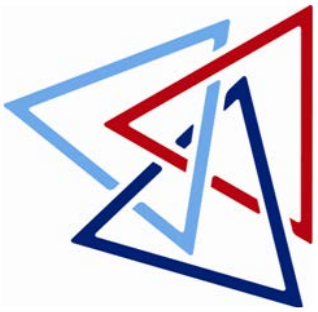

Household responses to the cessation of grant income: The case of South Africa's Old Age Pension

Vimal Ranchhod

Abstract

How do poor households respond to the cessation of cash transfers in developing countries? South Africa's generous social pension system results in most of the poor elderly being the primary 'breadwinner' in the household. I extract a longitudinal dataset using the rotating panel component of the nationally representative Quarterly Labour Force Surveys, and use fixed effects regression models to estimate the magnitude of changes in household composition and employment that coincide with the departure of a pensioner from the household. I find statistically significant changes in both of these outcome measures. Compositional changes include a decrease in the number of school going aged children, the number of teenagers, and the number of young adults; while the number of older adults increases. I also find significant increases in the number of employed prime aged adults and older adults. The combination of compositional changes and employment changes results in an increase in the mean proportion employed in all of the working age adult groups that we investigate. Overall, households respond by decreasing the number of dependents, increasing the number of potential caregivers, and increasing the proportion of adults engaged in income generating activities.

The **Research Project on Employment, Income Distribution and Inclusive Growth** is based at SALDRU at the University of Cape Town and supported by the National Treasury. Views expressed in REDI3x3 Working Papers are those of the authors and are not to be attributed to any of these institutions.

Household responses to the cessation of grant income: The case of South Africa's Old Age Pension

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1. Introduction

How do households respond to the cessation of cash transfers in developing countries? Cash transfers, both conditional and unconditional, have become increasingly common in developing countries, with the most famous probably being the *Progresa* in Mexico and *Bolsa Familia* in Brazil. There is also a substantial literature measuring the substantial positive effects that these programs have, on various outcomes including schooling outcomes, health, and poverty reduction.[3] An important question to consider then, is 'How do households cope when these sources of income cease to flow into the household'?

In this paper, we answer the question posed above in the specific case of South Africa. We estimate the magnitude of changes in household composition and employment that occur when a pensioner leaves the household in South Africa, either due to out-migration or death. The non-contributory South African Old Age Pension (OAP) is one of the main components of the South African social security system. Recipiency rates are high amongst the elderly, and over 80% of African or Coloured respondents who are age-eligible and not employed report receiving the pension.[4] In addition, a means test ensures that the pension disproportionately reaches poorer households. The value of the OAP is also sufficiently high such that it generally makes the pensioner the main breadwinner in their household. Case and Deaton (1998) note that in 1993, the value of the pension was ``twice the median household's per capita income'' amongst African households.

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[2] The author acknowledges funding from the REDI3x3 project for this paper, and from the NRF RCA Fellowship more generally. Ranchhod greatly appreciates the assistance provided by Monet Durieux from StatsSA in providing him with the link files required to extract the panel from the repeated cross-sections.

[3] See for example; Fiszbein and Schady (2009) for the effects of cash transfers on poverty, Gertler (2004) on health, and Adato and Hoddinott (2010) who consider the effects of conditional cash transfers on multiple dimensions of wellbeing in a number of Latin American countries.

[4] 'African' and 'Coloured' were two of the official racial categories from the *Apartheid* era. They continue to be used in current surveys and Censuses.

We estimate a number of household level fixed effects regressions to explore these changes. The data used is nationally representative household level panel data. This dataset was extracted from the rotating panel component of South Africa's Quarterly Labour Force Surveys (QLFS), from the first quarter of 2010 to the fourth quarter of 2014. Our primary findings are that households respond to the loss of a pensioner by decreasing the number of dependents, increasing the number of potential caregivers, and increasing the proportion of adults engaged in income generating activities.

The remainder of this paper is structured as follows. In Section 2, we briefly describe the characteristics of the OAP policy, and review some of the related empirical literature that has developed. We describe the data and sample selection in Section 3, the econometric methods that we use in Section 4, and present some summary statistics in Section 5. In Section 7 and Section 8 we present our main result, and discuss some caveats and robustness tests. We provide a concluding discussion in Section 8.

2. Background and literature on the Old Age Pension

Lund (1993) provides an historical discussion of the OAP policy, and an updated description of cash transfers in South Africa is provided by Woolard and Leibbrandt (2010). Eligibility for the pension is based on a means test, nationality and age; but is non-contributory. The age-eligibility thresholds were 60 for women and 65 for men, but this legally changed in 2008. The change was implemented in stages, so that by 2010 the age-eligibility threshold was 60 for both men and women. The level of the means test is set fairly high, so that most of the elderly receive the grant. The value of the pension is adjusted, generally in line with inflation, on an annual basis. The value of the OAP in 2014 was R1500 per month[5], and this represents a large transfer relative to potential wage income for this subset of the population.

Several researchers have investigated the effects of pension recipiency on various dimensions of household welfare. Case and Deaton (1998) find that the pension is an effective tool for redistribution and that it is well targeted to reach poorer households. Furthermore, the prevalence of three-generation households, as well as `skip generation' households, results in the pension disproportionately reaching children in poverty.[6]

In terms of health outcomes, Duflo (2000) finds a discontinuous increase in girls' height for age for children living with pension eligible persons. This increase is significant and is

[5] This equates to between 100 to 125 US dollars per month, depending on the exchange rate.
[6] These are households with grandparents and grandchildren but non-resident parents.

realized on average only when the pension recipient is a woman. Duflo (2003) reports similar evidence of income being shared between members of the household. Case (2004) finds that the health of all household members is improved as a result of the pension.

Others have investigated behavioural responses amongst non-pensioner household members. Bertrand, Mullainathan and Miller (2003) find that having a pension age-eligible person in the household has a statistically significant and negative impact on the labour supply of prime aged resident males in the household. Edmonds (2003) considers the impact of the OAP on child labour supply and schooling attendance. Ranchhod (2006) finds that the pension causes retirement amongst the recipients themselves. Posel, Lund and Fairburn (2006), Ardington, Case and Hosegood (2009) and Ardington *et al* (2015) all find that the pension actually increases the labour supply of non-resident household members by financing labour migration towards areas with better employment prospects.

Jensen (2004) investigates whether pension income is *de facto* shared with family members even when they do not reside with the pensioner. He estimates that crowding out of remittances by pensions is large and significant. On average, every rand of pension income received by the elderly is met with a 0.25 to 0.30 rand decrease in remittances received from the pensioner's children.

Several researchers have considered the impact on household composition. Edmonds, Mammen and Miller (2005) find a decrease in the number of prime working-age women, and an increase in the number of children younger than five and young women of childbearing age. Klasen and Woolard (2009) argue that the OAP might not be reducing labour supply, but that the observed changes may reflect migration and compositional changes generated by unemployed people joining the households of relatives who share pension income with them. Hamoudi and Thomas (2014) find evidence that the OAP results in compositional changes consistent with sorting on the basis of unmeasured personal characteristics. In combination with the migration related studies using longitudinal data by Ardington, Case and Hosegood (2009) and Ardington *et al* (2015), the evidence on compositional changes pose a challenge to much of the prior research conducted using cross-sectional data.

Given that the OAP has been shown to have several socio-economic benefits for recipients and their families, an important question arises as to how households cope with the loss of this income. From the literature discussed, one dimension of response is likely to be on the impact on household composition, which then potentially confounds some of the other

findings. Yet the scarcity of longitudinal data means that only two studies have investigated changes in composition and behaviour simultaneously[7], and both of these are restricted to a small, rural and undeveloped part of the country. In addition, there are conflicting views in terms of the effects of the OAP on labour supply within the household. Our contribution here is to add to this literature, by estimating the effects of the loss of a pension using a large, high frequency and nationally representative dataset.

3. Data

The data that we use comes from twenty waves of the Quarterly Labour Force Survey (QLFS). These are large, nationally representative surveys conducted by StatsSA, the official statistical organization in the country. With four waves per year, the time period that our data spans is five years, beginning in the first quarter of 2010 and ending in the fourth quarter of 2014. The data contain a complete household roster, demographic information such as age, gender, race and education for all resident members of the dwelling; and detailed information on employment and labour force participation for respondents aged 15 or above.

Over this period, the QLFS cross-sections contain a rotating panel design at the dwelling level with a 25% out-rotation rate. Thus, a dwelling could be revisited up to four times over the course of twelve months. Since the unit of analysis in this paper is the household level, we converted all the relevant information to the household level. We appended the various waves together, and thus identify dwellings that were re-visited across subsequent waves.

One important concern is that the dwelling that was revisited may not house the same household members over time. This may occur due to migration of the entire family, or because of an error in the actual dwelling that was 'revisited'. To minimize the effects of these observations on our analysis, we used only the sub-sample of households that contained at least one individual member who maintained residency in the dwelling across subsequent waves. This was implemented using a set of 'link' files that were provided by StatsSA.[8]

[7] These are the studies by Ardington, Case and Hosegood (2009) and Ardington *et al* (2015). All of the other studies used cross-sectional data, and as such, can only speak to aggregate changes that reflect changes in behaviour combined with changes in household composition.

[8] The match quality in these 'links' is likely to be high. We were provided with these files as part of a collaborative data quality project with StatsSA. The matching variables include age, race, gender, geographic variables, as well as individual respondents' names.

By using these individual links across subsequent waves, we identify a cohort of households across multiple waves, and restrict our sample to the subset that included at least one household member across each subsequent wave that the household was revisited. The effect that these criteria have on our sample sizes are shown in the first four columns in Table 1. In Column 1, we see that each cross-section contains approximately 25 000 households, with a total of 495 443 households over all 20 waves.[9] Column 2 shows the number of households that could be matched with a household in either the subsequent or preceding wave. This reduces the number of households available to 475 419. Column 3 captures the number of households where we have at least one individual level match in that household, either to the previous wave or the subsequent wave. In Column 4, we impose a further restriction that the number of times a household is observed in the data must equal to the number of 'pairwise links' across consecutive waves plus one. This ensures that each cohort of new households observed has at least one person maintaining residence in the dwelling across each consecutive wave, over the entire time period that the household is observed in the data.[10] Our final household panel thus includes 392 832 observations.

In addition, we restrict our sample to African or Coloured headed households.[11] Here we are departing from some of the earlier literature, which focussed exclusively on African headed households. The general motivation in those papers is that Africans make up approximately 80% of the overall population, are disproportionately poor, and have very high take up rates of the OAP. The latter part of this motivation applies just as well to the Coloured sub-population, and while they are a minority group of just below 10% of the overall population, they represent the largest racial group in the Western Cape province. If we exclude this group, it may decrease the overall representativity of the study, and we would lose some statistical power due to a smaller estimation sample size.[12]

The identification in this paper is obtained by measuring changes in households that lost a pension-aged resident, either due to out-migration or death. We thus restrict the sample to focus specifically on households that had at least one resident pension-aged individual when

[9] We renamed the QLFS2010:1 to wave 1, increasing with each subsequent wave, until our final wave 20 which is QLFS2014:4.

[10] Note that it is not necessary for a single individual to be present in all waves. What we require is that there is always at least one person who can be identified across any two consecutive waves.

[11] Practically, we classify the race of the household head using the race of the oldest household member. About 99% of households in the sample that are headed by an African or Coloured person have all members of the same race.

[12] Nonetheless, we do estimate our main regressions for the African sub-population only. These results are broadly similar to the main results discussed in the paper, and are available upon request. That the results are broadly similar is as expected given that a large majority of the remaining sample is African.

first observed in the panel. This sample has 83 882 observations, of which 23 040 are unique households.

4. Methods

Ideally, we want to measure the changes that occur when a household loses a pension in terms of employment and household composition. Instead, we focus on pension-aged individuals as a proxy for pension income, as many authors have done, due to data limitations. The survey does contain a question on pension receipt by individuals, but it is only asked of people who were not employed at the time of the survey. As argued by Ranchhod (2006), the means test is generous enough to allow most unskilled pension aged individuals to both work and satisfy the means test simultaneously. In addition, the question asks about either the OAP or disability grant combined.

In Table 2, we document the reported percentage in our sample who receives the OAP or disability grant, by age. There are substantial numbers of people aged below 60 who report receiving one of these grants, which reflects either the disability grant, or measurement error in age or measurement error in recipiency.[13] The 'No data' column reflects people who were not asked the question because they were employed. There are two points worth observing in the table. First, the percentage employed decreases by a large amount around age 60, from 37% at age 59 to 20.6% by age 61, and continues to decrease thereafter. Second, of those who were asked the question, the percent who report receiving either the disability grant or pension increases sharply from 36.3% at age 59 to 73.6% at age 60 and increases further to 84.9% by age 61. By age 70, most people are not employed and thus do answer the question, and 95% report receiving the pension.[14] We thus feel confident that using pension-aged individuals as a proxy for pension income is a valid proxy for the cash transfer.[15]

Our treatment variable is an indicator variable for a decrease in the number of pensioners in the household. Of our restricted sample of 23040 households that have at least one pensioner when we first observe them, we drop 1056 households that show a gain in the number of pensioners in any subsequent period. We also dropped 10 households that showed a loss of pensioners in more than one time period, and another 34 households that

[13] There is some evidence of measurement error in the *age* variable due to 'age heaping', particularly around age 60 and age 70, as shown in Figure 1 in the Appendix.
[14] The difference between OAP and disability grant income is not too problematic for us, as they both represent a cash transfer from the state, are of equivalent value, and once a person receiving the disability grant reaches 60, the disability grant stops and is replaced with the OAP.
[15] From this point onwards, we use the terms pensioner and pension-aged interchangeably.

showed a decrease of more than one pensioner in a single time period. Our final sample is thus comprised of 1350 'Loser' households and 20590 'Keeper' households, for a final sample size of 21940 unique households and 79667 observations.

We thus have an unbalanced panel of Keeper and Loser households. In addition, the loss of the pensioner in a particular household could occur after the 1st, 2nd or 3rd observation period. We generate a *time* variable that is centred on 0, and takes on integer values from -3 to 3. For *keeper* households, we set the time variable in the last period that the household is observed in to 0, thus the *time* variable is negative or zero for all observations of Keeper households. For Loser households, we set the *time* variable in the last period prior to the loss of the pensioner to zero. Thus, the *time* variable takes on values from -2 to 3. In our final sub-sample of Loser households, we have 1350 observations at *time* 1; 762 observations at *time* 2; and 341 observations at *time* 3.[16]

Our regression models are a conventional fixed effects regression model, of the form:

$$(Y_{i,t} - Y_{i,mean}) = \beta(X_{i,t} - X_{i,mean}) + (\epsilon_{i,t} - \epsilon_{i,mean})$$

The only explanatory variables included are a set of *time* dummies, with *time*=0 being the excluded category. Of interest to us are the coefficients on *time*=1, *time*=2 and *time*=3. [17] This allows us to observe changes that coincide with the departure of the pensioner, as well as to observe the speed with which such changes manifest.[18]

We estimate robust standard errors that are clustered at the primary sampling unit level. To account for attrition, we estimate a set of probit models, one for each new cohort of households, with the dependent variable being an indicator of whether those households survived into the final panel of households or not. The covariates we used in the probit regressions were indicators for province, type of area and original household size. Using these coefficients, we predicted the probability of survival into the panel and re-scale the

[16] The distribution of observations by *time* for keeper and loser households are presented in Table A1 in the appendix.

[17] There is some limitation with the *time*=3 variable. We only have 341 observations in this group, and thus have limited statistical power.

[18] Since we are using a fixed effects regression, we cannot estimate coefficients on time invariant variables that may be of interest. These include the original household size, the original number of pensioners in the household, the race or gender of the household head and whether the household is in an urban or rural area.

original sampling weights amongst surviving households by the inverse of the probability of survival.[19]

Our dependent variables are comprised of a set of count variables. For household composition, we classify each individual into one of a set of mutually exclusive and exhaustive age categories. The categories and corresponding ages are as follows:

- *kids_young* are aged 0-7
- *kids_school* are aged 8-14
- *teens* are aged 15-20
- *young_adults* are aged 21-34
- *prime_adults* are aged 35-49
- *older_adults* are aged 50-59
- *pension_aged_adults* are aged 60 or above.

We also create two composite groups:

- *young_prime_adults* aged 21-49
- *working_aged_adults* aged 21-59.

We then aggregate the number of individuals to get the number of members in a particular group, in each household in each wave.[20] In addition to each of the categories discussed above, we also generate an aggregate variable that does not consider age, which we call *hhsize*.

The employment related variables are derived in a similar fashion as the composition variables. StatsSA releases an official *status* variable for each person aged 15 or above in the QLFS, and one category in the *status* variable is 'employed'. By combining the groups defined above with each individual's employment status, we aggregate the number of employed individuals within an age group, household and wave. Our final employment variables, with corresponding ages in parentheses, are thus:

[19] Based on sampling theory, the survey weights should be identical for each household member, as the probability of inclusion for each member in the household should be the same. In practice, the weights in the public release amongst members of the same household do differ by a small amount. This occurs because StatsSA performs a post-survey adjustment to correct for non-response, which imposes that the aggregate distribution of demographic characteristics in the sample, after applying the weights, conforms to that of the mid-year population estimates from the most recent Census data. To address this issue, we calculate the mean weight of all household members in the first wave that we observe the household, and use this as the household's original sampling weight.

[20] We name these household aggregate variables by adding the suffix "hhnum_" to the variable names of the group identifiers at the individual level.

- *hhnum_teens_employed (15-20)*
- *hhnum_yadults_employed (21-34)*
- *hhnum_padults_employed (35-49)*
- *hhnum_oadults_employed (50-59)*
- *hhnum_yp_adults_employed (21-49)*
- *hhnum_wa_adults_employed (21-59)*

For the employment related analyses, it is generally more intuitive to think in ratios, such as an employment to population ratio, or labour absorption rate. The reason that we keep our dependent variables in numbers is because several households may have no people in a particular age category in at least one wave. In these cases, the employment to population ratio in the relevant group for that observation is undefined, and hence the mean for the household across waves is also undefined. These households would then get dropped from the relevant regression entirely, which would lead to an estimation sample that is quite different to the one that we are interested in.

At the same time, the effect of keeping our dependent variables in numbers makes it difficult to ascertain whether a particular coefficient is economically significant or not, which is different to the question of whether it is statistically significant or not. To address this issue, we calculate the mean numbers in the various age categories and in employment amongst Loser households at *time*=0, i.e. immediately before the loss of the pensioner. We then use the relevant coefficients from the composition and employment regressions, in conjunction with the observed means at *time*=0, to simulate the mean composition and employment numbers amongst Loser households at *time*=1, *time*=2, and *time*=3. We then calculate the ratio of these simulated means, which represent the changes in the employment to population ratio of a hypothetical 'average' Loser household.

5. Summary statistics

In Table 4, we present the mean of our outcome variables amongst Keeper and Loser households. We further separate our sample in two time periods. The 'pre-loss' period contains observations with *time* less than or equal to zero, i.e. before the loss occurred, while the 'post-loss' period contains observations with *time* greater than zero, i.e. after the loss occurred. There are no Keeper observations in the 'post-loss' period.

What we observe from the table is that the Keeper and Loser households are quite different even in the pre-loss period. Keeper households are smaller, with an average size of 4.76 people as compared to Loser households, which have 5.33 people on average. This pattern is maintained for each age group that we consider, and there are 0.29 more working aged

adults in Loser households as compared to Keepers in the pre-loss period. We can then observe how household composition changes on average within Loser households, between the pre-loss and post-loss period. In most categories, the mean number of household members goes down in absolute value. Household size decreases by 1.15 units, there is a decrease in the mean number of young children, school going aged children and teenagers. The number of young adults decreases by 0.04 units. Prime aged adults are fairly stable, showing a decrease of 0.01 units. The one category to indicate an increase in numbers is the older adults category, which increases by 0.03 units. The combined effect of this is that the number of working aged adults remains approximately unchanged within Loser households across the pre-loss and post-loss period.

When we consider employment and compare the Keeper and pre-loss Loser households, we see that Loser households have more employed people in each age group. To some extent, this is to be expected as we have already noted that Loser households on average have more household members within each age category. More interesting are the differences in numbers employed within Loser households across the pre-loss and post-loss groups. These increase for all adult age groups, with a net effect of 0.08 units amongst working aged adults. This represents an increase of about 14% over the pre-loss mean of 0.57 units.

The simple comparison of means provides us with some information that we can use to contextualise our analysis, but it does not account for the household specific fixed effects. This is the major advantage of the regression models that we estimate, and we present these results in the following section.

6. Results

In our household level fixed effects estimates for changes in household composition and employment, our primary coefficients of interest are the βs that correspond to *time=1, time=2 and time=3.* These represent the changes in household composition in the 1st, 2nd and 3rd quarters after the departure of the pensioner, within Loser households. The regressions differ from the table of means discussed above in three ways. First, we can observe the time that it takes for changes to manifest. Second, we have tests of statistical significance as to whether the coefficients are significantly different from zero. Third, we are using household fixed effects, which mean that the coefficients are reflecting the average change within households, rather than changes in averages across groups of households.

6.1 Regression results for household composition

Our regression results for household composition are presented in Table 5. The first three coefficients, those corresponding to *time= -3, time= -2* and *time= -1* are not of particular interest. They are determined overwhelmingly by the 20 590 Keeper households. All of these coefficients are clearly statistically significant, although the magnitudes vary across age groups. What these indicate is that household composition is dynamic, although the coefficients in general are fairly small relative to the constant term.

When we consider the post-loss coefficients, we see that for some groups they are statistically significant, while for others they are not. It is worth bearing in mind that these are identified entirely using observations from the 1350 Loser households. In terms of aggregate household size, the households decrease by an additional average of 0.142 units in the wave immediately after the departure of the pensioner.[21] This loss increases to 0.209 and 0.289 units by the second and third quarters after the loss of the pensioner. This indicates the time path effect described above. Households do adjust their size, but not all of the adjustments occur immediately.

The groups that do not have statistically significant changes on the relevant coefficients are the young children aged between 0 and 7 years old, and the prime aged adults who are between 35 and 49 years of age. In addition, their coefficients are fairly small in magnitude by the third period post-loss. The groups where we do observe statistically significant declines in the mean number of residents are the children of school going age, teenagers and young adults. For example, of the children aged 8 to 14, we see that the coefficients are all negative in sign and increase in absolute value from 0.0295 to 0.038 to 0.086. The first two coefficients are significant only at the 10% level, but the coefficient on the *time=3* variable is significant at the 1% level. This indicates that there is a time lag between losing the pensioner and the adjustments that the household will make. The coefficients for the Teens are very similar to that of the school going aged children, although the relative size of the adjustments are bigger, because there are fewer Teens on average than in the other group.[22]

The group with the largest coefficients, all of which are statistically significant, are the young adults aged 21 to 34. In the first period after the pensioner leaves, we observe an average reduction of 0.094 young adults in the household. This reduction continues as time

[21] We interpret the value of (β-1) here, as the one unit represents the pensioner who has departed.
[22] This will reflect some combination of the population age pyramid amongst Loser households, as well as a mechanical effect generated because the Teen category spans a six year age group while the school going aged group spans seven years.

progresses, almost doubling by the third post-loss period to an outflow of 0.179 members of this age group. This coefficient for *time=3* represents a decline in the number of young adults of approximately 18.5% relative to the pre-Loss mean of 0.96[23], and our data limitations are such that we cannot be certain that the re-adjustments have been completed yet.

In contrast to the other age groups, we see an increase in the number of older adults that are resident in the household.[24] The mean change is an increase of about 0.032 household members immediately after the loss, which increases to about 0.059 household members by the third wave after the loss.

In summation, we find strong evidence that the household re-constitutes itself when a pensioner leaves the household. The number of prime aged adults and young children are not statistically significantly affected, there is an outflow of dependents who are likely to be in school, a large decline in the number of young adults, and a smaller increase in the number of older adults who could provide childcare.[25] The combined groups of young/prime aged adults and working aged adults thus both also show significant reductions in number of household residents. The young/prime adult group reflects changes primarily driven by the young adults, and the coefficients are similar to those of the young adults, as the prime adult category is fairly stable.[26] The coefficients from the working aged adults are moderated by combining the negative coefficients from the young adults and the positive coefficients from the older adults. This highlights how aggregation can sometimes mask interesting and divergent effects within sub-groups in the household.

6.2 Regression results for numbers employed

In Table 6, we present our estimates for the number of people who are employed within each age group, and how these numbers change over time once the pensioner has left the

[23] As reported in Table 4.

[24] These coefficients need to be interpreted with caution. Measurement error on the age variable may lead us to erroneously classify a household as a Loser household when it is in fact a Keeper household, or it may have result in us classifying a non-pensioner household as a pensioner household to begin with. In either case, the household may in reality be stable, but the way that we've constructed the data leads us to include them as Loser households. For all the other age groups, such measurement error would induce an attenuation bias in our estimates, thus making them conservative, but this would not be true with this group. In these cases, however, the time path of adjustment should be immediate, which is not what we observe.

[25] This conjecture with regard to childcare is corroborated by observing that the corresponding coefficients are larger for female older adults and are always statistically significant at the 1% level, whereas for male older adults they are much smaller in magnitude and generally not statistically significant except for the third time period after the loss where the coefficient is significant at the 10% level. (Results not shown).

[26] Note that the coefficients on the combined groups must, by construction, be equal to the addition of the relevant coefficients from each group by itself.

household. For the teens and young adults, we find no evidence that the loss of the pensioner changed the average number of residents employed in these age categories. For the prime aged adults, the evidence is less clear cut. All of the coefficients are positive, but only the coefficient corresponding to *time=2* is statistically significant, with a value of 0.0335. This being said, the coefficient for *time=3* is of similar magnitude at 0.0296, and the lack of significance may in part be reflecting that this coefficient is estimated using only 341 observations. On the whole, we interpret this as being suggestive evidence that the loss of the pensioner does lead to some increase in the number of prime aged adults who are employed.

The clearest evidence that the loss of the pensioner leads to increased employment amongst household residents is obtained from the group of older adults. All three of the corresponding coefficients are positive and statistically significant. There is also evidence of the time path of adjustment, with the coefficient of 0.0374 on *time=3* being more than double the corresponding coefficient for *time=1*.

Of the combined groups, the young or prime aged adults do have positive coefficients, but none of these are statistically significant at any conventional levels of significance. On the other hand, the working aged adult group, which includes the older adults, does show a statistically significant increase in the number of employed persons in this age range in the household. Immediately after the loss, we see a coefficient of 0.0362 and this is significant at the 10% level. By the next wave, the corresponding coefficient has doubled to 0.0777, and this is significant at the 5% level of significance. For *time=3*, the coefficient is similar at 0.0787, but the standard errors are much larger and we can no longer claim statistical significance.

Our overall findings are thus that the loss of the pension does lead to an increase in the number of employed adults amongst household residents, and that this is driven mostly by an increase in the number of older adults and prime aged adults, conditional on residency within the household.

6.3 Simulating the employment to population ratio using the regression results

As explained in the Methods section, it is difficult to gain a sense of whether the regression coefficients are economically significant or not. To obtain some sense of what the regressions imply, we present a simulation of the average numbers within each group, as well as the number employed within the relevant groups, amongst Loser households. The

value of our initial category is obtained by calculating the weighted mean in the relevant category at *time=0* over all Loser households.

Of interest to us are the simulated proportions in employment, which are calculated as the ratio between the simulated numbers in employment divided by the simulated number in the relevant group. These are contained in the bottom section of Table 7. The Teens category shows the smallest changes in proportion employed, and always at very low levels. In contrast, all of the adult groups, both individually and combined, show economically meaningful increases in the proportion of residents in employment.

Of the young adults, the proportion increases from 0.29 before the loss to 0.35 by the third period after the loss, an increase of over 20%. From the regressions above, we know that this is driven mostly by compositional changes and not employment changes amongst young adults who maintain residency, which implies that the loss of the pension income coincided with an out-migration of young adults who were not employed. The prime adults also show a sustained increase in the proportion employed, from 0.426 pre-loss to almost 0.5 at *time=2*, before decreasing to 0.466 at *time=3*. These represent an increase of about 9% and 17% respectively, and are mostly driven by changes in employment rather than composition. The proportion employed in the older adult category increases from 0.346 pre-loss, to about 0.40 between the second and third post-loss period, an increase of just over 15%. This cannot be driven primarily by compositional changes, as the number of older adults increased after the loss of the pension. It thus represents either an in-migration of already employed older adults, or an increase in the employment rate of resident adults, or some combination of the two.[27]

Of the combined groups, we see a remarkably similar time path in the proportion employed. Both start with a value of about 0.335, and both increase to about 0.393 by the third time period after the loss, an increase of 17.3%. It is also interesting to observe that most of this adjustment is attained within the first two quarters after the loss of the pensioner.

Our overall results thus indicate that households re-organize after the loss of a pensioner, such that there is a reduction in the number of dependents, an increase in the number of potential caregivers, and an increase in the proportion of adults who are employed.

[27] Note that we cannot rule out the possibility of both outflows and inflows of household members, as we are only measuring the net changes in composition and employment.

7. Caveats and robustness tests

There are a few caveats that need to be discussed about our study. The first is that we have observed the loss of a pensioner from the household, but we are interpreting the subsequent changes as due to the loss of pension income. If the pensioner also provided services to the household, such as childcare, then the income effect becomes conflated with a home production effect. Our data does not allow us to differentiate between these possibilities.

Second, it is possible that the loss of the pensioner resulted in other financial implications which are driving our results. A key concern would be the often substantial funeral costs associated with death. Here too, our data cannot help us to test these possibilities, although it is more difficult to reconcile this explanation with the out-migration of school-going aged children and teenagers.

A third issue is that we cannot separate between the case of the pensioner dying, which would result in the stopping of the pension, or the case where the pensioner has simply moved to another residence. In the appendix Table A2, we tabulate the age of the oldest household member in Keeper and Loser households, in the first period that the household was observed. We find that the oldest resident prior to the loss is much more likely to be substantially older in Loser than Keeper households. The oldest household member was aged between 60 and 69 in about 59% of Keeper households, while the corresponding statistic was about 42% in Loser households. In contrast, only about 13.5% of Keeper households had a resident aged 80 or above, while amongst Loser households this was 26%. While this is only suggestive, it does provide some support for the hypothesis that our proxy variable is likely to correlate with the death of the pensioner. Moreover, even in cases where the pensioner has out-migrated, the pension no longer accrues to the former household, and to the extent that there is sharing across households within the same family, our estimates would be biased towards zero.

A fourth concern might be that we are simply picking up general trends in the way that households evolve over time. This is unlikely given the magnitudes of some of the coefficients, relative to the pre-loss levels. In addition, we estimated our regression models on the same set of dependent variables, but restricted our estimation sample to the set of Loser households only.[28] Our coefficients for the post-loss periods are qualitatively unchanged, but the coefficients on the *time= -1* variable are all small in magnitude and

[28] The results are presented in Table A3 and Table A4 in the Appendix.

generally not statistically significant at the 10% level.[29] This indicates that Loser households were fairly stable for at least one quarter prior to the loss of the pensioner.

8. Discussion

We set out to estimate how households respond to the loss of a cash transfer. We used a new, high frequency, longitudinal and nationally representative dataset, and focussed on the loss of pension income in South Africa. Our main findings were that household composition and employment of continued residents both change in statistically significant and economically meaningful ways.

There is an out-migration of school-going aged children and teenagers, as well as an out-migration of young adults. This out-migration is comprised mainly of young adults who were not employed, such that the remaining young adults are over 20% more likely to be employed. The proportion of prime aged adults in employment also increases, although this is mostly driven by labour market changes rather than compositional changes. We also observe an in-migration of older adults into the household, and an increase in the likelihood of older adults being employed. The net result is that there is more time from older adults being spent both in employment as well as time available for home production activities such as childcare.

Our findings are consistent with many previous findings about the South African Old Age Pension. Our paper also helps to partly reconcile one of the conflicting findings in the literature. Some research exists using national cross-sectional data that indicates a decrease in labour supply in response to pension receipt, while others have found evidence of migration related increases in labour supply, using longitudinal data from a rural area. What happens in under-developed rural areas might not generalise to a national level, but multiple sources of evidence that household composition is endogenous to the pension does challenge the cross-sectional findings. We find that household composition is endogenous to the loss of the pension, and that amongst the young or prime aged individuals (who were the focus of the above mentioned studies), there is indeed an increase in the proportion employed after the loss of the pension, but this increase is almost entirely driven by the out-migration of young adults who were not employed even prior to the loss.

[29] There is one exception, for the number of older adults in the households, where the *time= -1* coefficient is 0.0129 and is significant at the 10% level only.

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Tables

Table 1: Sample sizes of Households

Wave	# HH in cross-section	Possible Match	Actual matches	Longitudinal sample	Afr./Col. HH	Pension aged adult when first observed	Wave first observed
1	25,043	18,225	16,259	15,741	14,248	3,293	3,293
2	24,994	24,556	22,376	21,183	19,117	4,337	1,044
3	24,316	24,029	21,831	20,394	18,385	4,189	969
4	23,968	23,731	21,350	19,723	17,735	4,101	1,009
5	24,018	23,710	21,164	19,522	17,508	4,052	1,103
6	23,910	23,551	21,005	19,412	17,432	4,116	1,079
7	24,417	24,017	21,345	19,571	17,600	4,170	1,079
8	24,802	24,369	21,766	19,926	17,852	4,154	1,033
9	24,977	24,642	22,091	20,208	18,145	4,208	1,122
10	25,152	24,842	22,262	20,385	18,362	4,248	1,115
11	25,291	24,910	22,283	20,515	18,470	4,257	1,058
12	25,209	24,876	22,036	20,277	18,294	4,256	1,026
13	24,996	24,684	21,967	20,095	18,129	4,260	1,153
14	25,333	24,955	22,184	20,253	18,292	4,335	1,164
15	25,296	24,921	22,188	20,246	18,301	4,432	1,151
16	25,279	24,901	22,153	20,263	18,312	4,532	1,154
17	25,188	24,789	22,002	20,135	18,229	4,481	1,093
18	24,466	24,115	21,475	19,890	17,998	4,482	1,173
19	24,621	24,048	21,445	20,221	18,231	4,576	1,222
20	24,167	17,548	15,477	14,872	13,418	3,403	---
Total	495,443	475,419	424,659	392,832	354,058	83,882	23,040

Notes:

1. Col. 1 represents the number of unique HHID values in each cross-section.
2. Col. 2 shows the number of times a HHID in a particular wave is also observed in either the preceding or subsequent wave.
3. Since the sample has a 25% rotation rate, and wave 1 and wave 20 can only match in one possible direction, the number of possible matches are substantially smaller than for the other waves.
4. In addition to rotation, some household may not be found or have refused to participate in a subsequent wave.
5. Column 3 captures the number of households where we have at least one individual level match, either forward or backward.
6. The match rate out of possible matches is 89%.
7. The longitudinal sample excludes HHIDs that are only observed once, or that do not have a 'link' (i.e.person level match) with another wave, or that do not have enough'links' to make the 'chain' for the cohort complete.
8. African or Coloured headed households are classified by the race of the eldest person in the household. More than 99% of these households have all household members of the same race.

Table 2: Percentage reporting Pension income, by age

	African or Coloured respondents						
		Percentage			Subsample with data		
Age	# obs	Yes	No	No data	# obs	# Yes	% Yes
55	12,029	14.1	38.7	47.2	6,355	1,701	26.8
56	11,858	15.8	38.3	46.0	6,409	1,871	29.2
57	11,202	16.3	40.4	43.3	6,356	1,827	28.7
58	10,402	20.2	39.7	40.2	6,221	2,097	33.7
59	10,692	22.9	40.2	37.0	6,738	2,444	36.3
60	10,322	53.2	19.1	27.8	7,457	5,491	73.6
61	9,863	67.4	12.0	20.6	7,830	6,649	84.9
62	9,180	74.4	9.3	16.3	7,682	6,829	88.9
63	8,724	76.8	8.7	14.5	7,458	6,697	89.8
64	8,360	79.8	8.2	12.0	7,358	6,671	90.7
65	7,803	83.8	8.0	8.2	7,165	6,539	91.3
66	7,100	85.1	7.8	7.1	6,597	6,042	91.6
67	6,678	87.5	6.7	5.9	6,287	5,841	92.9
68	6,152	89.2	5.8	4.9	5,848	5,490	93.9
69	6,004	90.2	5.7	4.2	5,754	5,415	94.1
70	5,967	91.8	4.7	3.5	5,759	5,478	95.1
71	5,871	92.0	4.8	3.2	5,685	5,402	95.0
72	5,206	92.7	4.2	3.1	5,045	4,826	95.7
73	4,923	92.6	5.1	2.3	4,808	4,557	94.8
74	4,392	93.2	4.2	2.6	4,279	4,095	95.7
75	3,830	93.3	4.4	2.2	3,745	3,575	95.5
76 plus	30,872	94.8	4.2	1.0	30,561	29,251	95.7
Total	197,430	65.2	16.5	18.3	161,397	128,788	79.8

Notes:

1. Data is from 20 waves of the QLFS, QLFS2010:1 - QLFS2014:4

2. Data is at the individual level, and are unweighted.

3. The relevant question asks about 'pension or disability' grants.

Table 3: Restricting the estimation sample for identification

Gainers	1056
Keepers	20590
Lose in more than one time period	10
Lose more than one, in only one time period	34
Lose one pension aged adult in only one time period	1350
Total Households (from Table 1a.)	23040

Table 4: Means of household composition and employment by keeper/loser

	Number in Household			Number employed in Household		
State	Keeper	Loser: Pre-loss	Loser: Post-loss	Keeper	Loser: Pre-loss	Loser: Post-loss
All ages	4.76	5.33	4.18			
Kids young	0.79	0.86	0.79			
Kids school	0.67	0.68	0.64			
Teens	0.60	0.66	0.63	0.01	0.02	0.02
Young adults	0.83	0.96	0.92	0.23	0.25	0.29
Prime aged adults	0.46	0.55	0.54	0.19	0.22	0.24
Older adults	0.23	0.31	0.34	0.07	0.10	0.12
Pension aged adults	1.19	1.31	0.31			
Young/Prime adults	1.29	1.50	1.47	0.41	0.47	0.53
Working age adults	1.52	1.81	1.81	0.49	0.57	0.65
Sample size	74,643	2,571	2,453	74,643	2,571	2,453

Notes:

1. The means here are sample means and are unweighted.
2. There is no post loss period for Keeper households.

Table 5: Fixed effects regressions for household composition.

VARIABLES	(1) HH size	(2) # Kids young (0-7)	(3) # Kids school (8-14)	(4) # Teens (15-20)	(5) # young adults (21-34)	(6) # prime adults (35-49)	(7) # Older adults (50-59)	-8 # young/ prime adult (21-49)	-9 # working age adults (21-59)
time=-3	0.209***	0.0342***	0.0131***	0.0401***	0.110***	0.0199***	-0.00866***	0.130***	0.122***
	[0.0123]	[0.00530]	[0.00461]	[0.00490]	[0.00663]	[0.00406]	[0.00195]	[0.00758]	[0.00777]
time=-2	0.116***	0.0228***	0.00949**	0.0235***	0.0595***	0.00663**	-0.00618***	0.0661***	0.0599***
	[0.00967]	[0.00438]	[0.00369]	[0.00403]	[0.00516]	[0.00305]	[0.00160]	[0.00573]	[0.00587]
time=-1	0.0608***	0.0135***	0.00631**	0.00900***	0.0296***	0.00552**	-0.00313***	0.0351***	0.0320***
	[0.00749]	[0.00347]	[0.00286]	[0.00319]	[0.00404]	[0.00235]	[0.00107]	[0.00452]	[0.00458]
time=1	-1.142***	-0.0241	-0.0295*	-0.0263*	-0.0948***	0.00125	0.0318***	-0.0935***	-0.0618**
	[0.0434]	[0.0190]	[0.0153]	[0.0141]	[0.0254]	[0.0136]	[0.00898]	[0.0285]	[0.0296]
time=2	-1.209***	-0.0345	-0.0380*	-0.0375*	-0.114***	-0.0181	0.0323***	-0.132***	-0.0993***
	[0.0585]	[0.0270]	[0.0205]	[0.0193]	[0.0301]	[0.0161]	[0.0103]	[0.0337]	[0.0363]
time=3	-1.289***	-0.00634	-0.0867***	-0.0877***	-0.179***	0.0121	0.0588***	-0.167***	-0.108**
	[0.0687]	[0.0296]	[0.0269]	[0.0293]	[0.0395]	[0.0226]	[0.0163]	[0.0457]	[0.0484]
Constant	5.028***	0.798***	0.672***	0.612***	0.997***	0.552***	0.231***	1.549***	1.780***
	[0.00584]	[0.00261]	[0.00220]	[0.00238]	[0.00314]	[0.00185]	[0.000937]	[0.00349]	[0.00360]
Obs.	79,667	79,667	79,667	79,667	79,667	79,667	79,667	79,667	79,667
R-sq.	0.066	0.002	0.001	0.003	0.015	0.001	0.003	0.016	0.013
# ofHHs	21,940	21,940	21,940	21,940	21,940	21,940	21,940	21,940	21,940

Notes:

1. Robust standard errors in brackets
2. *** p<0.01, ** p<0.05, * p<0.1
3. Regressions are household level fixed effects regressions.
4. Weights are household sampling weights re-scale by the 'inverse probability re-weighting' method.
5. Omitted category is *time*=0, the last period observed prior to the loss of the pensioner.

Table 6: Fixed effects regressions of number of people employed in household

VARIABLES	(1) # Teens (15-20)	(2) # young adults (21-34)	(3) # prime adults (35-49)	(4) # Older adults (50-59)	(5) # young/ prime adult (21-49)	(6) # working age adults (21-59)
Time= -3	0.00366***	0.0256***	0.00844**	-0.00312*	0.0340***	0.0309***
	[0.00136]	[0.00458]	[0.00347]	[0.00182]	[0.00556]	[0.00583]
Time= -2	0.00149	0.0163***	-0.000915	-0.00188	0.0154***	0.0135***
	[0.000915]	[0.00392]	[0.00275]	[0.00156]	[0.00470]	[0.00494]
Time= -1	0.000812	0.00310	0.00139	-0.000672	0.00450	0.00382
	[0.000776]	[0.00329]	[0.00250]	[0.00112]	[0.00404]	[0.00423]
Time = 1	0.00380	0.00562	0.0146	0.0159**	0.0202	0.0362*
	[0.00452]	[0.0152]	[0.0103]	[0.00738]	[0.0184]	[0.0198]
Time = 2	0.0102	0.0129	0.0335**	0.0313***	0.0464	0.0777**
	[0.00771]	[0.0235]	[0.0159]	[0.00985]	[0.0291]	[0.0309]
Time = 3	-0.00747	0.0117	0.0296	0.0374***	0.0414	0.0787
	[0.00869]	[0.0401]	[0.0229]	[0.0135]	[0.0498]	[0.0519]
Constant	0.0111***	0.285***	0.227***	0.0778***	0.512***	0.590***
	[0.000561]	[0.00233]	[0.00170]	[0.000869]	[0.00285]	[0.00299]
Observations	79,667	79,667	79,667	79,667	79,667	79,667
R-squared	0.001	0.002	0.001	0.001	0.002	0.002
Number of id	21,940	21,940	21,940	21,940	21,940	21,940

Notes:

1. Robust standard errors in brackets

2. *** p<0.01, ** p<0.05, * p<0.1

3. Regressions are household level fixed effects regressions.

4. Weights are household sampling weights re-scale by the 'inverse probability re-weighting' method.

5. Omitted category is *time*=0, the last period observed prior to the loss of the pensioner.

Table 7: Simulated numbers and proportion in age groups and employment

	Sample	Simulated		
	t=0	t=1	t=2	t=3
Household composition (number in group)				
HH size	5.6138	4.4718	4.4048	4.3248
Kids young	0.8552	0.8311	0.8207	0.8489
Kids School	0.6728	0.6433	0.6348	0.5861
Teens	0.6707	0.6444	0.6332	0.5830
Young adults	1.2507	1.1559	1.1367	1.0717
Prime aged adults	0.6029	0.6041	0.5848	0.6150
Older adults	0.3033	0.3351	0.3356	0.3621
Pension aged adults	1.2582	0.2582	0.2582	0.2582
Young/prime adults	1.8536	1.7601	1.7216	1.6866
Working aged adults	2.1569	2.0951	2.0576	2.0489
Number employed in group				
Teens	0.0195	0.0233	0.0297	0.0120
Young adults	0.3642	0.3698	0.3771	0.3759
Prime aged adults	0.2571	0.2717	0.2906	0.2867
Older adults	0.1049	0.1208	0.1362	0.1423
Young/prime adults	0.6213	0.6415	0.6677	0.6627
Working aged adults	0.7262	0.7624	0.8039	0.8049
Ratio of number employed to number in group				
Teens	0.0290	0.0361	0.0469	0.0206
Young adults	0.2912	0.3199	0.3317	0.3507
Prime aged adults	0.4264	0.4497	0.4969	0.4662
Older adults	0.3458	0.3604	0.4058	0.3929
Young/prime adults	0.3352	0.3645	0.3878	0.3929
Working aged adults	0.3367	0.3639	0.3907	0.3928

Notes:

1. Weighted means of group in period immediately before loss in Loser HHs

Appendix

Fig. 1: Age distribution amongst older respondents

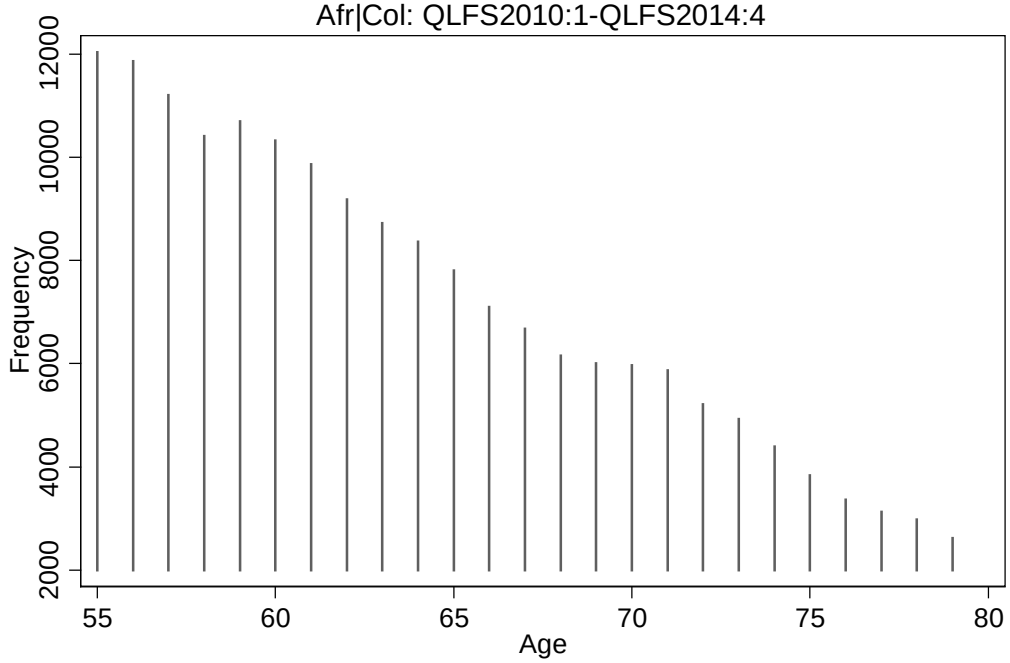

Table A1: Time distribution of (HH x Year) observations

	Number			Percentage		
Time	Loser	Keeper	Total	Loser	Keeper	Total
-3	0	15,429	15,429	0	20.67	19.37
-2	403	18,034	18,437	8.02	24.16	23.14
-1	818	20,590	21,408	16.28	27.58	26.87
0	1,350	20,590	21,940	26.87	27.58	27.54
1	1,350	0	1,350	26.87	0	1.69
2	762	0	762	15.17	0	0.96
3	341	0	341	6.79	0	0.43
Total	5,024	74,643	79,667	100	100	100

Table A2: Age distribution of oldest HH member, by keeper/loser status, when first observed

	Keeper		Loser	
Age group	Number	%	Number	%
60-64	7788	37.82	315	23.33
65-69	4312	20.94	250	18.52
70-74	3477	16.89	221	16.37
75-79	2239	10.87	213	15.78
80-84	1527	7.42	178	13.19
85-89	739	3.59	81	6
90 plus	508	2.47	92	6.81
Total	20590	100	1350	100

Table A3: Fixed effects regressions for household composition: Loser households only

VARIABLES	HH size	# Kids young (0-7)	# Kids school (8-14)	# Teens (15-20)	# young adults (21-34)	# prime adults (35-49)	# Older adults (50-59)	# young/ prime adult (21-49)	# working age adults (21-59)
t2	0.191***	-0.0157	0.0483*	0.0401*	0.0686**	0.0471**	0.00228	0.116***	0.118***
	[0.0618]	[0.0281]	[0.0257]	[0.0220]	[0.0310]	[0.0192]	[0.0126]	[0.0354]	[0.0361]
t3	0.0579	0.0197	0.00666	0.0232	-0.00307	-0.00147	0.0129*	-0.00454	0.00835
	[0.0399]	[0.0193]	[0.0182]	[0.0149]	[0.0267]	[0.0137]	[0.00671]	[0.0291]	[0.0294]
t5	-1.134***	-0.0268	-0.0248*	-0.0202	-0.103***	0.00402	0.0374***	-0.0991***	-0.0617**
	[0.0457]	[0.0187]	[0.0141]	[0.0140]	[0.0256]	[0.0130]	[0.00929]	[0.0288]	[0.0294]
t6	-1.206***	-0.0347	-0.0360*	-0.0327	-0.122***	-0.0180	0.0372***	-0.140***	-0.103***
	[0.0609]	[0.0268]	[0.0205]	[0.0201]	[0.0309]	[0.0164]	[0.0109]	[0.0347]	[0.0372]
t7	-1.285***	-0.00732	-0.0844***	-0.0840***	-0.185***	0.0130	0.0623***	-0.172***	-0.109**
	[0.0701]	[0.0299]	[0.0271]	[0.0298]	[0.0402]	[0.0228]	[0.0167]	[0.0465]	[0.0492]
Constant	5.617***	0.852***	0.679***	0.672***	1.249***	0.604***	0.300***	1.853***	2.153***
	[0.0273]	[0.0115]	[0.00914]	[0.00887]	[0.0149]	[0.00736]	[0.00557]	[0.0165]	[0.0170]
Observations	5,024	5,024	5,024	5,024	5,024	5,024	5,024	5,024	5,024
R-squared	0.344	0.003	0.007	0.007	0.023	0.003	0.013	0.021	0.011
Number of id	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350

Notes:

1. Robust standard errors in brackets
2. *** p<0.01, ** p<0.05, * p<0.1
3. Regressions are household level fixed effects regressions.
4. Weights are household sampling weights re-scale by the 'inverse probability re-weighting' method.
5. Omitted category is *time*=0, the last period observed prior to the loss of the pensioner.

Table A4: Fixed effects regressions of number of people employed in household

VARIABLES	(1) # Teens (15-20)	(2) # young adults (21-34)	(3) # prime adults (35-49)	(4) # Older adults (50-59)	(5) # young/ prime adult (21-49)	(6) # working age adults (21-59)
t2	-0.0126**	0.00841	0.00678	-0.00195	0.0152	0.0132
	[0.00598]	[0.0182]	[0.0177]	[0.0161]	[0.0252]	[0.0302]
t3	-0.00333	0.00571	-0.0134	0.00419	-0.00774	-0.00356
	[0.00396]	[0.0174]	[0.0131]	[0.00888]	[0.0212]	[0.0230]
t5	0.000931	0.00544	0.0112	0.0173**	0.0167	0.0340*
	[0.00468]	[0.0152]	[0.0103]	[0.00705]	[0.0186]	[0.0198]
t6	0.00835	0.0132	0.0298*	0.0327***	0.0430	0.0757**
	[0.00756]	[0.0245]	[0.0161]	[0.0103]	[0.0301]	[0.0318]
t7	-0.00905	0.0118	0.0272	0.0383***	0.0390	0.0773
	[0.00870]	[0.0408]	[0.0231]	[0.0138]	[0.0506]	[0.0529]
Constant	0.0196***	0.365***	0.258***	0.104***	0.624***	0.728***
	[0.00261]	[0.0105]	[0.00673]	[0.00495]	[0.0128]	[0.0138]
Observations	5,024	5,024	5,024	5,024	5,024	5,024
R-squared	0.003	0.000	0.003	0.007	0.002	0.005
Number of id	1,350	1,350	1,350	1,350	1,350	1,350

Notes:

1. Robust standard errors in brackets
2. *** p<0.01, ** p<0.05, * p<0.1
3. Regressions are household level fixed effects regressions.
4. Weights are household sampling weights re-scale by the 'inverse probability re-weighting' method.
5. Omitted category is *time*=0, the last period observed prior to the loss of the pensioner.

The **Research Project on Employment, Income Distribution and Inclusive Growth (REDI3x3)** is a multi-year collaborative national research initiative. The project seeks to address South Africa's unemployment, inequality and poverty challenges.

It is aimed at deepening understanding of the dynamics of employment, incomes and economic growth trends, in particular by focusing on the interconnections between these three areas.

The project is designed to promote dialogue across disciplines and paradigms and to forge a stronger engagement between research and policy making. By generating an independent, rich and nuanced knowledge base and expert network, it intends to contribute to integrated and consistent policies and development strategies that will address these three critical problem areas effectively.

Collaboration with researchers at universities and research entities and fostering engagement between researchers and policymakers are key objectives of the initiative.

The project is based at SALDRU at the University of Cape Town and supported by the National Treasury.

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Research Project on Employment, Income Distribution & Inclusive Growth

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