445***	-0.175	0.587***	0.216	0.367	-0.761**
	(0.183)	(0.216)	(0.219)	(0.160)	(0.284)	(0.192)	(0.171)	(0.493)	(0.312)
Eldest male	0.005	0.009	0.002	0.001	0.014**	0.004	-0.001	0.009	0.014**
	(0.004)	(0.007)	(0.003)	(0.003)	(0.006)	(0.005)	(0.003)	(0.012)	(0.007)
Eldest female	-0.011*	-0.014*	-0.006	-0.002	-0.020**	-0.008	0.007	-0.019	-0.022**
	(0.006)	(0.008)	(0.007)	(0.004)	(0.010)	(0.006)	(0.005)	(0.013)	(0.010)
Constant	1.581***	1.968***	1.058***	0.843***	2.411***	1.272***	0.159	2.849***	1.940***
	(0.331)	(0.465)	(0.370)	(0.254)	(0.537)	(0.391)	(0.271)	(0.755)	(0.550)
Observations	2,145	6,642	6,687	7,260	7,094	577	525	497	473
R-squared	0.009	0.022	0.005	0.015	0.025	0.021	0.020	0.033	0.034

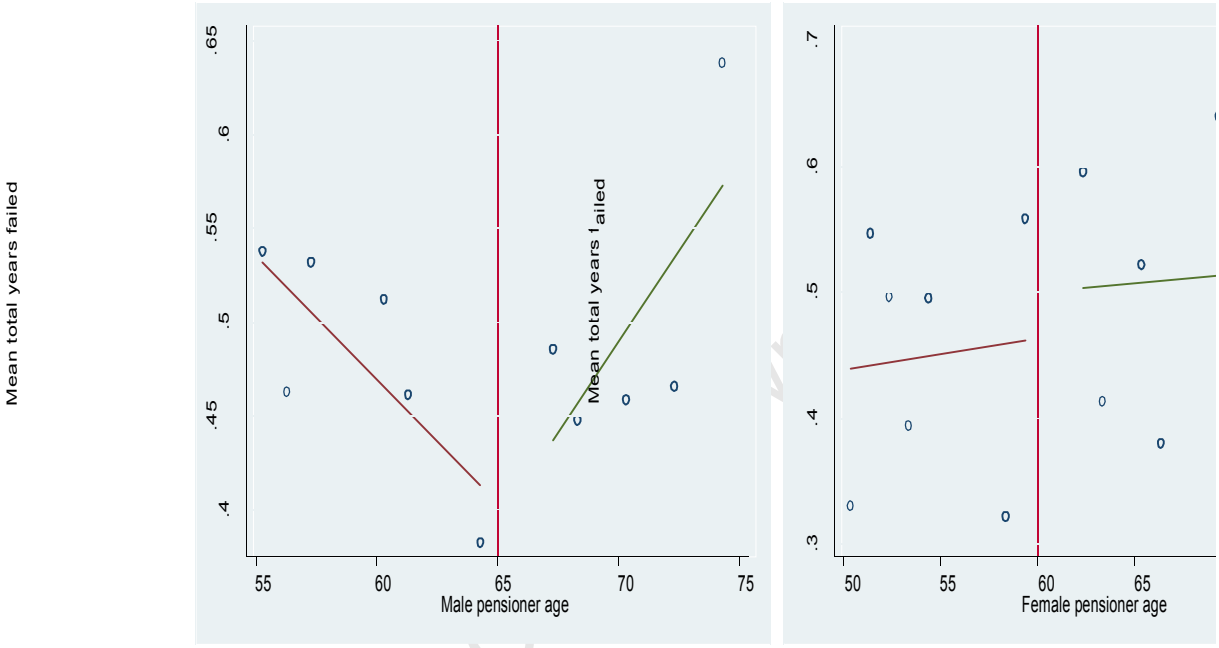
*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses are clustered at the age of the oldest man - age of the oldest woman

All regressions are weighted with survey post stratification weights

C: Graphs of the Relationship Between Pension Eligibility and Child Progr School

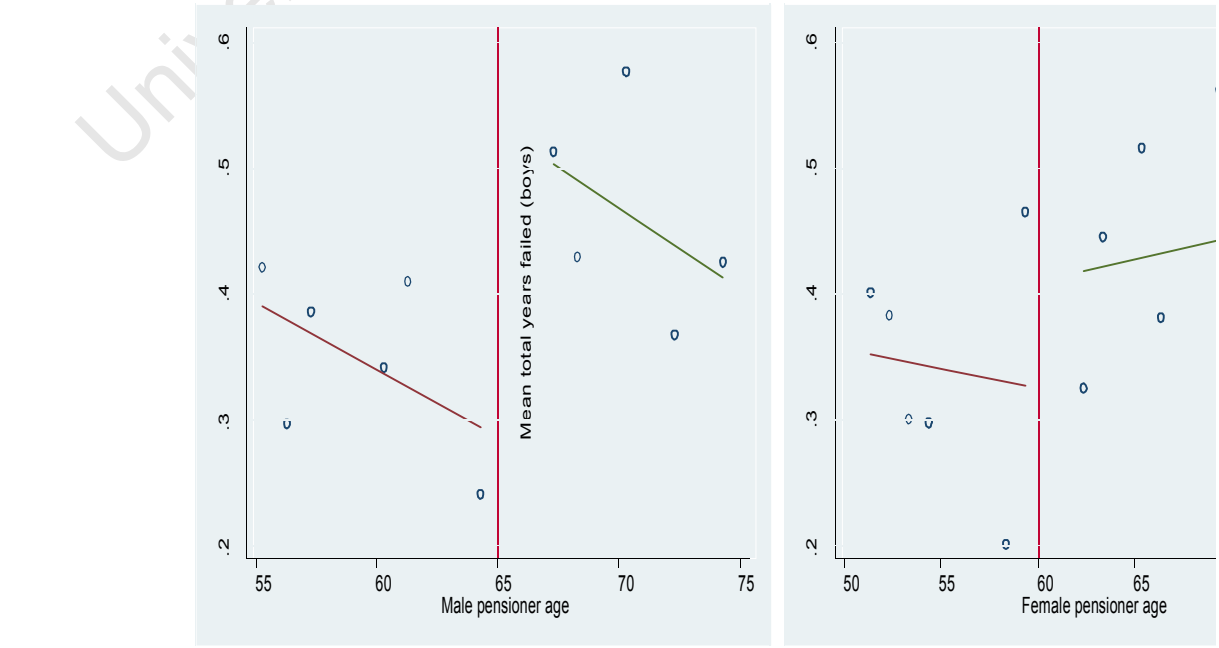
Figures 3 & 4: Mean of Total Years Failed by Age of Co-resident Pensioner (All Children)

3. Male Pensioners **4. Female Pensioners**



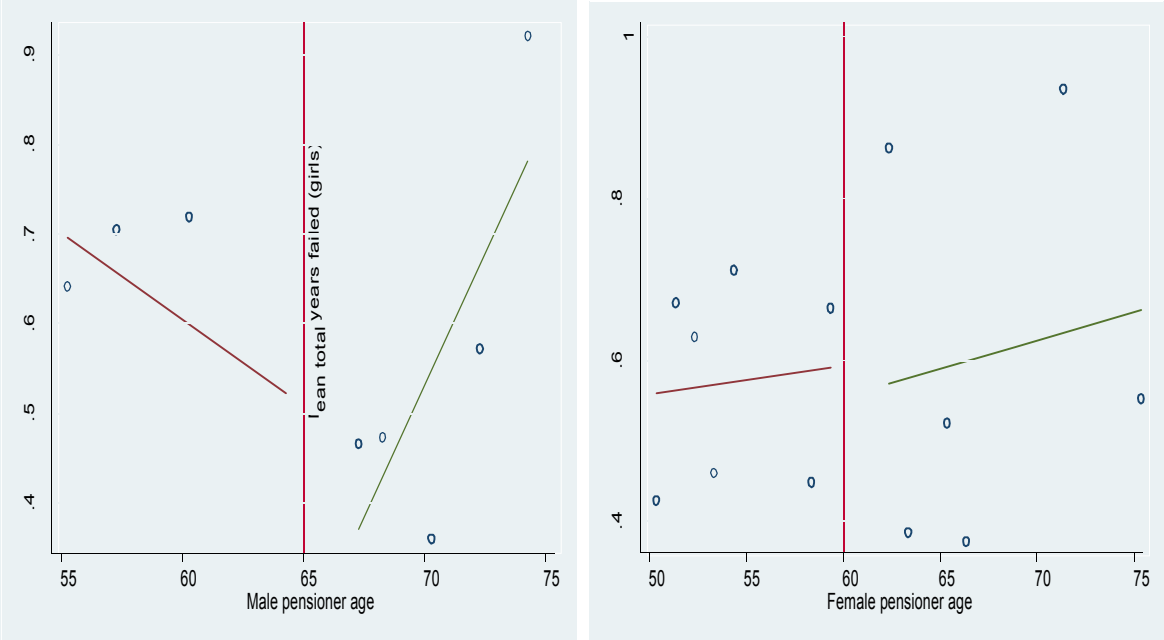
Figures 5 & 6: Mean of Total Years Failed by Age of Co-resident Pensioner (Boys)

5. Male Pensioners **6. Female Pensioners**



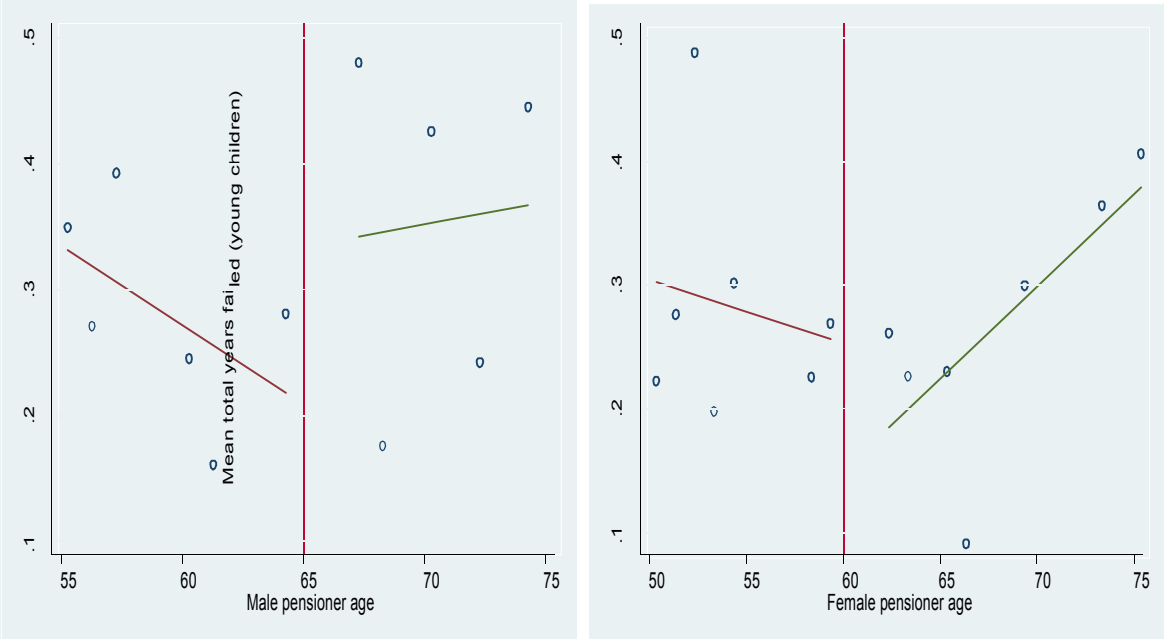
Figures 7 & 8: Mean of Total Years Failed by Age of Co-resident Pensioner (Girls)

7. Male Pensioners **8. Female Pensioners**



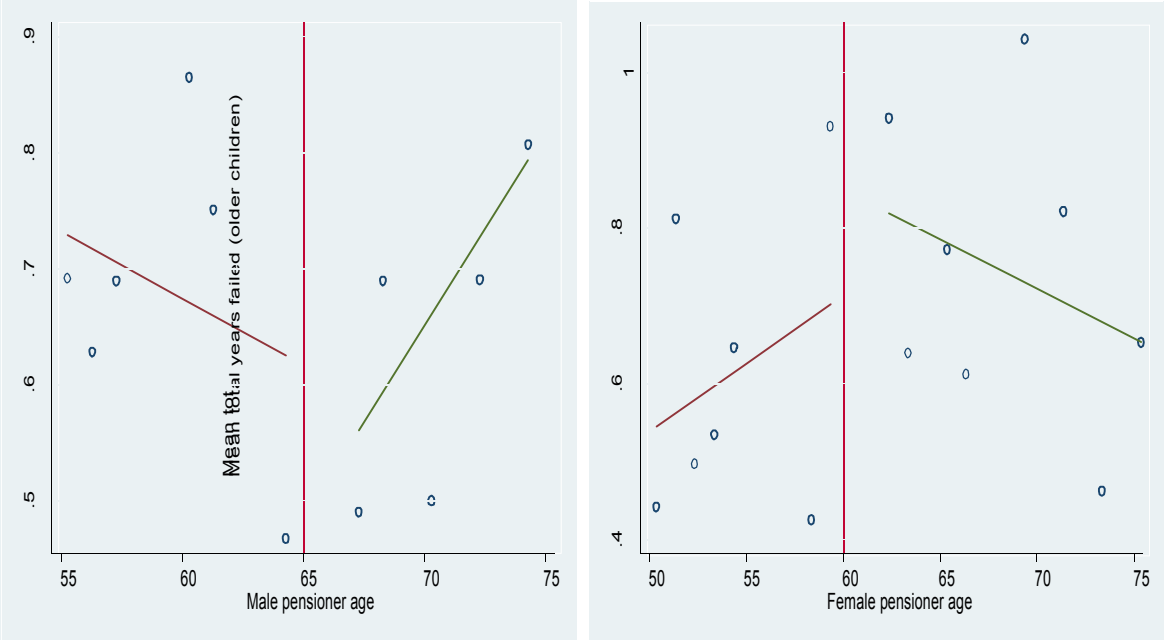
Figures 9 & 10: Mean of Total Years Failed by Age of Co-resident Pensioner (Young Children 6-12)

9. Male Pensioners **10. Female Pensioners**



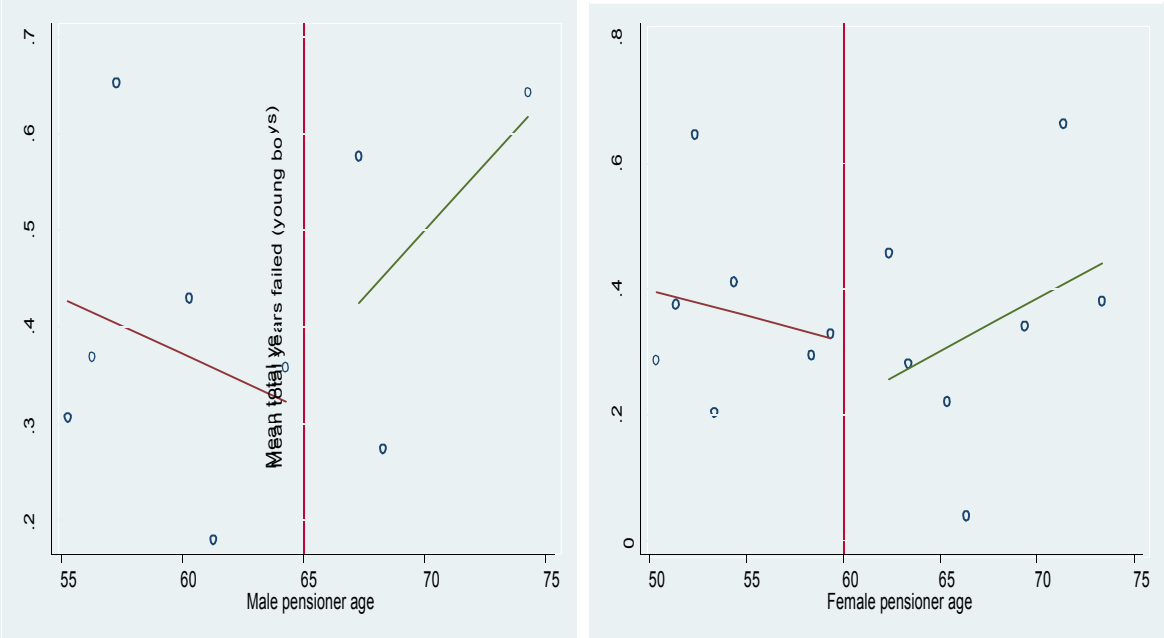
Figures 11 & 12: Mean of Total Years Failed by Age of Co-resident Pensioner (Older Children 13-19)

11. Male Pensioners **12. Female Pensioners**



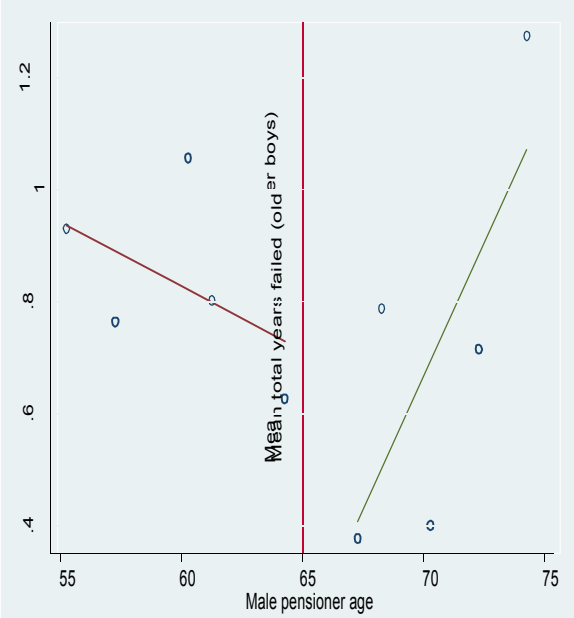
Figures 13 & 14: Mean of Total Years Failed by Age of Co-resident Pensioner (Young Boys 6-12)

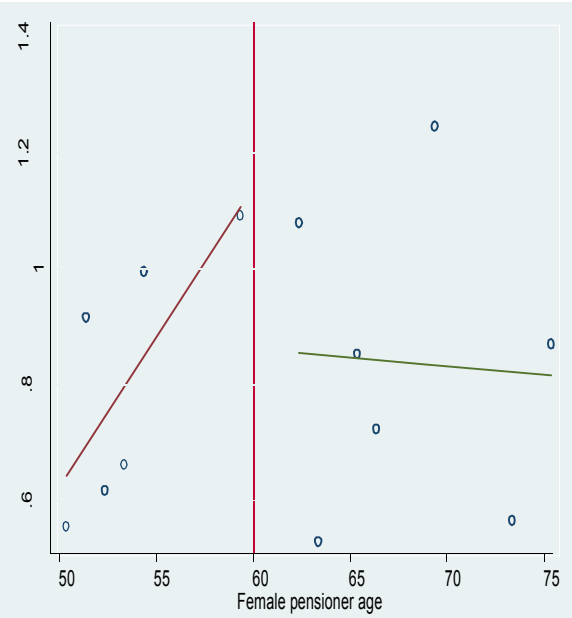
13. Male Pensioners **14. Female Pensioners**



Figures 15 & 16: Mean of Total Years Failed by Age of Co-resident Pensioner (Older Boys 13-19)

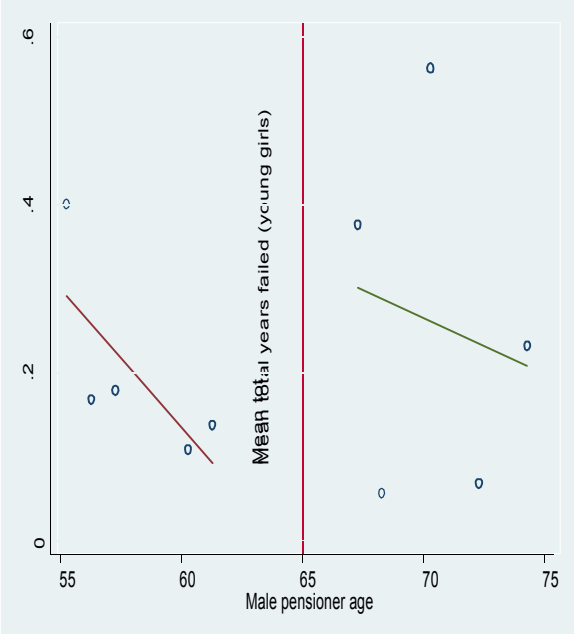
15. Male Pensioners **16. Female Pensioners**

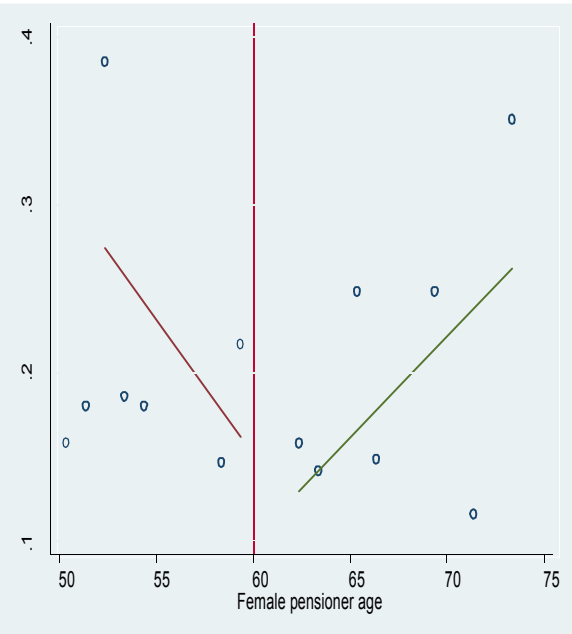




Figures 17 & 18: Mean of Total Years Failed by Age of Co-resident Pensioner (Young Girls 6-12)

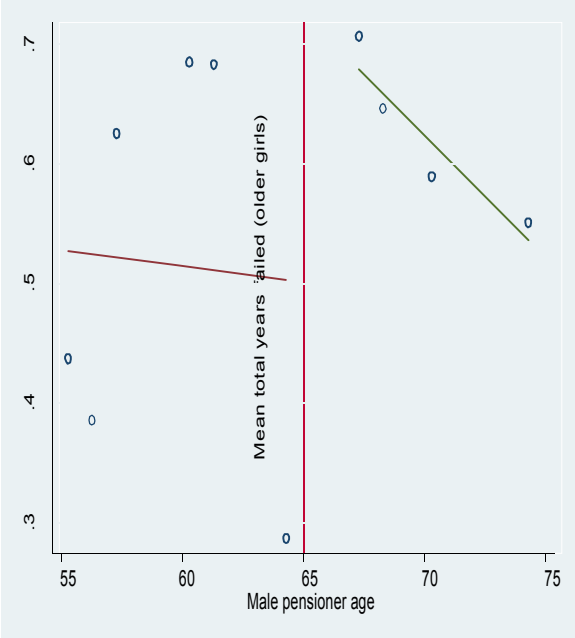
17. Male Pensioners **18. Female Pensioners**

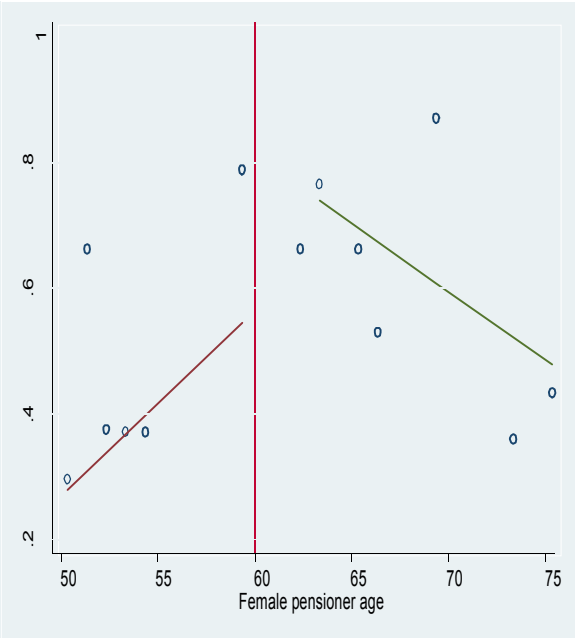




Figures 19 & 20: Mean of Total Years Failed by Age of Co-resident Pensioner (Older Girls 13-19)

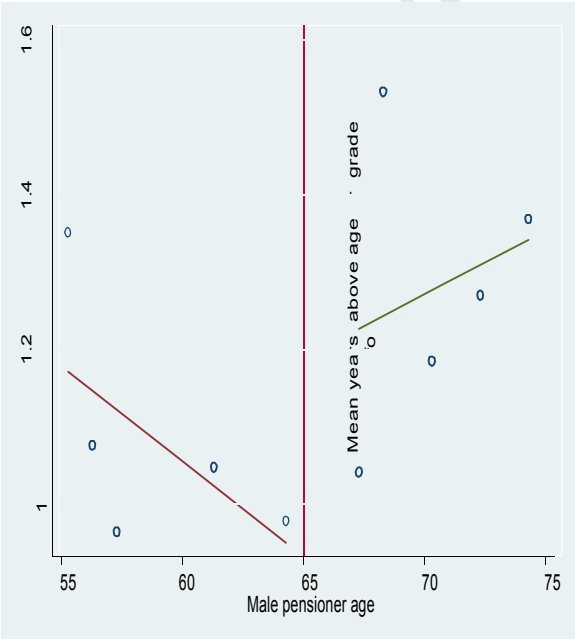
19. Male Pensioners **20. Female Pensioners**

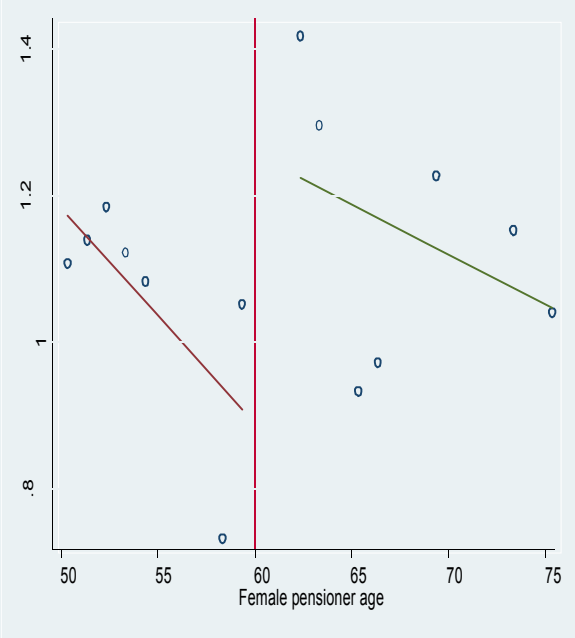




Figures 21 & 22: Mean Years Above Correct Age for Current Grade (All Children)

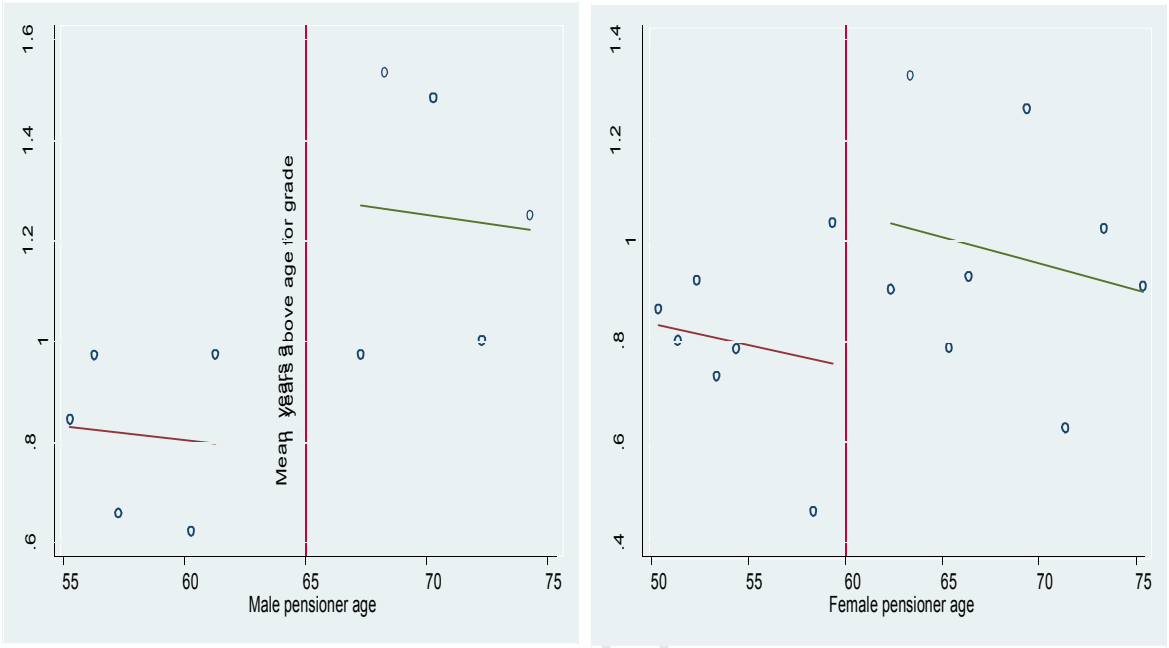
21. Male Pensioners **22. Female Pensioners**





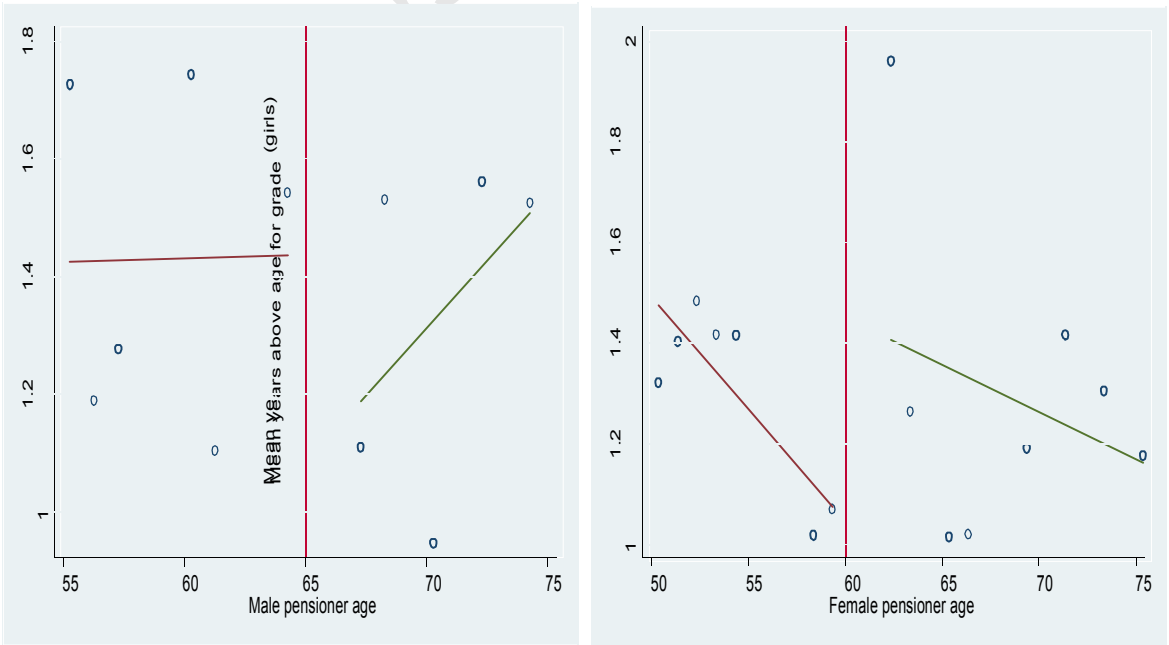
Figures 23 & 24: Mean Years Above Correct Age for Current Grade (Boys)

23. Male Pensioners **24. Female Pensioners**



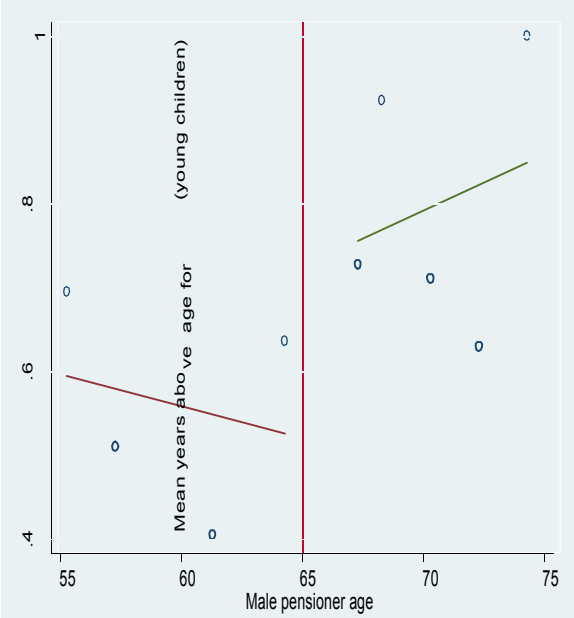
Figures 25 & 26: Mean Years Above Correct Age for Current Grade (Girls)

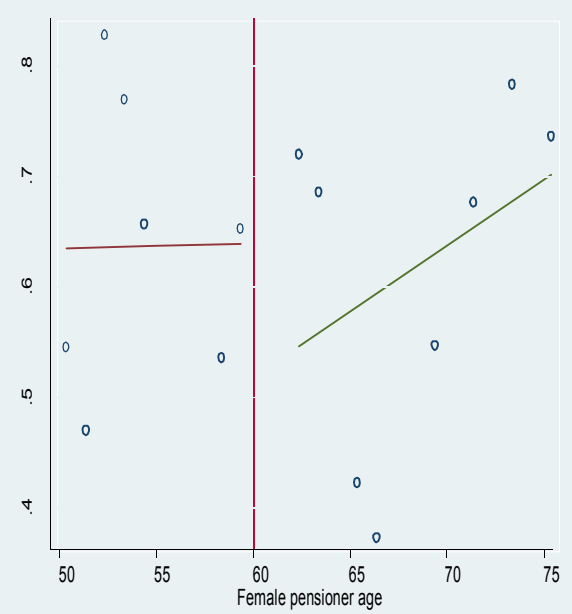
25. Male Pensioners **26. Female Pensioners**



Figures 27 & 28: Mean Years Above Correct Age for Current Grade (Young Children 6-12)

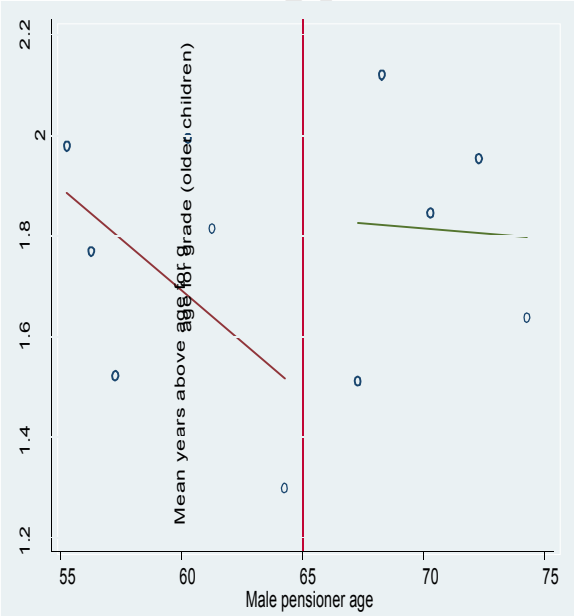
27. Male Pensioners **28. Female Pensioners**

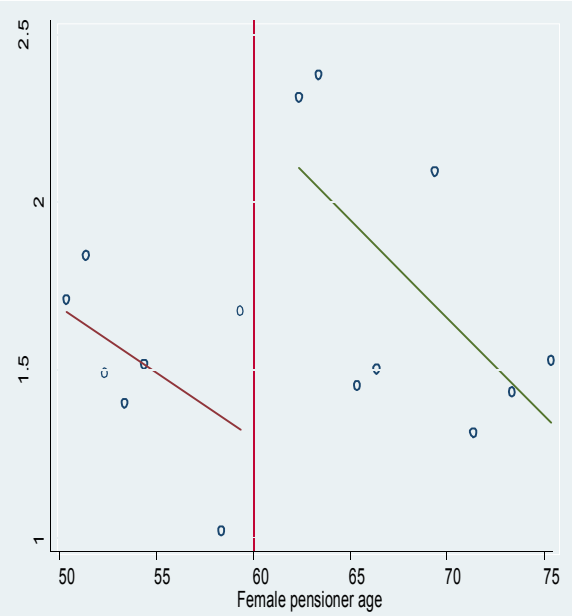




Figures 29 & 30: Mean Years Above Correct Age for Current Grade (Older Children 13-19)

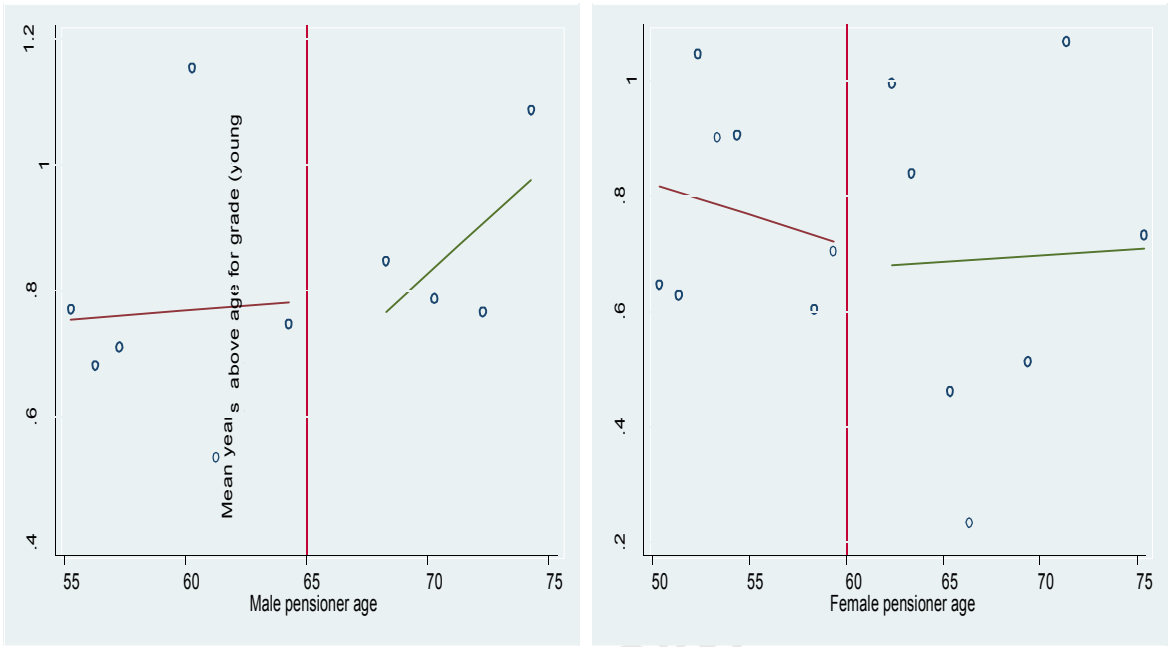
29. Male Pensioners **30. Female Pensioners**





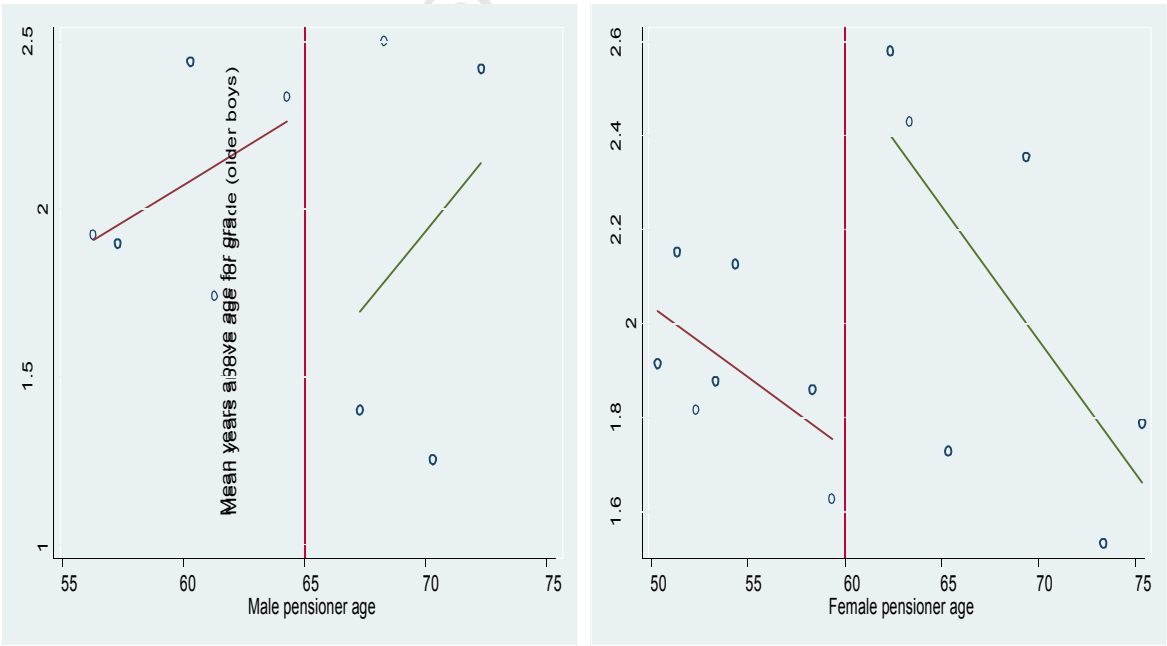
Figures 31 & 32: Mean Years Above Correct Age for Current Grade (Young Boys 6-12)

31. Male Pensioners **32. Female Pensioners**



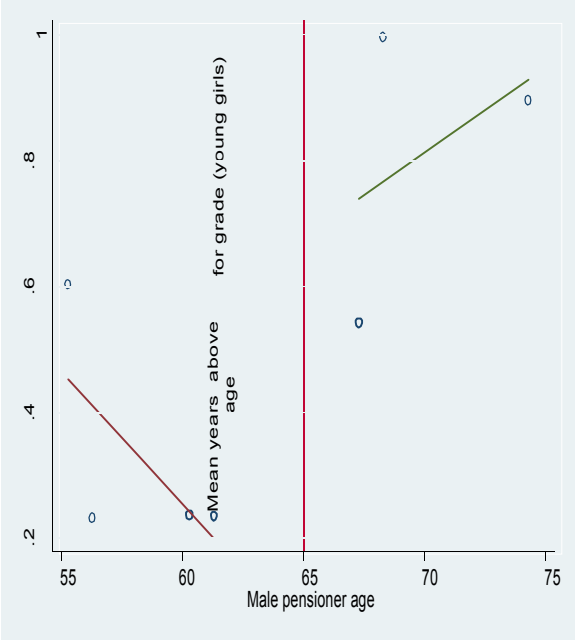
Figures 33 & 34: Mean Years Above Correct Age for Current Grade (Older Boys 13-19)

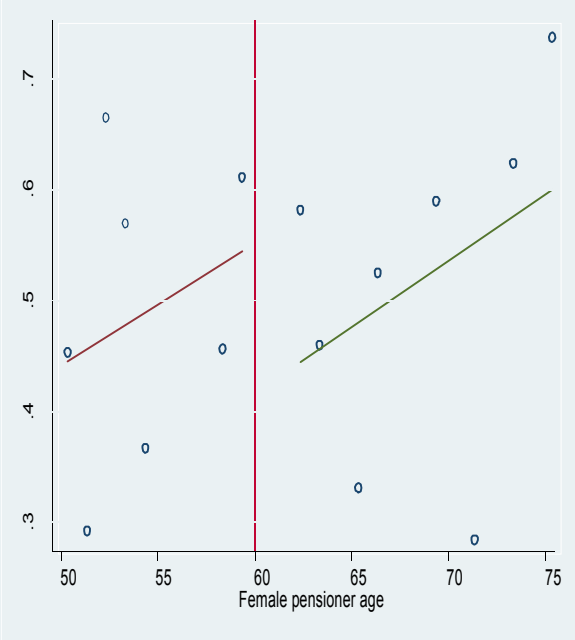
33. Male Pensioners **34. Female Pensioners**



Figures 35 & 36: Mean Years Above Correct Age for Current Grade (Young Girls 6-12)

35. Male Pensioners **36. Female Pensioners**





Figures 37 & 38: Mean Years Above Correct Age for Current Grade (Older Girls 13-19)

37. Male Pensioners **38. Female Pensioners**