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Public Pensions and Elderly Informal Employment: Evidence from a Change in Retirement Age in South Africa

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Abstract

We investigate the impact of a reform of the public, non-contributory pension system in South Africa, which lowered the age of retirement from 65 to 60 for men only. Despite no explicit requirement to stop working when the public pension is received, we provide clear evidence that this reform triggered a large drop in old-age male employment. We show that this drop comes entirely from informal employment, while formal jobs, even if not covered by private pension schemes, are not affected. These results are consistent with the view that a significant portion of informal employment occurs out of “necessity”, and that, in particular at an old-age, workers choose not to work informally when they receive other income support. Simple back-of-the-envelope calculations reveal that the public pension alone can explain up to 10% less informal employment at the national level.

1 Introduction

Despite extensive research on informality in the labour market, the interaction between social assistance and the size of informal employment has not received a sufficient amount of attention in the literature. This is particularly evident in the case of South Africa, a country that combines both high social spending (Woolard and Leibbrandt (2013)), and a low level of informal employment (Kingdon and Knight (2004), Tondini (2017)). In this paper, we investigate the effect of a public and non-contributory pension scheme on the presence of informal employment for older workers. By making use of a reform in pension age for men, we show that recipients dramatically decrease their supply of informal labour, while formal employment remains virtually unaffected. This occurs despite no explicit requirement to stop working when receiving the public pension, and the implicit incentive to receive both the pension and earnings from informal labour. Compared to previous studies on this program, the advantage of using the latest reforms in age eligibility is that we are able to disentangle clearly the effect of the public pension from other private schemes, which may otherwise confound the effect. As “private” pension schemes also have

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similar age threshold, this step is key for correct identification of the employment effects of the public pension.

Our paper fits into the broader literature about informality in the labour market. This topic, at the intersection of labour and development economics, has been debated extensively, producing a large body of evidence across several countries. The main controversy remains the nature of informal employment, i.e. whether workers decide to join the informal sector to escape taxes and/or gain higher returns, or whether informal employment provides a “job of last resort” when better employment opportunities are lacking.¹ Less attention has been placed on the interaction between social security program and informality, more specifically on how different social policies shape the size and composition of the informal sector.² Our results support the “necessity” view, which seems to be particularly pertinent to individuals at an old age. We show that, after age 60, most of informal employment occurs out of necessity, relative to formal employment, and for the most part disappears when other income support is available.

Because of its peculiar features, the *Old Age Pension* scheme has attracted a significant amount of attention amongst economists. The amount and extension of the grant are rare in developing countries. However, the OAP has often been studied as a cash transfer to the household, and with respect to outcomes well beyond its legal definition as a pension scheme. Less attention has been given to its more classical definition, that of a public, non-contributory pension. In this paper, we attempt to fill this gap by analyzing in detail the effects of a decrease in men’s retirement age from 65 to 60. This offers the fairly unique opportunity to identify the effect of a decrease in pension age in a developing country.

The literature on the OAP is sizable, and can be categorized in two main tranches: 1) its effects on household composition, transfers and bargaining power. 2) its labour market effects on both direct and indirect recipients, meaning those individuals who live in the same household as an elderly recipient.

The first branch of the literature relates to the impacts of the OAP on children’s outcomes and, more generally, to the intra-household allocation of resources. Duflo (2000, 2003) finds that the extension of the OAP to the African population in the early 90s has led to higher health and nutrition outcomes for children who share an household with a pension recipient. Interestingly, these positive effects only go through female recipients and only benefit girls. Ambler (2016) expands on this argument to show that this is the result of a change in bargaining power within the household upon pension receipt. As men are more likely to withdraw from the labour force when receiving the OAP, their income share within the household does not change, while women’s income share increases.³ Jensen

¹For the “voluntary” view see Maloney (1999, 2004), and for the “necessity” view see La Porta and Schleifer (2014). For a full review of the literature see the introduction of Tondini (2017).

²With some exceptions, Bianchi and Bobba (2012) for *Progres*a in Mexico; Del Valle (2013) for *Seguro Popular* also in Mexico; and Tondini (2017) for the *Child Support Grant* in South Africa.

³In the case of Ambler (2016), the data used is from 2008, before the equalisation in age thresholds between men and women took place. Hence, the differential labour force responses between men and women may just derive from the different age thresholds.

(2003) tackles the question of whether public pension crowds out private transfers. The argument is that, in the absence of public support for the elderly, family members are the ones usually stepping in and supporting older individuals outside employment. By comparing the evolution of individuals just above and just below the threshold (± 5 years from the threshold), he reveals a large “crowding out” effect on private remittances. He finds that “each rand of public pension income to the elderly leads to a 0.25-0.30 rand reduction in private transfers from children living away from home.”

The labour market effects of the OAP have also been at the center of a significant empirical investigation. Ranchhod (2006) estimates the discontinuity in labour supply and employment for individuals at the age cut-off point, finding large disincentive effects for both men and women. The main issue with these estimations is that, in the cross-section, it is difficult to disentangle the effect of the OAP from other private schemes that have the same age threshold. We are able to improve on this by taking advantage of the latest reforms in age-eligibility. This is in line with on-going work by Matsuda (2016), who also uses the latest age reforms to look at the labour market impacts of this transfer. Moreover, we expand on this framework by differentiating between informal employment and formal employment, both with and without a private pension scheme.

Evidence on the labour market impacts on other household members is mixed and significantly more complex, mostly because of the issue of selection when household composition changes as a result of pension receipt (Hamoudi and Thomas (2014)). Cross-sectional evidence from Bertrand et al. (2003) revealed the presence of disincentive effects for other members of the household who were not the direct recipients. They exploit the age-eligibility threshold and find a large drop in activity and employment for prime-aged individuals when an older member is eligible for the OAP. Posel et al. (2006) replicate this analysis but underline the role of selection. Migration of other household members is also impacted by the grant, as members of OAP recipient household are more likely to migrate. To solve this selection issue, Ardington et al. (2009) make use of panel data in one of the poorest provinces of South Africa, which tracks individuals regardless of whether they migrate or not from the household. Longitudinal analysis reveals opposite effects from the simple cross-sectional evidence. Households that receive the OAP actually experience an increase in employment, which “occurs primarily through labour migration.” However, recent results by Abel (2013), who also uses panel data but at the country level, go back to the initial insight that the OAP has disincentive effects on employment, for both direct and indirect recipients. Thus, evidence on the employment effects for indirect recipients is still unclear.

Our paper documents in detail the labour market effects on direct recipients. Relative to prior work, we are able to provide neater estimates of the labour market effects of public pension, by making use of the latest reform and avoiding mixing in the effect of other, private schemes. We provide evidence that the disincentive effects of the OAP on its direct recipients are large, but exclusively concentrated on informal employment. Formal workers, even if not covered by a private pension scheme, are not affected. We believe

these results have important implications for both economic research and policy. First, these effects show that, at least at an old age, informal employment occurs for the most part out of necessity. Providing individuals with an external source of income support decreases informality to virtually zero amongst recipients. We find no evidence that the pension gives the incentive to combine earnings from informal labour, which do not enter the means-test, with the transfer. Second, we are able to provide a precise estimate of the direct effect of the pension on labour supply, which may be of use for policy makers if further reforms of pension age will be considered.

2 The South African *Old Age Pension*

The *Old Age Pension* (OAP) is a non-contributory pension system in South Africa, originally put in place in the 1920s to provide a minimal level of income to those Whites and Coloured who were not covered by a retirement plan (Duflo (2000), Woolard and Leibbrandt (2013)). During the Apartheid period, Black South Africans were consistently excluded from most social transfers, and, to a large extent, from public pensions. This occurred in several different ways: the means test was set at different levels for different races, and was significantly lower for Black and Coloured people. Moreover, the benefits paid when actually eligible only made up one tenth of the amount paid to Whites (Duflo (2003)). Several other administrative loopholes were exploited to keep groups other than White to fully access the grant (for a full account of the history of the OAP in Apartheid South Africa refer to Lund (1993) and Woolard and Leibbrandt (2013)). The means-tests were equalised in 1992, and full “legal” equality was achieved as from 1993, about one year before the official end of Apartheid in South Africa (Duflo (2003), Woolard and Leibbrandt (2013)).

Together with the *Disability Grant*, which is in practice equivalent to the OAP but can be received before pension age, the *Old age Pension* scheme is the largest social program in South Africa in terms of spending (National Budget Reviews (2013)). Access to the grant is subject to two criteria: 1) an age criterion, for which the recipient has to be older than a certain age; and 2) a means-test criterion, for which the recipient’s earnings (and overall wealth) have to be lower than a certain threshold. Private occupational pensions enter the computation for the means-test.⁴ There are no criteria with respect to past contributions or even past employment, hence it can be characterized as a non-contributory, means-tested pension scheme. Since the extension of the grant to the Black population, the age criterion for women has been always fixed at 60 years old. Instead, the threshold for men has been set at 65 until July 2008, and then gradually lowered to 60 in the two following years. We present the reforms in the age threshold and amount over time in Table 1.

The amount of the pension in nominal terms has been constantly increased since 1993 to keep up with inflation. While there are some fluctuations in the real amount, in particular in the early 2000s when inflation increased more than the nominal amount, the real amount

⁴This is clearly stated in the guidelines published by the South African Government: <http://www.gov.za/services/social-benefits-retirement-and-old-age/old-age-pension>

of the grant is fairly constant, around R 1000 (2010), which is equivalent to approximately 200 \$ PPP. This is a remarkably high transfer when compared to median income (Woolard and Leibbrandt (2013)), and to wages, as we will show in the following section. Historical information on the means-test is harder to obtain. However, the literature points to the fact that since 1993, when the means-test was equalized across races, it was set very high both in terms of income and wealth, and that is unlikely to be binding for a significant portion of the population. Nonetheless, since 1993, it has been successful at excluding the majority of the Indian and White population from receiving the OAP. Initially, the proportion of the grant paid was supposed to be a decreasing function of the recipient's income, which would reach zero at the threshold. However, it seems that the means-test was always understood in a "binary fashion"(i.e. an individual either makes the means-test or he/she does not), hence with a 100% marginal tax rate (Ranchhod (2006)).

An important, complementary feature of the *Old Age Pension* is the *Disability Grant* (DG). This transfer is received by individuals who have not yet reached the age threshold for the public pension, and carry some sort of physical and/or mental disability.⁵ The Disability Grant has exactly the same means-test of the OAP, and pays the same amount. Moreover, it is automatically converted into the pension once the appropriate age is reached (Abel (2013)). The two transfers cannot be received simultaneously, as one condition to get the Disability grant is to be younger than the pension age threshold. Therefore, they have to be thought of as complementary, in that the DG provides some form of income support to people who cannot work before they reach pension age. Figure 1 gives the number of beneficiaries of the OAP and Disability Grant, and their sum, over time.⁶ As from 2008 when retirement age is lowered, there is a large increase in the number of OAP recipients. This positive trend is partly offset by a decrease in the number of disability grants, because the two transfers are not cumulative. The total number of beneficiaries increases during the period of the reform but not at a faster (nor slower) pace than the previous years, because the faster growth in the number of public pension is offset by a decline in the number of Disability grants.

In Figure 2, we plot the average take-up of the Disability Grant and the Old Age Pension by age in the years before and after the reforms in age-eligibility. The percentage of men aged 60 to 64 receiving the Disability Grant before 2008 was already fairly high. However, we do observe a large spike in the take-up of the Old Age Pension for the post-reform years. Consistently, this only occurs for men and not for women, whose age profile remains virtually unchanged. Take-up levels are overall very high, reaching peaks of over 80% for women older than 65, and around 70% for men of a similar age. These rates are even higher when excluding the White and Indian population, for whom the take-up of social grants is lower, and can reach up to 90% for the remainder of the population. Interestingly, we also observe that take-up is overall lower for men than for women, this is true both before and after the equalisation of the age threshold. The explanation presumably lies in the

⁵Information about the Disability Grant can be found here: <http://www.gov.za/services/social-benefits/disability-grant>

⁶These figures are calculated on administrative data from the Social Security administration (SOCPEN database) found in the yearly National Budget Reviews.

higher prevalence of formal employment amongst men, who are therefore more likely to be covered by occupational pension scheme rather than the public pension. Interestingly, we also observe that take-up for men jumps at 65 even after the age thresholds have been equalised between men and women. There are different possible explanations for this: this could be the results of an inertia mechanism, whereby not everybody is aware of the change in pension age. Otherwise, it could also be driven by men in formal employment, but not covered by occupational pension, who tend to retire at 65 and consequently take-up the public pension.

3 Data and Descriptive Statistics

3.1 Data

Our analysis relies on the the use of two datasets: the *General Household Survey* (GHS) and the *Post-Apartheid Labour Market Series* (PALMS). The GHS is an annual, nationally representative survey that covers the period 2002 to 2015, run by the South African statistical agency (STATSA). It includes information on the Old Age Pension, the Disability grant, and some basic information about employment and salary. However, the GHS has no questions that can be used to define informality. Respondents are not asked in which sector they work, nor about the social security coverage, contract status or business registration.

The PALMS consists of several appended cross-sections from 1994 to 2015. Over our period of interest (2002-2015), the PALMS is made up of two similar surveys: the *Labour Force Survey* (2002-2007) and the *Quarterly Labour Force Survey* (2008-2015). These surveys are generally considered to be of high quality, and are the main source of labour market information in South Africa. They are also run by STASA, but the PALMS dataset, which combines them in a coherent way, is put together by researchers at *Data First* of the University of Cape Town.⁷ From 2000 to 2007, the LFS was bi-annual, i.e. interviews were carried out in March and September. As from 2008 to now, together with a change in the sampling framework, the QLFS began to be run each quarter. Overall, both the LFS and the QLFS have much more detailed information on employment, informality and wages (except for the period 2008-2009, where salary information was not asked). The disadvantage of these surveys is that information about social transfers (including the public pension) is asked only to individuals who are not working, i.e. limited to the inactive or unemployed. This makes it impossible to calculate a first-stage on the PALMS, given that employed people can also access the OAP.⁸

The advantage of using the PALMS, rather than the original waves from the LFS and the QLFS, is that variables are coded consistently over the whole period, and sampling weights are adjusted to be coherent over time, but the underlying data is the same. Throughout these papers, we will run the analysis on the two datasets (GHS and PALMS),

⁷Detailed information about how the PALMS 3.1 was put together can be found here: <https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/434>

⁸This is something we observe in the GHS, for example, even if to a very small extent.

both because of their complementary features and as a robustness test. With the GHS, we can look at the effect of the reform on both take-up and overall employment. While with the LFSs, we are able to replicate the total effect on employment but also disentangle the impact by informality and private pension status, which is our main interest. To ensure the maximal comparability across the GHS and the PALMS, we exclude the initial waves of the PALMS and focus only on the period 2002-2015.

3.2 Informality Definition

Throughout this paper, our focus will be on informal employment rather than the informal sector, meaning that our definition of informality will be job-based rather than firm-based.⁹ In practice, this means that we define a worker as informal depending on whether his/her job is not covered by labour market legislation, rather than whether the firm he/she works for is informal. The reasons behind this choice are data-driven: there is no constant definition of formal/informal sector across the different waves of the PALMS.¹⁰ We define informality status separately for employees and self-employed. For employees, we identify informal workers as those without a written contract. Instead, we categorize as informal those self-employed workers whose business is not registered for value-added tax. These are standard definitions of informality found in the literature. They have the advantage of being based on fairly clear and objective questions, which leads to greater comparability over time and across surveys.

Moreover, given the scope of our paper, we divide formal employment between those workers who are covered by a private pension plan and those who are not.¹¹ This is important given that a reform in the public pension system is likely to affect all those workers who do not have a private pension plan, both informal and formal. Only a portion of formal employees are covered by a private pension scheme, but not all. Formal self-employed are not asked whether they are covered by a private pension plan, because the question refers to whether the employer contributes to a retirement fund on behalf of the employee. Hence, this question does not pertain to the self-employed who by definition do not have an employer. However, formal self-employed make-up less than 4% of total employment.

We show descriptive statistics by informality and pension status in Table 2 for the year 2010. In total, informality accounts for around 30% of total employment. The vast majority of self-employed has an unregistered business (75%+), but only around 7% of the working-age population in South Africa is self-employed. Therefore, informal self-employed make up less than half of informal employment. Formal employees with a private pension are the largest group overall (around 18% of working-age population), but we also observe

⁹For a detailed discussion of the difference between informal employment and the informal sector see Tondini (2017).

¹⁰The question that allowed to distinguish between formal and informal sector was discontinued in 2008 when the QLFS was introduced. In the QLFS, formal/informal sector divide is defined using several other variables (such as firm size, for example).

¹¹Information about employer's contribution to a retirement fund is not originally coded in the PALMS. We retrieve this information from the original LFS/QLFS files and merge it into the PALMS. The question on which this variable is based remains virtually unchanged throughout our period of analysis (2002-2015).

that a large portion of workers with a written contract are not covered by a private pension scheme. They account for around 13% of working-age population, which is approximately comparable to the size of informal employment in South Africa.

We then look at median earnings across the same groups. Formal self-employed are by far the highest earning in the labour market with 50% of them making more than R 10 000 a month. On the contrary, informal employees only make slightly more than R 1000 (2010) per month. Informal self-employed earn more on average than informal employees, but they represent a smaller portion of the population. We also observe that wages are significantly higher for those formal employees with a private pension, around three times higher than those without.

We compare the distribution of earnings to the means-test level for the Old Age Pension, which was set at 31,296 Rand per year in 2010 (i.e. 2600 Rand per month approximately). The means-test is important because, with age, is the only other requirement to access the pension. The large majority of informal employees (86%), even when working, are below the means-test threshold. Around 60% of the informal self-employed and those formal employees without a private pension are also below the means-test level. The portion of individuals below the means-test is likely to be considerably higher when considering that the means-test is doubled for married couples. Moreover, informal earnings should not, in practice, enter the computation for the means-test, given that they are very unlikely to be reported. The amount of the OAP in 2010 was 1080 Rand per month. This is only slightly lower than the median earnings of an informal employee, and around half of that of a formal employee without a private pension or an individual who runs an unregistered business. Instead, this amounts to less than one fifth of the median wage of a formal employee with a private pension scheme, and one tenth of the median earnings of an individuals who runs a formal business.

In Table 3, we delve into the characteristics of males aged 50 to 59, in order to restrict the attention to the subgroup close to pension age, and hence affected by the reform. We separate them in three groups: informal workers, formal workers without a private pension and formal workers with a private pension.¹² Informal workers are predominately black, they are also more likely to be rural (although a large majority is urban), single, and less educated. The vast majority of them is found in small enterprises with less than 5 employees, and up to 20% only works part-time. Formal workers without a private pension are also more likely to be black (around 2/3) than those with a private pension scheme (1/2). They are also less educated by an average of three years of schooling, and have significantly shorter tenure on their current job (almost ten years difference on average.) Even for the subgroup of males close to retirement age (50-59), the median earnings of formal employees without a private pension are closer to those of an informal worker than

¹²Those workers who are formal self-employed (i.e. run a VAT registered business) are not asked about their pension contributions. Throughout the analysis, they are grouped with those formal employees with a private pension, because they are the most similar. However, they represent a very small fraction of the working population: excluding them from the analysis or including them in a separate group does not change the results in any way.

an individual whose is formally employed with a private pension.

4 Empirical Analysis

In order to capture the labour market effects of the Old Age Pension, we make use of the latest reform in eligibility, which only directly affected men. In our estimations, we employ a “modified” Regression Discontinuity Design (RDD). The main concern here is to avoid bias from private pension schemes with a similar age threshold. With this in mind, we extend the RDD framework to incorporate the time variation in the age threshold introduced by the reform. Therefore, rather than simply estimating the jump at a given threshold as in a traditional RDD setting, we estimate the difference in the jump before and after the reform. This relaxes considerably the “classic” RDD assumption that, in the absence of the treatment, there should be no discontinuity at the cut-off point. Instead, by performing this estimation, our only requirement for identification is that the discontinuity at the threshold would have remained the same in the absence of the reform. This design can be thought of as combining both a “Difference-in-Differences” (DID) and an RDD, but requires significantly weaker assumptions than any of the two methodologies applied independently.¹³ All our estimations are run on the subsample of individuals aged 50 to 70, during the years 2002 to 2007 and 2010 to 2015. We exclude the reform years (2008-2009), and only focus on the before/after period. Formally, we estimate the following equation, separately for men and women:

$$Y_i = \delta_t + \gamma_r + f(\text{age}_i) + f(\text{age}_i) \times \text{Age}_{(60+)} + f(\text{age}_i) \times \text{Post} + f(\text{age}_i) \times \text{Age}_{(60+)} \times \text{Post} + \text{Age}_{(60+)} + \beta_1 \text{Post} \times \text{Age}_{(60+)} + \epsilon_i \quad (1)$$

where Y_i is the outcome of interest. δ_t and γ_r are, respectively, year and race fixed effects. $f(\text{Age}_i)$ is a function of age, and we test the sensitivity of our results to both a linear and quadratic function. As suggested in Gelman and Imbens (2014), we avoid the use of higher order polynomials. Post is a binary variable equal to 1 for the years after the reform (2010-2015) and equal to 0 for the years before (2002-2007). $\text{Age}_{(60+)}$ is also a dummy variable indicating whether the individual is older than 60, which is the cut-off point. We interact the function of age with the Post and $\text{Age}_{(60+)}$ variables. In this way, we allow for four different functions of age, on both sides of the threshold and before/after. We also allow for two different discontinuities: before, $\text{Age}_{(60+)}$, and after, $\text{Post} \times \text{Age}_{(60+)}$. β_1 is our parameter of interest, which captures the before/after difference in the discontinuity at age 60. It is important to underline that we observe age as a discrete variable, so our design suffers from the limitations of an RD with a discrete forcing variable in terms of inference (Lee and Card (2008), Lee and Lemieux (2010), Kolesár and Rothe (2016)). As suggested by Kolesár and Rothe (2016), we do not cluster by the running variable (i.e. age). Instead, we obtain robust standard errors by clustering at the race-cohort level. In this way, we want to account for the serial correlation arising from observing some of the same cohorts over time at different points of the age profile.

¹³The assumption of the DID is that the affected and unaffected age-groups would have evolved in the same way over the period in the absence of the reform.

One of the advantages of this estimation is that it offers a practical solution to “age heaping”, meaning the tendency among survey respondents to round age to the closest multiple of 5 or 10, as already pointed out by Ranchhod (2006). Given that we focus on the change in the discontinuity, rather than the discontinuity itself, this does not pose a problem unless heaping is more or less severe before or after the reform. This can be checked easily by looking at the change in density.

A more pertinent concern in this setting is the possible presence of anticipation effects. This is a common problem when dealing with age as a forcing variable. Individuals are aware of the age threshold, and can anticipate or postpone their retirement decision before reaching the age threshold. Given that we focus on the (change in) discontinuity at the threshold, our estimation ignores possible changes that occur before the threshold as a response to the pension reform. With this in mind, our estimates have to be understood as capturing the anticipated income effect of receiving the pension (relative to not receiving it) rather than as the “absolute” effect of the pension reform. In terms of the total effect, the bias from anticipation effects could go both ways: if individuals younger than 60 anticipate their retirement decision because of the lower age threshold, then our estimates will be a lower bound. However, if individuals postpone their retirement to reach the public pension age, then we would overestimate the effect of the pension.

In order to test for the presence of anticipation effects, we exploit the fact that women are not directly impacted by the reform and that age brackets closer to the threshold are more affected than those further to the left. With this in mind, we compare the evolution in employment of men and women in unaffected age-brackets to see whether men change their labour market behavior before reaching pension age. We estimate the following equation on the subsample of individuals aged 50-59 (unaffected age brackets):

$$\begin{aligned}
Y_i = & \delta_t + \gamma_r + Male + Male \times Post + \sum_{a=51}^{59} \mathbb{1}\{Age_i = a\} + Male \times \sum_{a=51}^{59} \mathbb{1}\{Age_i = a\} \\
& + Post \times \sum_{a=51}^{59} \mathbb{1}\{Age_i = a\} + Post \times Male \times \sum_{a=51}^{59} \beta_a \mathbb{1}\{Age_i = a\} + \epsilon_i \quad (2)
\end{aligned}$$

where *Male* is a binary variable equal to 1 for men. We introduce a dummy variable for each discrete age value (excluding age 50) and then interact it with the *Post* and *Male* variable separately, and together in a triple interaction term. The coefficients of interest in this regression are B_a , which are age-specific coefficients capturing the relative evolution with respect to the excluded age value (age 50) and relative to the same evolution for women. Given that the age threshold was not changed for women, we interpret any relative change to be indicating the presence of anticipation effects. This estimation relies on the assumption that the evolution of each specific age value relative to the excluded one value would have been the same between men and women in the absence of the reform, and that anticipation effects should be stronger for those age values that are closer to the pension threshold than those further to the left. This estimation should give a sense of whether men in unaffected age-groups have responded significantly to the lowering of

pension age.

As mentioned before, the analysis will be run on two different datasets. In a first part, we will run these estimations on the General Household Survey, which allows us to have a precise impact of the reforms on OAP take-up and overall employment. In a second part, we will run the estimation on the PALMS, where we can replicate the effect on total employment, but also disentangle it between formal and informal employment.

4.1 Impact of the Reform on OAP Take-Up and Employment

Table 4 presents the results of estimating Equation 1 on the General Household Survey, while Table 5 estimates the exact same equation for the same years but on the PALMS. With the GHS, we estimate a jump in take-up of around 30 pp. at age 60, which does not seem to be sensitive to the functional form specified in the regression. We also observe a smaller increase for women, between 6-9 pp. at the threshold, however not statistically significant and much smaller than the observed jump for men. Graphical evidence of this jump for both men and women is presented in Figure 4. Coherently with the reform, the large increase is concentrated amongst men aged 60 to 64. While we observe that take-up also increases for men at age 65 relative to before, from that point onwards, the age profile resembles the pre-reform period.

We then turn to the effect on employment. In our regression, point estimates on the GHS range between 10-13pp. for men, depending on whether we specify a linear or a quadratic function. We also estimate a smaller, negative and slightly significant coefficient for women when using a linear specification, however the coefficient drops to zero once a more flexible function is introduced. Our results on the PALMS (Table 5) give more conservative estimates of the impact on total employment: the point estimate with a quadratic function is around 6pp., hence around half of the impact found on the GHS. Graphical representation of the effect on employment are shown in Figure 5 for the GHS and Figure 6 for the PALMS. From the graphical analysis, it would seem that the reason behind the difference in the estimates is a jump up in employment at age 59 in the GHS, which surprisingly is not observed in the PALMS.

In Table 6, we test for anticipation effects as outlined in Equation 2. When using the PALMS, we find no evidence of anticipation effects on employment, as the unaffected age groups evolve similarly between men and women over the period. However, we do observe a large relative jump in employment at age 59 for men when using the General Household Survey. This would bias our estimates of the total effect upwards. The jump is around half the size of the drop measured with the modified RDD estimation. Once this is taken into account, by excluding age 59 from the regression, the “net” drop in employment is similar in size between the two datasets, in the order of 6pp. However, we are not able to explain why we observe this jump and then a larger decrease in only one dataset and not the other.

Overall, the magnitude of the drop in employment is sizable: a 6pp. drop equals a

10-11% decrease in total employment at the threshold. This effect is surprisingly large if considering that there is no explicit requirement to stop working when receiving the OAP, and that most workers still pass the means-test even when working full-time. To understand the mechanisms behind this response, we turn to the PALMS and to the analysis of informality.

4.2 Impact of the Reform on Informal and Formal Employment

Our main goal is to understand what kind of employment is affected by the public pension reform. To do so, we exploit the detailed information in the PALMS about informal employment. The idea is to test whether workers respond differently to the availability of the public pension scheme depending on what job they are in. It is important to underline that heterogeneous effects could result from an heterogeneous treatment, i.e. the reform impacts differently formal and informal workers, or because informal and formal workers are inherently different, and would respond differently to the same reform. In Table 5, we run Equation 1 on informal and formal employment separately. Also, we separate formal workers between those who have an employer who contributes to a retirement fund and those who do not. The second group should be more affected by the OAP reform than people who have a private pension scheme, and who should make their retirement decisions independently of the public pension. This group is also more similar to informal workers (than formal workers with a private pension) in terms of observable characteristics.

In theory, income from informal employment should be hidden, and not enter the means-test. Moreover, as shown before, the large majority of informal workers still earn less than the means-test when working full-time. Therefore, a worker does not necessarily have to leave his/her job when becoming eligible for the OAP. On the contrary, one could easily cumulate the pension amount with earnings from informal labour. Nonetheless, our results show that the drop in employment is concentrated entirely amongst informal workers, who account for virtually the full decrease in employment at the threshold. This is very clear in Figure 7. We do not find that formal workers adjust their employment in response to the public pension, irrespectively of whether they are covered by a private pension scheme. Workers with a formal job, but without a private pension scheme, do not seem to respond to the reform in terms of their employment rate. The drop in informality is remarkably large for old-age workers: a 5 pp. drop equals around a 40% drop in informality at the threshold.

Due to the presence of the means-test, whether to take-up the OAP and stop employment is a joint decision for those workers who are above the income threshold. Therefore, we cannot directly interpret the increase in pension take-up as a “first stage” and re-weight the coefficients on employment by the jump in take-up. However, hidden informal earnings should not enter the means-test threshold. Moreover, as shown in Table 3, the large majority of informal workers is below the means-test. Therefore, for informal workers, we could interpret the decision to take-up the pension and to stop employment as independent decisions in two stages. Given a re-weighting factor of approximately 3, treatment effects are in the order of 16 pp. on informal employment. Hence, the effects on the treated are

actually larger than the average level of informal employment at age 59, which suggests informal employment may virtually disappear amongst those who begin receiving the pension. There is no evidence that individuals decide to keep their informal job while also receiving the OAP. On the contrary, most of them seem to quit their informal jobs. This is consistent with the view that portrays informal work occurring “out of necessity”, with workers who tend to leave this type of employment when an external source of income is provided.

A simple back-of-the-envelope calculation reveals that, given the number of recipients of the OAP and disability grant, these results can explain between 1.2-1.4 pp. less informal employment at the country level (or 12% less informal employment given the average over the period).¹⁴ This is based on the assumptions that the effect is the same for men and women, and that the Disability grant has the same effect as the Old Age Pension. Both these assumptions are questionable. The effect could be larger for women, who are found prevalently in informal employment, or smaller if informality is more of a choice than for men. However, their age profile in terms of informal employment is very similar to that of men after the reform, with a sharp decline at age 60, which suggests the effect is similar for women. The Disability grant might have no impact on informal employment if people who receive it would not work in any case, or the effect could be even larger if we consider that this grant is accessible to people still in their working age. Even assuming that the Disability Grant has no impact on informality, the pension alone could account for almost one percentage point less in informal employment.

4.3 Robustness Checks

We conduct several robustness tests to confirm the validity of these results. As mentioned before, “age heaping” is problematic when dealing with age as a forcing variable. In our empirical setting, this is an issue only if age heaping is more or less severe before or after the reform. Therefore, we look at the change in density around the threshold both in the GHS and the PALMS. In the spirit of a McCrary (2008) test, we run 1 on the log number of individuals within each cell (age x year). Neither dataset reveals a discontinuous change at the threshold, which suggests this is unlikely to be an issue in our estimations. A standard check in an RD design is to examine the distribution of pre-determined observables around the threshold. In our modified version, we again focus on the changes in observables before and after the reform, which may indicate selection. For a set of observables that includes education, race, province, household size and marital status, we do not find any evidence of selection either in the GHS or in the PALMS. Both set of results are presented in Table 8.

In order to check that the heterogeneity in the results is not driven by racial composition, we restrict the sample to the Black population and re-run the analysis. The results are presented in Table 7, where we show that the same pattern holds when we focus exclu-

¹⁴This is using the estimate of Table 5 and considering that the average coverage rate of the OAP and the Disability grant combined since 2010 is around 7.98% for the population aged 18 to 69, and that the average level of informality since 2010 is around 12.6 percent for the same population.

sively on this population group. The drop in employment is slightly larger, around 7 pp., and entirely concentrated on informal employment.

Lastly, we check the sensitivity of our results to the selected window. In our main estimations, we chose arbitrarily a ± 10 window. In Figure 10, we test the sensitivity of these results with a simple linear function to both a larger and smaller bandwidth, for both the PALMS and the GHS. The point estimate on the PALMS is fairly stable around 6 pp. with a large window up to ± 8 , and then decreases as the window gets smaller. In the smallest possible window, the effect remains negative around 4 pp. but insignificant. Results with the GHS are actually very similar to those of the PALMS when the bandwidth is large. This is because a linear function gives the same weight to points close to the threshold as it does to points further away, and hence “ignores” the problem of the jump up at age 59. However, we see that the effect gets increasingly larger as the window gets smaller, and the bias from the single point increases with a smaller bandwidth.

5 Conclusion

This paper looks at the impact of a reform in the public, non-contributory pension system of South Africa. The age threshold to access the Old Age Pension was lowered from 65 to 60 for men only. Despite no explicit requirement to retire when receiving the pension, we provide clear evidence that this reform triggered a large drop in old-age male employment. We show that this occurs because informal workers leave their informal jobs, while formal workers, even if not covered by a private pension scheme, do not respond to the change in retirement age. We find that the Old Age Pension and the Disability grant can explain around 1.3pp. less informal employment in South Africa. These findings are coherent with the thesis that South Africa’s high level of social spending may be behind its low level of informal employment, and, more generally, that social security plays an important role in shaping the size and composition of the informal sector.

Our results fit into the literature about informality in the labour market. The main debate in this literature has been whether workers choose informal employment or whether they have a preference for formal jobs, but take informal work “out of necessity.” The findings of this paper clearly support the second view. We find that the disincentive effects of a public pension scheme only occur for informal workers, despite the fact that they are the least required to stop working when receiving the pension. Moreover, a transfer that is roughly equal to the median wage in the informal sector decreases informality by 40%.

Lastly, this paper wants to contribute to the design of pension systems in developing countries. From this paper, we derive two main policy implications, which may apply to different extents to countries other than South Africa: 1) while there are strong disincentive effects on employment when expanding the public, non-contributory pension scheme, these mostly impact “subsistence-level”, informal jobs; 2) conversely, given the large share of the population that is not covered by an occupational pension, an increase in the age threshold of this scheme will likely result in older workers having to recur to informal jobs out of

necessity. It is unlikely that South Africa will be able to maintain the same age threshold in the upcoming years, as the fiscal burden increases significantly as the population ages. With this in mind, we believe these results are important in informing the debate around future reforms of the *Old Age Pension*.

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6 Tables and Figures

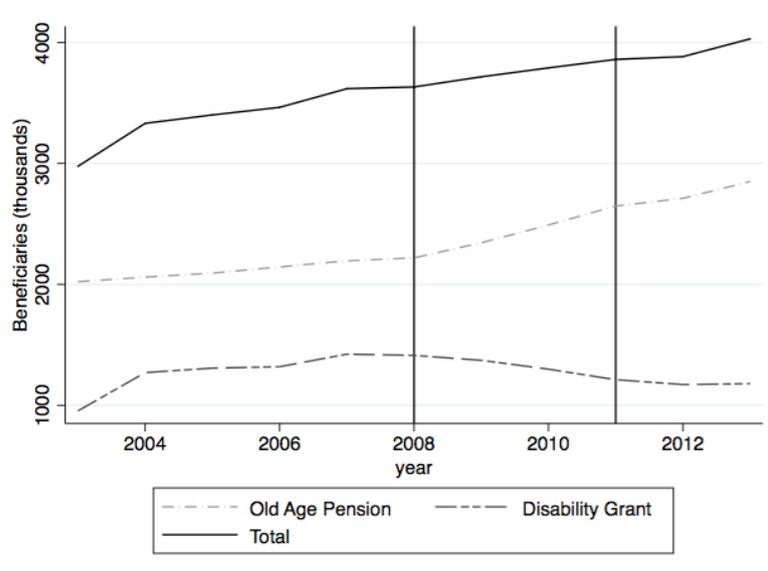
Table 1: Evolution of the OAP, 1993-2010

Date	Age threshold		Amount	Amount (R '10)	Means-Test
	Men	Women			
1993	65	60	R 370	R 1008	
1994	65	60	R 390	R 977	R 4440
2000	65	60	R 540	R 902	
2003	65	60	R 700	R 955	R 16920
2007	65	60	R 870	R 1069	
2008(Q3)	63	60	R 940	R 1049	
2009(Q2)	61	60	R 1010	R 1051	R 27552
2010(Q2)	60	60	R 1080	R 1080	R 31296

Note: The age threshold was different for men and women until it was equalized between 2008-10. Amount is presented in current Rand and 2010 Rand separately, CPI data is taken from OECD.stat.

Source: The main sources on OAP amounts are Eyal and Woolard (2011) and the South African government (<http://www.gov.za/services/social-benefits-retirement-and-old-age/old-age-pension>). Reform dates are from the National Budget Reviews (2013). Information on the means-test for 2009 and 2010 is collected from US (2015); Ranchhod (2006) for 2003; Case and Deaton (1998) for 1994.

Figure 1: Number of OAP and Disability Grant Beneficiaries, 2003-2013



Note: This graph gives the number of beneficiaries of the Old Age Pension and of the Disability Grant between 2003 and 2013, and their sum (in thousands, 2000 on the graph equals 2 million). The vertical lines indicate the reform period for the OAP, where the age threshold for men was gradually lowered from 65 to 60.

Source: National Budget Reviews (2013). These figures come from administrative data (SOCPEN). When there are small discrepancies for the same year, the latest available estimate is used

Table 2: Informality Definition, 2010

	Informal	Formal	
<i>Employees</i>	<i>No Written Contract</i>	<i>Written Contract</i>	
		Without Private Pension	With Private Pension
% of Working Age Population	8.16	12.78	17.79
Median Wage (2010 Rand)	R 1200	R 2200	R 5633
% below 2010 Means-Test	86%	59%	22%
<i>Self-Employed</i>	<i>No VAT Registration</i>	<i>VAT Registration</i>	
% of Working Age Population	5.33	1.72	
Median Wage (2010 Rand)	R 2000	R 10000	
% below 2010 Means-Test	59%	14%	

Note: % of Working Age Population refers to the share relative to the population aged 18 to 64. Median wage refers to the value of the 50th percentile of the wage distribution for the specific group in 2010. % below 2010 Means-Test refers to the share of workers in each group who are below the means-test in 2010, when it was set at 31296 Rand annually in 2010 (i.e. around 2600 per month). Informal employees are identified as those workers without a written contract. Formal employees are divided between those whose employer contributes to a retirement fund, and those without a private pension scheme. Self-employed are all workers who own their own business, regardless of whether they employ other people or not. Informal self-employed are those whose business is not registered for *Value-Added Tax*. Self-employed individuals are not asked about their pension contributions.

Source: Authors' calculations on PALMS 3.1

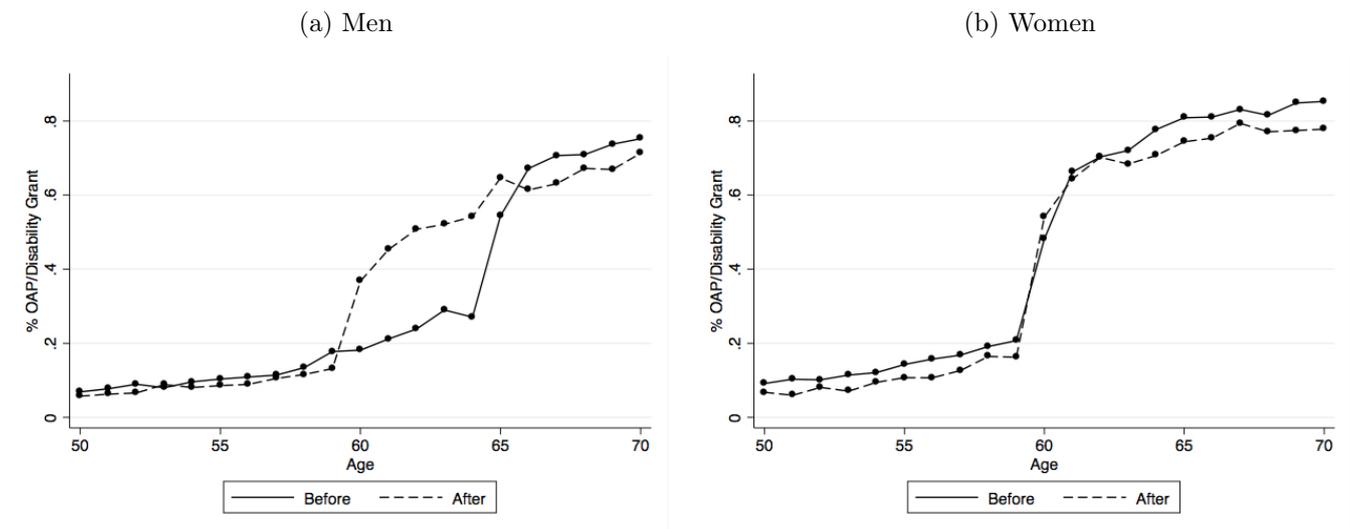
Table 3: Composition of Formal and Informal Employment, Men 50 to 59 years old, 2010

	Informal	Formal	
		Without Private Pension	With Private Pension
<i>Demographic Characteristics</i>			
Black	80.5	65.8	51.3
Rural	34.2	23.3	14.9
Education (yrs)	6.5	7.7	10.5
Married	73.1	81.6	89.5
<i>Job Characteristics</i>			
Firm Size (<5)	75.5	11.8	9.1
Tenure (yrs)	7.4	8.2	17.4
Part Time (<30hrs)	23.3	4.2	4.3
Monthly Salary	R 1700	R 2816	R 6500
% below 2010 Means-Test	65.7	48.3	19.1

Note: Formal self-employed individuals are included within Formal with Private Pension (see footnote on Page 8 for discussion). *Black* refers to the share of African people within each group (i.e. 80.5% of informal workers are black.) *Firm Size* refers to the share of workers in firms with less than 5 workers (or self-employed employing less than 5 workers). *Part time* reports the percentage of individuals working on average 30 hours or less per week. *Monthly Salary* are median earnings at the monthly level, and *% below 2010 Means-Test* gives the percentage of individuals who would pass the OAP means-test based on their monthly earnings.

Source: Authors' calculations on PALMS 3.1 and QLFS(2010)

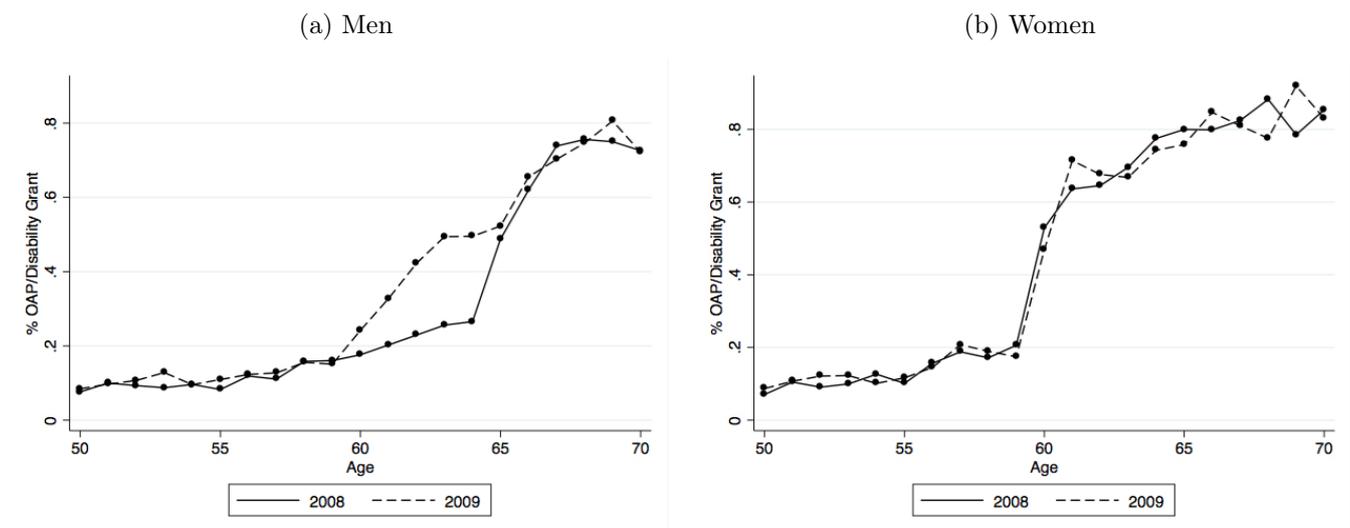
Figure 2: Old Age and Disability Grant Take-up by Age, **Before and After** Pension Reform



Note: These graphs plot the share of individuals receiving the OAP or the Disability Grant within each age bin, for men and women separately. The solid line plots the relation between age and take-up before the reform (2002-2007), while the dotted line for the years after the reform (2010-2015).

Source: Authors' calculations on GHS

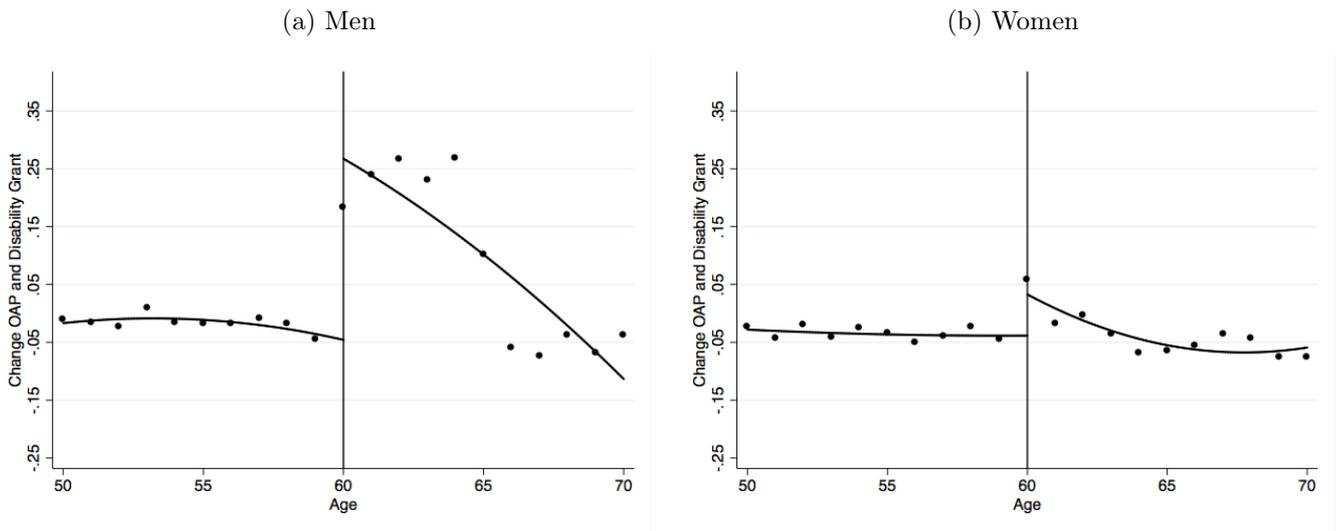
Figure 3: Old Age and Disability Grant Take-up by Age **During** Pension Reform



Note: These graphs plot the share of individuals receiving the OAP or the Disability Grant within each age bin, for men and women separately. The solid line plots the relation between age and take-up in 2008, when the age threshold was lowered to 63 for men. The dotted line for is for the year 2009, when the threshold was lowered to 61.

Source: Authors' calculations on GHS

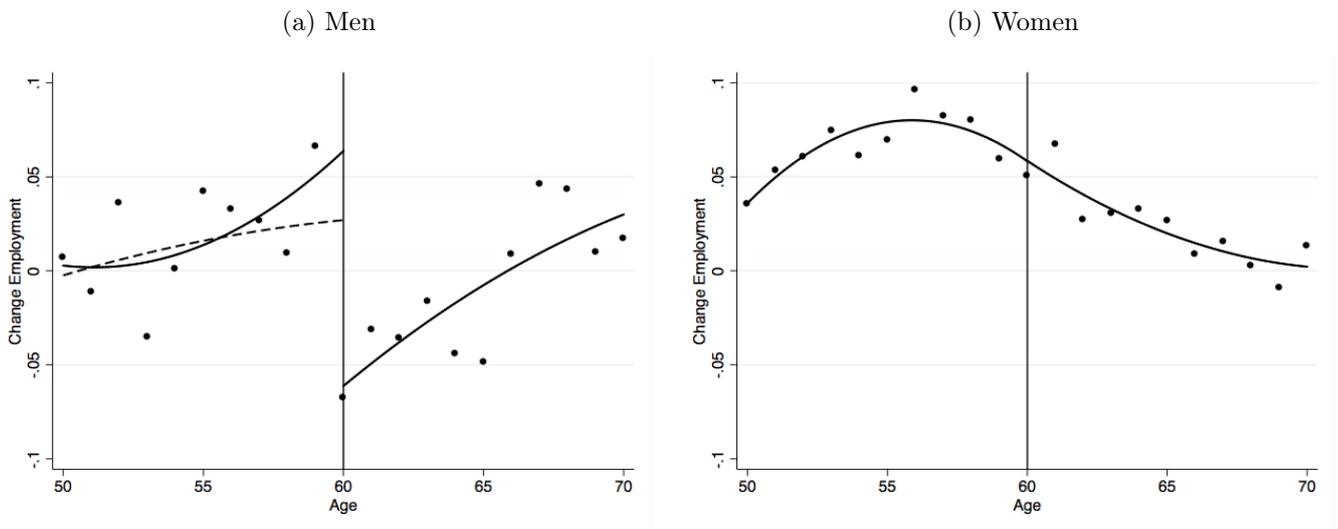
Figure 4: Change in OAP Take-Up Rates by Age and Gender, GHS



Note: These graphs plot the change in OAP/Disability Grant take-up rates from before to after the reform, at each specific age value for men and women separately. A quadratic function is fit on each side of the threshold.

Source: Authors' calculations on GHS

Figure 5: Change in Employment Rates by Age and Gender, GHS



Note: These graphs plot the change in the employment rate from before to after the reform at each specific age value for men and women separately. A quadratic function is fit on each side of the threshold. The dashed line in panel (a) excludes the value at age 59, see page 11 for discussion.

Source: Authors' calculations on GHS

Table 4: Old Age Pension and Employment, GHS Results

<i>Age Window</i>	OAP		Employed	
	Linear	Quadratic	Linear	Quadratic
a. Men				
<i>Post</i> × <i>Age</i> ₍₆₀₊₎	0.3093*** (0.0396)	0.2997*** (0.0518)	-0.1046*** (0.0262)	-0.1311*** (0.0301)
Mean <i>Y</i> at Age 59	0.13		0.56	
Observations	65,670	65,670	65,670	65,670
R-squared	0.3183	0.3191	0.1749	0.1751
b. Women				
<i>Post</i> × <i>Age</i> ₍₆₀₊₎	0.0643 (0.0503)	0.0927 (0.0695)	-0.0398* (0.0215)	-0.0094 (0.0238)
Mean <i>Y</i> at Age 59	0.16		0.37	
Observations	90,132	90,132	90,132	90,132
R-squared	0.4669	0.4695	0.1500	0.1507

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. This table gives the results of Equation 1 on the GHS, for men (upper panel) and women (lower panel). We only report the coefficient of interest, β_1 . On the left, the dependent variable is the Old Age Pension. On the right, the dependent variable is employment. For each outcome, we test the sensitivity of our estimates to both a linear and a quadratic function. *Mean Y at Age 59* refers to the value of the dependent variable at age 59 in the years after the reform. Robust standard errors clustered at the race-cohort group.

Source: Authors' calculations on GHS (2002-2007, 2010-2015)

Table 5: Old Age Pension and Employment, PALMS Results

	Employed	Informal	Formal	
	(1)	(2)	Without Private Pension (3)	With Private Pension (4)
a. Men				
<i>Post</i> × <i>Age</i> ₍₆₀₊₎	-0.0624** (0.0240)	-0.0499*** (0.0181)	-0.0009 (0.0139)	-0.0116 (0.0279)
Mean <i>Y</i> at Age 59	0.54	0.14	0.08	0.32
Observations	189,824	189,824	189,824	189,824
R-squared	0.1785	0.0295	0.0163	0.1395
b. Women				
<i>Post</i> × <i>Age</i> ₍₆₀₊₎	0.0043 (0.0207)	-0.0065 (0.0191)	-0.0004 (0.0137)	0.0112 (0.0198)
Mean <i>Y</i> at Age 59	0.35	0.13	0.08	0.14
Observations	260,792	260,792	260,792	260,792
R-squared	0.1423	0.0523	0.0276	0.0866

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. This table gives the results of Equation 1 on the PALMS with a **quadratic function**, for men (upper panel) and women (lower panel). We only report the coefficient of interest, β_1 . The dependent variables are binary variables for: (1) employed, (2) informally employed, (3) formally employed without private pension, (4) formally employed with private pension, such that (1)=(2)+(3)+(4). Formal self-employed individuals are included in group (4), see footnote on page 8 for discussion. *Mean Y at Age 59* refers to the value of the dependent variable at age 59 in the years after the reform. Robust standard errors clustered at the race-cohort group.

Source: Authors' calculations on PALMS 3.1 (2002-2007 and 2010-2015)

Table 6: Anticipation Effects

	GHS		PALMS
	(1)	(2)	(3)
	OAP	Employment	Employment
<i>Male × Post ×</i>			
<i>Age</i> ₅₁	-0.0038 (0.0108)	-0.0234 (0.0169)	-0.0049 (0.0189)
<i>Age</i> ₅₂	-0.0079 (0.0110)	0.0185 (0.0200)	-0.0060 (0.0200)
<i>Age</i> ₅₃	0.0178 (0.0135)	-0.0389 (0.0246)	0.0004 (0.0239)
<i>Age</i> ₅₄	-0.0045 (0.0148)	-0.0089 (0.0298)	0.0018 (0.0239)
<i>Age</i> ₅₅	-0.0058 (0.0114)	0.0312 (0.0261)	0.0081 (0.0225)
<i>Age</i> ₅₆	-0.0081 (0.0166)	0.0246 (0.0267)	0.0258 (0.0213)
<i>Age</i> ₅₇	0.0031 (0.0158)	0.0185 (0.0292)	0.0142 (0.0265)
<i>Age</i> ₅₈	-0.0099 (0.0171)	0.0082 (0.0328)	0.0052 (0.0256)
<i>Age</i> ₅₉	-0.0374 (0.0260)	0.0662* (0.0363)	0.0115 (0.0270)
Observations	92,192	92,192	262,940
R-squared	0.0288	0.0871	0.0647

Note: *** p<0.01, ** p<0.05, * p<0.1. This table presents the results of Equation 2 on the GHS (left panel) and the PALMS (right panel). The dependent variable is OAP in Column (1) and employment in Column (2) and (3). Only the coefficients of interest, β_a , are presented. Robust standard errors clustered at the sex-race-cohort group.

Source: Authors' calculations on GHS and PALMS 3.1

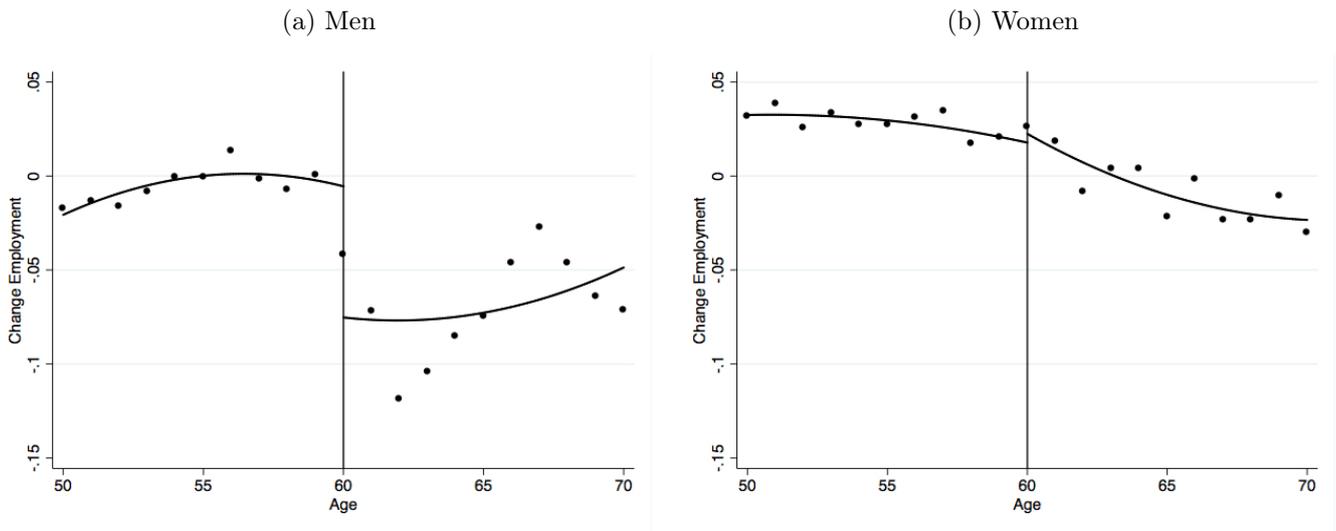
Table 7: Old Age Pension and Employment, **Black Population Only**, PALMS Results

	Employed	Informal	Formal	
			Without Private Pension	With Private Pension
	(1)	(2)	(3)	(4)
a. Men				
<i>Post</i> × <i>Age</i> ₍₆₀₊₎	-0.0720*** (0.0229)	-0.0572*** (0.0183)	-0.0023 (0.0116)	-0.0124 (0.0200)
Mean <i>Y</i> at Age 59	0.48	0.16	0.08	0.24
Observations	129,029	129,029	129,029	129,029
R-squared	0.1424	0.0236	0.0180	0.0701
b. Women				
<i>Post</i> × <i>Age</i> ₍₆₀₊₎	0.0220 (0.0178)	-0.0032 (0.0146)	0.0084 (0.0083)	0.0169 (0.0119)
Mean <i>Y</i> at Age 59	0.33	0.15	0.07	0.11
Observations	189,484	189,484	189,484	189,484
R-squared	0.1308	0.0427	0.0278	0.0438

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. This table gives the results of Equation 1 on the PALMS with a **quadratic function**, for Black men (upper panel) and Black women (lower panel). We only report the coefficient of interest, β_1 . The dependent variables are binary variables for: (1) employed, (2) informally employed, (3) formally employed without private pension, (4) formally employed with private pension, such that (1)=(2)+(3)+(4). Formal self-employed individuals are included in group (4), see footnote on page 8 for discussion. *Mean Y at Age 59* refers to the value of the dependent variable at age 59 in the years after the reform. Robust standard errors in parentheses.

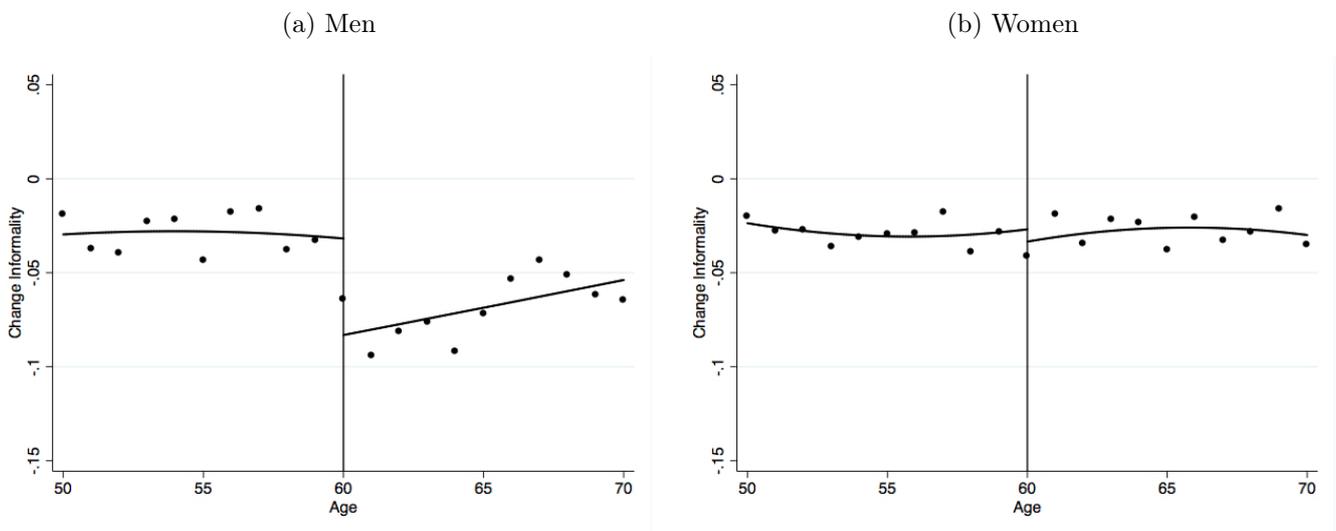
Source: Authors' calculations on PALMS 3.1 (2002-2007 and 2010-2015)

Figure 6: Change in Employment Rates by Age and Gender, PALMS



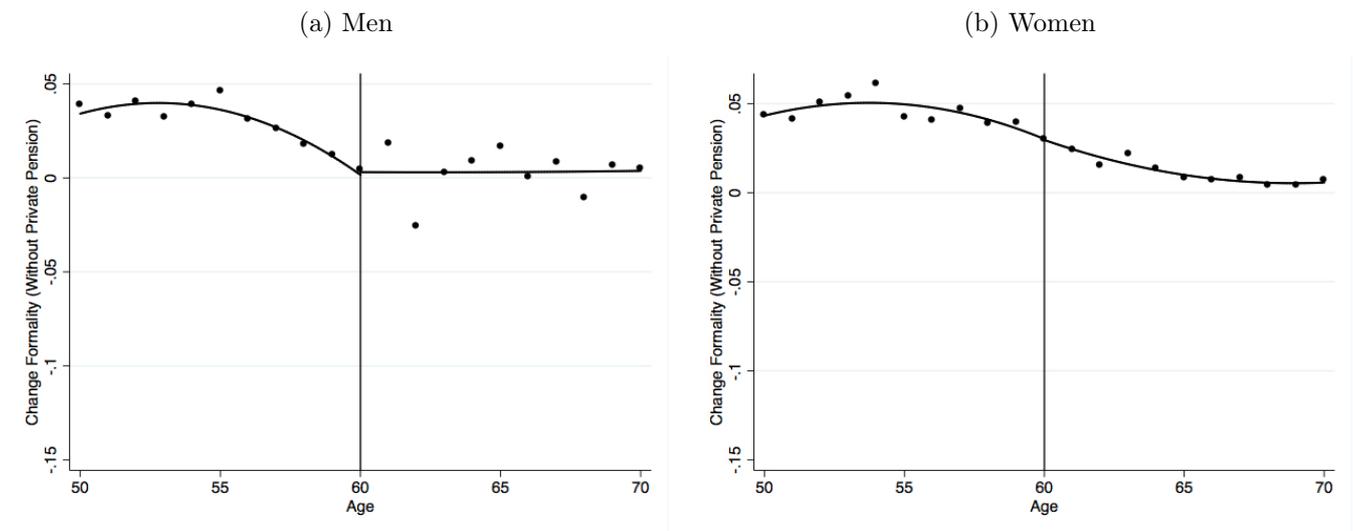
Note: These graphs plot the change in the employment rate from before to after the reform at each specific age value for men and women separately. A quadratic function is fit on each side of the threshold.
Source: Authors' calculations on PALMS 3.1

Figure 7: Change in Informal Employment Rates by Age and Gender, PALMS



Note: These graphs plot the change in informal employment rates from before to after the reform at each specific age value for men and women separately. A quadratic function is fit on each side of the threshold.
Source: Authors' calculations on PALMS 3.1

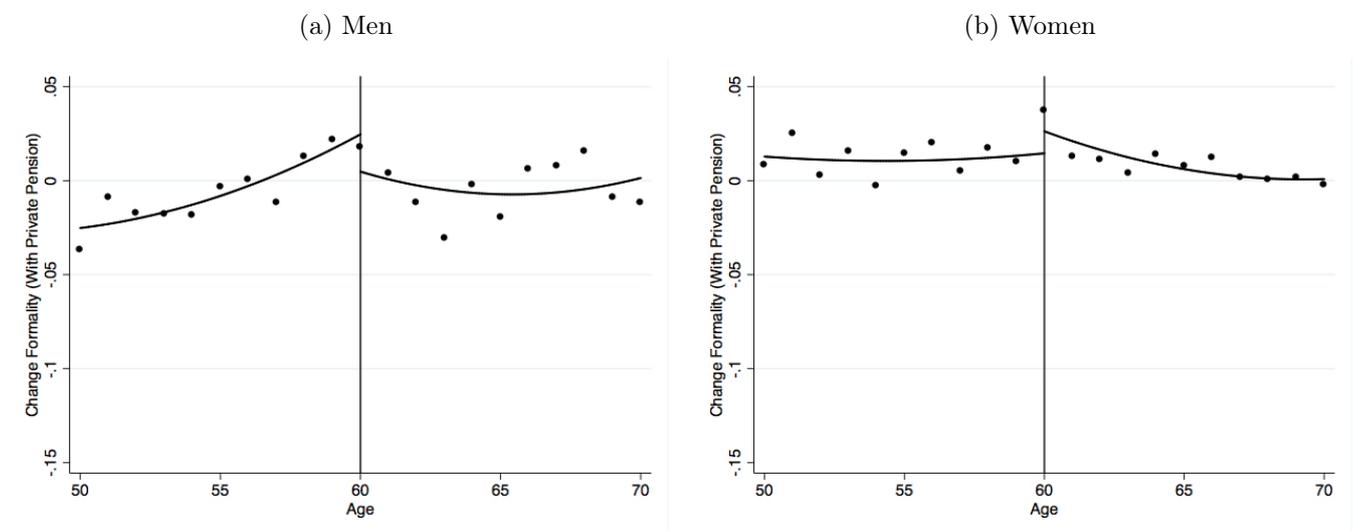
Figure 8: Change in Formal Employment Rates **without** Private Pension by Age and Gender, PALMS



Note: These graphs plot the change in the rates of formal employment without a private pension from before to after the reform at each specific age value for men and women separately. A quadratic function is fit on each side of the threshold.

Source: Authors' calculations on PALMS 3.1

Figure 9: Change in Formal Employment Rates **with** Private Pension by Age and Gender, PALMS

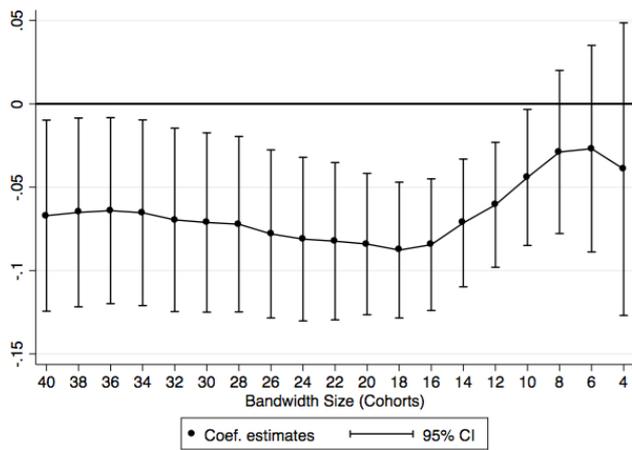


Note: These graphs plot the change in the rates of formal employment with a private pension from before to after the reform at each specific age value for men and women separately. A quadratic function is fit on each side of the threshold.

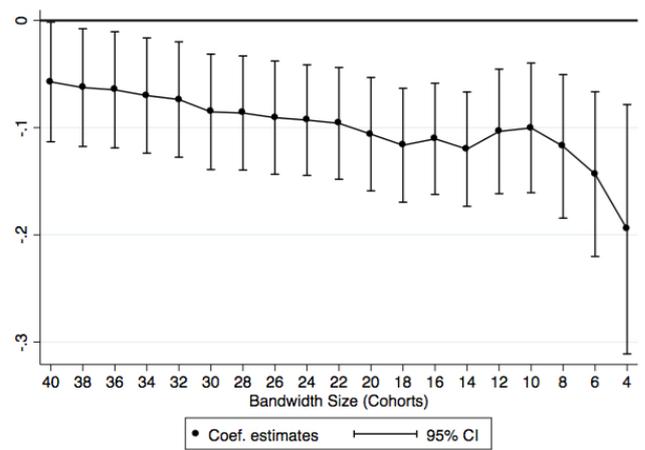
Source: Authors' calculations on PALMS 3.1

Figure 10: Impact on Employment, Bandwidth Sensitivity, PALMS & GHS

(a) PALMS



(b) GHS



Note: These graphs plot the coefficients of Equation 1 on employment for different age windows. The x-axis reports the number of age-values included in the estimation, where 40 equals window from 40 to 80 years of age. The left panel reports the estimates on the PALMS, while the right panel reports the estimates on the GHS, both with 95% confidence intervals.

Source: Authors' calculations on GHS and PALMS

Table 8: Robustness Tests, GHS and PALMS, Men Only

		GHS	PALMS
		(1)	(2)
a. Density			
	<i>Log of Individuals</i>		
		-0.1446 (0.1084)	-0.1251 (0.0960)
	Observations	252	252
b. Balancing Test			
	<i>Y Variable</i>		
	Black	-0.0467 (0.1513)	-0.0074 (0.1456)
	White	0.0372 (0.1186)	-0.0142 (0.1106)
	Married	0.0033 (0.0347)	0.0117 (0.0177)
	Education	-0.0563 (0.0547)	0.0265 (0.2058)
	Cape Province	0.0125 (0.0297)	-0.0149 (0.0184)
	Household Size	0.0545 (0.2079)	-0.1275 (0.1514)
	Observations	65,670	189,824

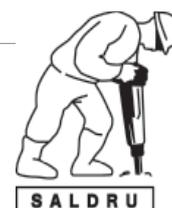
Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The sample is restricted to men. This table reports the coefficient B_1 in Equation 1 with a quadratic function. In the upper panel, observations are collapsed at the cell level (age x year level). The dependent variable is the log of individuals within each cell. Robust standard errors in parentheses (panel a). In the lower panel, the variables aligned vertically are the dependent variables in the regression. The coefficients are estimated separately on the GHS (Column 1) and the PALMS (Column 2). *Education* is a categorical variable in the GHS, and a continuous variable in the PALMS (i.e. years of education.) *Cape Province* is a binary variable equal to one for an individual residing in either the Western, Eastern, or Northern Cape provinces. Robust standard errors clustered at the race-cohort group (panel b).

Source: Authors' calculations on GHS and PALMS 3.1

southern africa labour and development research unit

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

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



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