Labor supply responses to large social transfers: Longitudinal evidence from South Africa

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1. Introduction

The South African old-age social pension has been much studied by both researchers and policy makers, in part for the larger lessons that might be learned about behavioral responses to cash transfers in developing countries. A non-contributory pension, the social pension pays more than twice median per capita African (Black) income and represents an important source of income for a third of all African households in the country. For the vast majority of South African women aged 60 and above, and men aged 65 and above, the social pension provides a generous means of support in old age. In principle the social pension is means tested, and the amount received should depend on the recipient's other income, but in practice it pays the maximum each month (currently 820 Rands) to women and men who reach pension age without access to private pensions. (See Case and Deaton 1998 for details.) Africans often live in three or four generation households, so that the social pension (which we will refer to as 'the pension') has the potential of reaching many poor children and prime aged adults.

Because the pension relies on age-eligibility, researchers can largely eliminate changes in personal behavior, undertaken to create eligibility, from the list of potential behavioral responses, when evaluating its impact. Relatedly, because pension eligibility for the African community is very well predicted by age-eligibility, data sets containing information on the ages of persons under study are often adequate to examine the impact of the pension on individual and household behavior. The pension is also generous enough to have the potential of changing behaviors in important ways.

In this paper, we will focus on whether and to what extent this large, stable source of income leads to change in the labor force attachment of the prime-aged adults in

households containing pensioners. If households pool income, we might expect prime aged adults who share resources with pensioners to reduce their work hours, or choose not to participate in the labor market, when pension receipt begins. Alternatively, if social transfers allow households to overcome credit constraints, enabling households to bankroll potential migrants who need financial support to look for jobs, then social transfers like the pension may help households to break out of poverty traps. It is an empirical question whether and to what extent resources channeled into households, in the form of the pension, change the labor market behavior of household members.

To date, evidence on labor supply responses to pension receipt in South Africa has largely relied on careful analysis of cross sectional data. Bertrand, Mullainathan and Miller (2003), using nationally representative cross-sectional data, find that prime-aged adults living in three generation households with pensioners have significantly lower rates of labor force participation than do those in three generation households without a pensioner. They conclude that "the pension dramatically reduces the labor supply of the prime-age members of the household." Using the same data, Posel, Fairburn and Lund (2004) argue that the labor supply effects are more nuanced: households with pensioners may be observed with lower labor force participation among *resident* prime-aged members, but these households are significantly more likely to have members who have migrated either to work or to look for work. These authors argue that this effect may be due to credit constraints, or to the need potential migrants have for a woman to be at home to care for children left behind – a role that could be played by female pensioners.

In this paper, we identify individual labor supply responses to the Social Pension using longitudinal data recently collected in Northern KwaZulu-Natal (KZN). Beginning

in January 2000, the Africa Centre for Health and Population Studies has followed members of approximately 11,000 households in the Umkhanyakude District of KZN. Because the survey has been carried out in multiple waves, we can examine changes in employment and migrant status between waves, given changes in household pension status. We examine the effect of household pension receipt, and pension loss, on labor force participation for all prime-aged adult members of households in the Demographic Surveillance Area (DSA). The longitudinal nature of these data allows us to use the timing of events – pension receipt, migration, labor force participation – to estimate causal pathways. Our ability to compare households and individuals before and after pension receipt, and pension loss, allows us to control for a host of unobservable household and individual characteristics that may determine labor market behavior.

When we estimate labor supply effects using only cross-sectional data from the household socioeconomic survey, we replicate many of the findings from the earlier cross-sectional analyses. Similar to Bertrand et al, we find a negative and significant relationship between the presence of a pensioner in the household and employment among prime-aged adults who are co-resident with the pensioner. As did these earlier authors, we find this result is driven by prime-aged men living with pensioners being less likely to be employed. Similar to Posel et al, we find prime-aged adults are significantly more likely to be labor migrants (that is, residing outside the DSA and reported to be working) when their households in DSA include a resident adult age-eligible for the pension. Like these authors, we find this effect is larger for women than for men, although in our data the associations are positive and significant for both.

When we turn to longitudinal analysis, we find a small positive increase in the employment of prime-aged men once pension receipt begins in their households. The larger effects, however, regard where that employment takes place. Prime-aged adults are significantly more likely to be labor migrants after pension receipt. If prime-aged adults have better employment opportunities away from the DSA, the arrival of the pension may help these individuals accept better jobs. On the flip side, we find individuals in households that lose pension eligibility between rounds of the survey are significantly less likely to be labor migrants once the pension is lost, a result largely driven by migrants returning to the DSA once the household loses pension status.

The paper proceeds as follows. Section 2 presents details on the Africa Centre Demographic Information System (ACDIS), with which we will evaluate the behavioral response to the pension. Section 3 demonstrates that our results match those found in earlier cross-sectional analysis. Section 4 presents descriptive results in which we map the changes through time that we observe in households before and after pension receipt, and before and after the withdrawal of the pension. Section 5 presents a model of migration decision-making that can explain our descriptive findings, and evidence that our results are due both to resource constraints, and to the needs of households that must care for young children. Section 6 concludes.

2. The Africa Centre Demographic Information System (ACDIS)

We evaluate individual and household behavioral responses to the pension using data collected on approximately 100,000 people being followed by ACDIS. The surveillance site, part of one of the poorest districts in KwaZulu-Natal, lies approximately 2.5 hours

north of Durban. The field site contains both a well-established township and a rural reserve that continues to be subject to both civil and tribal law. The area is shouldering a heavy disease and death burden associated with the AIDS pandemic.

Demographic data on individuals and households in the surveillance area are collected twice annually, and information on births, deaths, changes in marital status, and migration is updated at each round. To reflect the complexity of living arrangements in South Africa, data collection here allows individuals to be members of multiple households – a man may have multiple wives, each in a separate household, for example, or a woman may be recognized as a member of both her mother's and her sister's households. (See Hosegood and Timæus 2005; Hosegood, Benzler and Solarsh 2005.) As noted by Posel et al, in a country in which migrant work is a dominant feature of the labor market, it is essential to understand the behavior of both resident and non-resident household members. The ACDIS data allow us to do so.

During the first five years of demographic surveillance, two rounds of socioeconomic data were collected, first in 2001 and then in 2003/04. We refer to the first round of Household Socio-Economic data collected as HSE1, and the second round as HSE2. We will use these data to measure changes in labor force participation upon pension receipt. Table 1 presents relevant characteristics of households in the Demographic Surveillance Area (DSA) at the time of the second socioeconomic survey, in the upper panel, and changes observed between HSE1 and HSE2, in the bottom panel, for households that existed in both periods.

In all that follows, we will refer to households as "receiving a pension" if they report having a member, resident in the household, who is age-eligible for the pension.

This allows us to sidestep issues of selection associated with a handful of elderly persons who worked for firms that maintain a private pension for them.

As is true for South Africa as a whole, one-third of households in the DSA report a person of pension age at HSE2. Twenty nine percent reported receiving a pension at both HSE1 and HSE2, 5.5 percent became pension households between rounds of the socioeconomic survey, and 3.5 percent lost pension status. (As a shorthand, we will refer to individuals who are members of households that became pensioner households between HSE1 and HSE2 as having "gained pension status" between waves of the survey, and those who had housed pensioners at HSE1 but not at HSE2 as having "lost pension status.") Households can gain a pension because someone of pension age joins the household as a resident member, or because someone already resident becomes age-eligible between waves of the survey. The latter represents the great majority (80 percent) of cases in which households in the DSA gained a pension between HSE1 and HSE2.

Households with pensioners at HSE2 (columns 2 and 4) are significantly larger than those that never had a pensioner and, on average, they report a significantly greater number of resident members. This by itself is not remarkable: in order to have a pension, the household has to have at least one resident member of pension age. What is more noteworthy is that pension households contain a significantly greater number of young children (ages 0 to 5) and older children (ages 6 to 17) than do households that never had a pension. Pensioner households at HSE2 also report a greater number of prime-aged members who are working migrants. (That these differences by type of household are statistically significant is indicated by an asterisk (*), which signals that the difference between households that never had a pension and households of other types is significant

at a 5 percent level.) Households that were never observed with a pension are wealthier, measured both by the number of assets owned by the household, and by household expenditure per resident member. These results – on relative household size, living arrangements of children, and lower socioeconomic status among pension households – are consistent with data for the country as a whole (see Case and Deaton 1998).

Households that gained or lost a pension display larger changes in household composition between waves of the survey than do households that never had a pension. The loss of a pension is associated not only with the loss of approximately one household member above age 50 (–0.97), but also with a decline in the number of children aged 0 to 5 (–0.17) and those aged 6 to 17 (–0.28). Table 1 also allows us to take an initial look at the change in migration between waves of the survey. Approximately one in five households (0.17) that gained a pension between the waves of the survey report an additional working migrant at HSE2.

Our focus will be on the behavior of prime-aged adults (men and women ages 18 to 50) at HSE2. Characteristics for these individuals are presented in Table 2. There is little difference between individuals who are members of households that do not have a resident member age-eligible for a pension in either period (column 1) and other prime-aged adults in terms of their ages and levels of education. However, prime-aged adults who live in households that had pensions in both periods are significant less likely to be female (50 versus 54 percent). Both waves of the HSE asked whether every adult in the household did “anything to earn money.” The household respondent is prompted to remember both formal and informal employment. We see no significant difference in employment between individuals living in households that always had a pension and

those that never had a pension. However, prime-aged adults in pension receiving households (columns 2 and 4) are significantly and substantially more likely to be working migrants (27 percent of prime-aged adults in pension households, compared with 20 percent in non-pension households). Those that gained a pension between the rounds of the survey are significantly more likely to become labor migrants between rounds of the survey.

In summary, households with pensioners tend to be larger and poorer on average than those that do not contain pensioners. They contain a significantly greater number of resident minors, but no greater number of resident prime-aged adults. They have significantly larger numbers of non-resident working members.

3. Cross-sectional patterns of employment and migration

Age patterns of employment and migration can be seen in Figure 1, which presents results separately for men and women, resident and non-resident, who were ages 18 to 50 at HSE2. The probability of being employed increases from something close to zero for men and women at age 18 to approximately 65 percent for men, and 55 percent for women, in their mid-thirties. Labor migration, again defined as working and being non-resident in the DSA, also increases with age: by their late twenties, approximately 40 percent of men are reported to be labor migrants, and approximately 20 percent of women. After age 30, labor migration rates for women begin to decline, so that by their late forties only 10 percent of women are reported to be labor migrants. In what follows, we include a quartic in age in employment and migration regressions that do not include

individual fixed effects. These polynomials in age adequately capture the patterns observed in Figure 1.

We examine the education pattern in employment and migration in Figure 2, where we plot, for each level of completed education, the fraction of men and women who are reported to be working or working migrants. Of special interest here is the role played by high school graduation (matric) for reports of employment. (This is marked in Figure 2 using a vertical line at grade 12.) Adults who have more than a high school degree are the most likely to be employed. Those who have fallen just short of a high school degree are the least likely to be employed. Because the pattern is not linear in years of completed schooling, nor adequately captured by an indicator of having completed a certain grade, we include a complete set of indicator variables for years of completed schooling in our cross-sectional analysis.

Our results are based on the regressions of the following form:

$$y^o_{iht} = \beta P_{ht} + \gamma X_{iht} + \varepsilon^o_{iht}. \quad o = e, m \qquad (1)$$

For individual i in household h observed in survey wave t, our focus is on two labor market outcomes: employment (y^e =1 if working, and =0 otherwise), and labor migrant status (y^m =1 if non-resident in the DSA and reported working, =0 otherwise). These are modeled as a function of the presence of a resident household member age-eligible for the pension ($P_{ht} = 1$ if a pensioner is resident, =0 otherwise). We also include in equation (1) a set of household and individual level controls X that we believe independently affect employment and labor migration status. These controls will vary, depending on whether we are estimating equation (1) in the cross-section, or in the panel (where we can control for individual-level fixed effects).

Throughout our analysis, the coefficient of interest will be β. If the presence of a pensioner is associated with a lower probability of employment among prime-aged household members, for example, we would expect β to be negative and significantly different from zero.

We present cross-sectional regression results of the association between the presence of a pensioner and employment and migration in Table 3. Each coefficient presented is an estimate of β from a different regression. Employment results are presented in the first two columns for resident members (column 1) and all members (column 2). Migration results are presented in the last column, where the dependent variable is equal to 1 if the individual is non-resident in the DSA and is working. The first row of the table presents results in which the effect of being a member of a pension household is estimated jointly for men and women. The second row presents results for women estimated separately, and the last row reports results for men alone. All regressions include the number of resident members in four age categories: ages 0 to 5, 6 to 17, 18 to 50 and above age 50. In addition, all regressions include a quartic in age, indicators for years of completed schooling, and (in row one) an indicator for sex. We allow for correlation in the unobservables of individuals who are members of the same household.

Estimates presented in column 1 are closest in spirit to those presented by Bertrand et al. Similar to their results, we find, when restricting the sample to resident members only, that the presence of a resident pensioner is associated with a three percentage point lower probability that a prime-age member is working. That this result is being driven by prime-aged resident men being less likely to be employed can be seen by

comparing results in the second and third rows of column 1. For women, the association is very small (–0.008) and not significantly different from zero. In contrast, holding all else constant, we find that prime-aged men living in pension households are five percentage points less likely to be employed, and that this effect is significantly different from zero.

Our specification in column 1 differs from that reported in Bertrand et al in ways that could affect our results, but in practice do not. Bertrand et al control for education by including an indicator variable that an individual has completed at least grade 8. In addition, these authors control for the number of resident members, and the number of members who are ages 0 to 24, using several categories between 16 and 24. They also include 16 and 17 year olds in their analysis of employment. Bertrand et al restrict their sample to households that have at least three-generations (grandparents, parents and children), in order to reduce the heterogeneity of their sample. We prefer to include all households – primarily because the middle generation is the most likely to have migrated for work (as seen in Figure 1) and the absence of a middle-generation adult might drop the household from the sample, if we restrict our sample to three generations. We exclude 16 and 17 year olds, because the probability that they are employed is very close to zero. However, when we estimate equation (1), restricting our sample to three-generation households, and using the same education variable and number of resident members variables used by Bertrand et al, our results do not change in any meaningful way. Prime-aged resident men, using their specification, are 6 percentage points less likely to be employed in pension households (results not shown).

Posel et al focus on the fact that restricting analysis to resident household members will miss an important group of working household members: labor migrants. Following Bertrand et al (in order to make their results as comparable as possible) Posel et al use data from the Project for Statistics on Living Standards and Development (PSLSD). The PSLSD only recorded whether there were household members who were migrants, and why they were absent (working, looking for work, etc.) but otherwise collected no information on the hours worked or earnings of the migrants. Perhaps for this reason, Posel et al do not show how the probability of employment for all prime-aged adults (resident and non-resident alike) corresponds to the presence of a pensioner in the household. We provide this information for our sample in column 2 of Table 3. Once non-resident prime-aged members are added to our analysis, we find no statistically significant association between the presence of a pensioner and the probability of employment for men and women examined separately (rows 2 and 3) or jointly (row 1). The results for men are particularly interesting: including non-resident members, the coefficient on the presence of a pensioner falls from –0.05 to –0.01, and is no longer significantly different from zero.

That the presence of a pensioner is significantly associated with labor migrant status for both men and women can be seen in column 3 of Table 3. Prime-aged women in pension households are 5 percentage points more likely to be labor migrants than are other women, holding constant age, education and household composition, and prime-aged men are 4 percentage points more likely. Evidence in Table 3 is consistent with a model in which the presence of a pensioner allows prime-aged adults a greater opportunity to leave for work elsewhere.

4. Panel estimates of the impact of pension receipt on employment and migration

Data collected in ACDIS allow us to examine the timing of pension arrival, pension withdrawal, and changes in employment and migration. In this section, we present estimates based on longitudinal analyses of these data.

With data available from two rounds of the socioeconomic survey, we can modify equation (1) to allow for individual fixed effects. That is, the unobservable component of (1) can be written

$$\varepsilon^o_{iht} = \alpha^o_i + u^o_{iht}, \quad o = e, m \qquad (2)$$

where α^o_i is an individual-specific fixed effect for labor market outcome o. This effect will absorb all determinants of employment (α^e_i) or migration (α^m_i) that are constant within person i over time. This includes, inter alia, unobserved ability and characteristics of the household in which an individual was raised, together with his or her sex, year of birth, and (often) years of completed schooling. A straightforward way to estimate the fixed effects model, given we have two observations per person, is to run changes in labor market outcomes on changes in household's pension status and in characteristics that may change through time:

$$y^o_{iht} - y^o_{ih,t-1} = \beta(P_{ht} - P_{h,t-1}) + \gamma(X_{iht} - X_{ih,t-1}) + (u^o_{iht} - u^o_{ih,t-1}). \qquad (3)$$

We present estimates of β from equation (3) in Table 4 for employment outcomes. The first row of Table 4 presents results for all household members ages 18 to 50 at HSE2 (column 1), for women separately (column 2) and for men separately (column 3). In addition to change in pension status, we control for change in the number

of resident household members, and the time in days between the household's survey date at HSE1 and its survey date at HSE2.

We find a small, positive and significant relationship between the pension receipt and employment for men and women, estimated jointly. On average, gaining pension status is associated with a 2 percentage point increase in the probability that prime-aged men and women are working. That this effect is driven by men's employment can be seen by comparing results for men and women estimated separately. Women's employment is not significantly related to the arrival or withdrawal of the pension. However, men's employment changes by 3 percentage points on average in households when pension status changes between rounds of the survey.

This result stands in contrast to the earlier cross-sectional results of Bertrand et al, Posel et al, and our results in Table 3. All of the earlier cross-sectional results may suffer from omitted variable bias: the presence of a pensioner in the household may be correlated with unobservable characteristics about the household that also determine employment (Hosegood and Timæus 2005). In that case, in the absence of panel data one might not find a positive relationship between household pension status and men's job holding, even if pension receipt had a positive causal effect on prime-aged men's employment.

With fixed effect estimation, the only individuals who contribute information for the estimate of β are those that either gained a pension between the survey rounds, or lost a pension between the rounds. (The effects for individuals who were always living with a pensioner or who never lived with a pensioner are absorbed in those individuals' fixed effects.) Estimates in row 1 of Table 4 treat pension gain and pension loss

symmetrically. That is, the employment effect of gaining the pension between rounds of the survey is assumed to be equal and opposite to that of losing the pension between rounds. We can test whether the data support this by replacing our change in pension status variable by two variables – one that indicates that the individual's household gained pension status, and one that indicates the household lost pension status.

Results from this estimation are presented in the lower panel of Table 4, where we also present tests of whether one can reject an equal and opposite effect of pension receipt and withdrawal. We find, for both men and women, that the loss of a pension between rounds of the survey is associated with a lower probability of working, and the gain of a pension with a higher probability of working. Moreover, we cannot reject that these coefficients are equal and opposite in sign. The standard errors on the pension loss and gain indicator variables are quite large, however, and we also cannot reject that these indicator variables are jointly equal to zero. The results in Table 4 provide modest support for a positive impact of pension receipt on men's employment. They provide no evidence to support claims that the arrival of the pension has a negative causal effect on work.

Estimates of the impact of change in pension status on migration are provided in Table 5. Both the arrival and withdrawal of an old-age pension are significantly associated with change in migrant worker status, for both men and women. On average, individuals from households that lost pension status were 8 to 9 percentage points less likely to become or remain working migrants between HSE1 and HSE2. Individuals from households that gained pension status between HSE1 and HSE2 were 3 to 5 percentage points more likely to become or remain migrants.

Change in labor migrant status can occur either because the individual returns to the DSA, or because he or she remains outside of the DSA, but stops working. In our data, household members who stopped being labor migrants between HSE1 and HSE2 split almost evenly on this: 53 percent stopped working but remained non-resident, and 47 percent returned to the DSA. In Section 5, we present evidence that the loss of the pensioner changes labor migrant status through its effect on residency: individuals from households that lose a pension are significantly more likely to return to the DSA. For both women and men, we find that loss of a pension has little effect on employment status, conditional on remaining non-resident. This is discussed in detail below.

Losing pension status has a significantly larger effect on prime-aged adults' migration status than does gaining pension status. For both men and women, *F*-tests reject that the impact of losing a pension is equal and opposite in effect to that of gaining a pension. These results, by themselves, do not tell whether this arises because individuals who were labor migrants return to homesteads in the DSA after the household stops receiving the social pension, or whether households are less likely to send new migrants when they no longer receive the pension, or both. We examine which description best fits our data in the last two panels of Table 5. In the third panel, we restrict our analysis to individuals who were labor migrants at the time of the first household socioeconomic survey (HSE1), and in the last panel, we restrict our analysis to individuals who were not labor migrants at HSE1. We find that the impact of pension loss works partially through the effect it has on reducing the probability of sending migrants, which falls by 5 percentage points for men and women when estimated jointly. More

important is the effect of pension loss on reducing the probability that a current working migrant remains a working migrant, which falls by 17 percentage points.

The impact of pension loss on working migrants is larger for women. Among women who were working migrants at HSE1, the probability of being a working migrant at HSE2 fell by 21 percentage points for those women whose households lost pension status between survey rounds. The decline for men is smaller (13 percentage points), but is still substantial.

In summary, we find that the employment status of prime-aged household members is not sensitive to household pension status, but that labor migration is. We find that the labor migration status of a prime-aged woman is more closely connected to the presence of a resident pensioner in her household in the DSA than is that of a prime-aged man. We also find two sets of asymmetries with respect to the pension's effect. First, the impact of pension gain is not equal and opposite to the impact of pension loss. In addition, the impact of a change in pension status is different for potential migrants than it is for household members who are already labor migrants. In the next section, we present a model of migration decision-making which we use to interpret these results.

5. A model of migration decision-making

The decision of whether a prime-aged man or woman will migrate for employment is likely to be determined jointly by potential migrants and members of their households who might support them, or who might rely on them for support. Migration decisions will depend on employment opportunities and wages inside and outside the DSA,

financial and psychological costs associated with moving and being away, the household's need for child caregivers, and household credit constraints.

We initially present a model in which women's and men's roles in the household and labor market opportunities are the same. We will return to important differences between their circumstances once we have a model in place. Initially, we assume that households pool resources and make decisions jointly. (This will also be relaxed below.) We assume that individuals face credit constraints, and cannot borrow against future earnings. For notational purposes, we refer to the DSA as the rural sector r and the destination of migrants as the urban sector u. We assume that a person working in the DSA earns a wage w_r. Given the limited work opportunities available in the DSA, we assume that the wages offered there are unchanging through time, but pay well enough to meet individuals' minimum living expenses for necessities z_r (clothing, food and shelter)

$$w_r = \overline{w}_r = z_r .$$

If an individual migrates to find work, he or she receives initial wage offers of w_{u0}. Through the wage growth that comes with experience, or through job search once in the urban sector, wages rise with the time migrants spend in the urban sector. The growth path of urban wages w_{ut} can be characterized as

$$w_{ut} = w_{u0} e^{gt} + \varepsilon_t ,$$

where w_{u0} are the wages a migrant can earn upon arrival in the urban sector, t is the time since arrival there, g is the growth rate of wages in the sector, and ε is the idiosyncratic component to wages at time t.

We assume that initial wages in the urban sector do not cover expenses, so that

$$w_{u0} < z_u .$$

In order to survive in the urban sector, recent migrants need to rely on financial help from members of their households in the DSA, who transfer enough resources to ensure that living expenses z_u are met $(w_{ut} + transfer_t = z_u)$. Utility associated with simply meeting living expenses, either in the rural or urban sector, is normalized to zero. With time, labor migrants' wages grow to the point that, on average, labor migrants are self-supporting. When wages exceed living expenses in the urban sector, utility is higher for labor migrants than non-migrants (whose wages are stagnant at z_r).

For households to be able to send and support migrants for some period of time, two conditions must hold. First, total household income Y^H must exceed that necessary to meet resident members' basic needs by more than the migrant's income shortfall. In any period t, in a household with N_t resident members, household resources are sufficient to sustain a labor migrant if

$$Y_t^H - N_t z_r > z_u - w_{ut} .$$

This is the household's financial constraint F.

Financial constraint:
$$\begin{aligned} F &= 1 \quad if \quad Y_t^H - N_t z_r > z_u - w_{ut} \\ &= 0 \quad otherwise. \end{aligned} \qquad (4)$$

Each period following migration this condition is easier to maintain, given growth in urban sector wages.

In addition, the household must ensure that a migrant's children in the DSA household are being cared for. If the migrant has N_c children (this could be the number

of children aged 0 to 5, or 0 to 7, for example) resident in the DSA household, the condition that must be met in order to send an adult labor migrant is

$$[1-\mathrm{I}(R_t=1)] \times N_{ct}=0$$

where $\mathrm{I}(R_t=1)$ is an indicator variable that takes the value of 1 if there is a resident adult who is able and willing to care for the migrant's children in period t. This condition will hold either if there are no children in need of care $[N_{ct}=0]$, or if there is an adult in the DSA who can watch young children $[1-\mathrm{I}(R_t=1)=0]$. This is the household's childcare constraint C.

Childcare constraint:
$$\begin{aligned} C&=1 \quad \textit{if} \quad [1-\mathrm{I}(R_t=1)] \times N_{ct}=0 \\ &=0 \quad \textit{otherwise.} \end{aligned} \qquad (5)$$

Equations (4) and (5) are necessary, but not sufficient, conditions for households to send a labor migrant. Equation (4) may hold, but if household members do not pool income, potential migrants may not be guaranteed the support they would need from their households to sustain themselves in the urban sector until they find their feet. Equation (5) may hold, but the adults present in the DSA may not agree to watch children, for example. However, these conditions are necessary for a migrant to be able to leave for and (at least initially) to stay in the urban sector.

Our focus is on the ways in which the gain or loss of a resident pensioner in the migrant's DSA household affects the probability that equations (4) and (5) are met and, in this way, affects the probability that a labor migrant is sent to the urban sector, stays in the sector, or returns to the DSA. Pensioners change the probabilities that constraints (4)

and (5) are met. Pension income generally increases Y^H, which increases the odds that the DSA household has funds to support a labor migrant until he or she becomes self-supporting. In addition, the presence of a pensioner increases the odds that there is an adult present in the DSA who is able and willing to care for children.

We can use equations (4) and (5) to examine the asymmetries noted above on the impact of pension gain and loss, and differences in impact on prospective migrants and current labor migrants. The probability of being a labor migrant (mig) can be written

$$\Pr(mig) = \Pr(C = 1, F = 1).$$

We can write the joint probability as the product of the probability of meeting the childcare constraint, conditional on the probability of meeting the financial constraint multiplied by the marginal probability of meeting the financial constraint:

$$\Pr(mig) = \Pr(C = 1, F = 1) = \Pr(C = 1 \mid F^*) \times \Pr(F = 1),$$

where F^* represents the probability that $Y_t^H - N_t z_r > z_u - w_{ut}$. We can then express the change in the probability of being a labor migrant, given change in household pension status $(pen\ status)$ as

$$\begin{aligned} &\Pr(mig \mid pen\ status_{t=2}) - \Pr(mig \mid pen\ status_{t=1}) \equiv \Delta \Pr(mig) \approx \\ &\qquad \Delta \Pr(C = 1 \mid F^*)\ \Pr(F_{t=1} = 1) + \Delta \Pr(F = 1)\ \Pr(C_{t=1} = 1 \mid F^*_{t=1}) \end{aligned} \tag{6}$$

The size of this effect will vary, depending on whether we are observing prime-aged individuals who are labor migrants at HSE1, or are observing instead individuals resident in the DSA at HSE1. Labor migrants at HSE1 are meeting their financial and childcare constraints. For these individuals, then, $\Pr(F_{t=1} = 1) = \Pr(C_{t=1} = 1 \mid F^*) = 1$. Otherwise we

would not have observed them as labor migrants at HSE1. Prime-aged individuals living in the DSA face financial constraints, or childcare constraints, or potentially both, that are responsible for their observed presence in the DSA at HSE1. In equation (6), this implies either $\Pr(F_{t=1} < 1)$ *or* $\Pr(C_{t=1} \mid F^* < 1)$ or both are strictly less than 1. This will cause the change in the probability of labor migration, given a change in household pension status, to differ from that observed for current labor migrants.

Labor migrants at HSE1

For labor migrants whose households lose pension status between waves of the survey, the change in the probability of remaining a labor migrant is the sum of the change in the conditional probability that the childcare constraint is being met plus the change in the probability that the financial constraint is being met:

$$\Delta \Pr(mig \mid pen\ loss) \approx \Delta \Pr(C = 1 \mid F^*, pen_{t=1} = 1, pen_{t=2} = 0) + \Delta \Pr(F = 1 \mid pen_{t=1} = 1, pen_{t=2} = 0)$$

.

For labor migrants, pension loss reduces the probability of meeting constraints posed both by equations (4) and (5). Labor migrants could be drawn back to the DSA, if household income no longer covers the needs of resident members. In addition, there may no longer be anyone available to care for the migrant's children in the DSA.

Labor migrants from households that gain pension status between waves of the survey should witness no change in the probability that they remain labor migrants. These migrants had already been meeting the constraints necessary for migration – that is, equations (4) and (5) already held. For these migrants, the arrival of the pension changes neither the probability that the financial constraint is met, nor the probability that the childcare constraint is met. In terms of equation (6), this implies

$\Delta \Pr(C = 1 \mid F^*) = \Delta \Pr(F = 1) = 0.$ The arrival of the pension simply reinforces their ability to meet these constraints.

We present these predicted changes in the probability of migration in the top panel of Table 6, for individuals observed as labor migrants at HSE1.

Non-migrants at HSE1

Pension loss should reduce the probability of migration among potential migrants currently living in the DSA: subsequent to the loss of a pensioner, (4) and (5) are less likely to be met. For non-migrants, we expect the gain of a pensioner between the survey rounds to have an equal and opposite effect to that of a loss of pension status between the rounds. We present these predicted changes in the probability of migration in the bottom panel of Table 6. Relative to the change in probability of labor migration expected by labor migrants upon the loss of a pension, these changes in the probability of labor migration are muted by the fact that at least one of the probabilities that these constraints were being met at HSE1 is strictly less than 1.

As can be seen in Table 6, the model offers clear predictions of the patterns we should observe in our data. The largest change in the probability of being a labor migrant should be observed for labor migrants at HSE1 whose households lose pension status between the rounds. Inspection of bottom two panels of Table 5 shows that this is indeed the case. For labor migrants whose households lose pension status, the probability of remaining a labor migrant falls by 17 percentage points. In addition, for labor migrants at HSE1, the change in the probability of remaining a labor migrant for individuals from households that gained pension status between rounds of the survey should be equal to

zero. Table 5 shows that this is also born out in our data (β=0.006 for this group). For non-migrants at HSE1, the effect of gaining pension status between the rounds should be equal and opposite to the effect of losing pension status. Table 5 suggests that this is also the case. Coefficients on the gain and loss are similar in absolute size (–0.052 for pension loss, 0.058 for pension gain) and *F*-tests do not reject the null hypothesis of these effects being equal and opposite. (For column 1, the *F*-test=0.16, *p*-value=0.6927). Our model suggests that these effects for non-migrants should be smaller than those for current labor migrants who lose the pension, and we find this is also true in our data.

We can use this model to examine more closely the role of household resources, and childcare considerations, on the impact of pension gain and loss on migration status.

Household socioeconomic status and pension status

We can test important pieces of this model by adding interaction terms to the labor migration regressions presented in Table 5. Table 7 presents the results of regressions in which indicators that the household gained or lost a pension are interacted with markers that the household is of relatively high socioeconomic status (SES). We add these interaction terms in order to test whether households of greater means are less sensitive to the gain or loss of a pensioner, when making decisions on migration, than are other households. Greater household resources should increase the probability of meeting the financial constraint posed in equation (4).

We use, as our measure of household SES, an indicator that at least one prime-aged member had a high school degree (results are quite similar if we use an indicator that the household owned more than 5 assets at HSE2). The main effect of our SES

measure will be absorbed in the individuals' fixed effects. Our interest is in the interaction terms of SES and pension loss, and SES and pension gain. For women, we find that having come from a household of higher SES protects labor migration status upon the loss of a pension. For women who were labor migrants at HSE1, those who came from lower SES households and lost pension status were 31 percentage points less likely to remain labor migrants than were other women labor migrants. Using household educational attainment as our marker of household SES, we find that women who are labor migrants from higher SES households face a much lower risk (they are approximately 11 percentage points less likely to remain labor migrants: –0.309+0.198).

Interaction terms for men are not statistically significant, suggesting that household resource constraints are not as significant a determinant of migration for men as they are for women. We can use equations (4) and (5) to explore this difference observed between men and women. If men have higher initial urban wages w_{uo}, or if their urban sector wages grow at a faster rate, then equation (4) is more likely to hold for men who are labor migrants than it is for women labor migrants observed at any point in time. Once labor migrants are self-supporting, equation (4) becomes irrelevant for their migration decisions. For this reason, we might expect the gain or loss of a pensioner to have a more muted effect on men's migration decisions.

The bottom panel of Table 7 demonstrates that, for both men and women, pension loss between waves of the survey reduces the probability of currently resident members being sent as migrants, while the introduction of the social pension into the household increases the probability significantly. For women, part of this effect appears to be a resource effect: for women in households with higher educational attainment, the loss of

a pension reduces the probability of migration for work upon the loss of a pensioner by 2 percentage points (–0.073+0.053). However, for men, the socioeconomic status of the household appears to have little effect on this process.

We have also explored whether it is a woman's own education that protects her status as a working migrant, upon loss of a pension, by running regressions that included an additional interaction term between loss of pension status and an indicator that the migrant is a high school graduate. If returns to education are higher in the urban sector, we might expect better educated women would be less likely to leave jobs, upon loss of household pension status, than other women would. This is not the case: we find that it is the presence of having any household member with a high school degree – and not a woman's own education – that reduces the probability she will stop being a labor migrant when pension status is lost.

Children left in the care of pensioners

Results in Table 1 suggested that pensioner households have a greater number of resident children, and working migrants. These may be closely related: migrants may leave children with a parent or grandparent, and strike out to find work in the urban sector. The death of the pensioner may unravel this arrangement, forcing working migrants back to the DSA to care for children.

We examine this possibility in Table 8, where we again present analyses separately depending on whether prime-aged adults were labor migrants at HSE1 (top panel), or were not (bottom panel). We find that migrants' children ages 0 to 5 play a role in reducing the probability that migrants maintain their labor migrant status upon the loss

of the pension in their households. Women migrants face an additional 39 percentage point increase in the probability of giving up labor migrant status upon the loss of pension status when they have young children in the DSA household. The probability of maintaining labor migrant status also falls sharply for men (19 percentage points) upon pension loss when they have small children in their DSA household.

Migrant status is not affected by the gain of a pension among those who were already working migrants at HSE1. This is true for both women and men, whether or not there were small children in the DSA household at HSE1.

Among those who were not working migrants at HSE1 (bottom panel of Table 8), we find that the presence of children ages 0 to 5 influences whether a woman becomes a working migrant. The gain of a pensioner in the household is associated with a 10 percentage point increase in the probability a non-migrant woman leaves for work elsewhere – unless there are small children in the household. Their presence cuts the probability of a woman migrating by 90 percent (0.096-0.084). Men's migration is significantly affected by pension gain, but it does not appear to be sensitive to the presence of small children.

This care-giving role appears to play less of a role as children get older. We found no evidence that the presence of children aged 6 to 12, or 6 to17, affected women's migration upon the gain or loss of a pension in the household.

Change in working migrant status

Individuals can exit from 'working migrant' status by returning to the DSA, or by remaining away from the DSA but stopping work. We investigate which of these

channels is important, for working migrants who lost pension status between the rounds, in Table 9. We present results for returning to the DSA in columns 1 and 2, and for remaining non-resident but stopping work in columns 3 and 4, separately for men and women. We present results from regressions in which these outcomes are regressed on indicators that the household lost a pension between the waves, or gained a pension between the waves, controlling for change in the number of resident members and the number of days between the HSE1 survey date and the HSE2 survey date. We find, for women, that pension loss increases the probability of returning to the DSA by 27 percentage points. For men, the effect of pension loss is significant, but less than a third of the size it is for women (8 percentage points). The result of pension loss, and gain, on the probability that a labor migrant remains a non-resident but stops work is generally small and not significantly different from zero, for both men and women.

Pensioner gender and migrant status

In their cross-sectional analysis, Posel et al find that the gender of the pensioner is significantly associated with the migration status of women. Specifically, in the PSLSD data, women are significantly more likely to be working migrants if a woman in their household is of pension age. We examine whether the gender of the pensioner has different effects on labor migration decisions in longitudinal analysis using the ACDIS data, and present results in Table 10. We find that the loss of a female pensioner has a large and significant effect on women maintaining their labor migrant status. On average, this falls by 22 percentage points for women when the household loses female pensioner status. For men, the impact is smaller (12 percentage points) but is still highly significant.

For both men and women, this effect is larger when they have children aged 0 to 5 in the DSA, although again the effect is larger for women (an additional 37 percentage point reduction in the probability of remaining a labor migrant) than it is for me (an 18 percentage point reduction).

Overall, we find evidence that the pension is used to allow both women and men to migrate to find work, and that the effect is partly due childcare needs, and partly due to the household's newly found ability to provide for migrants while they find jobs in the urban sector.

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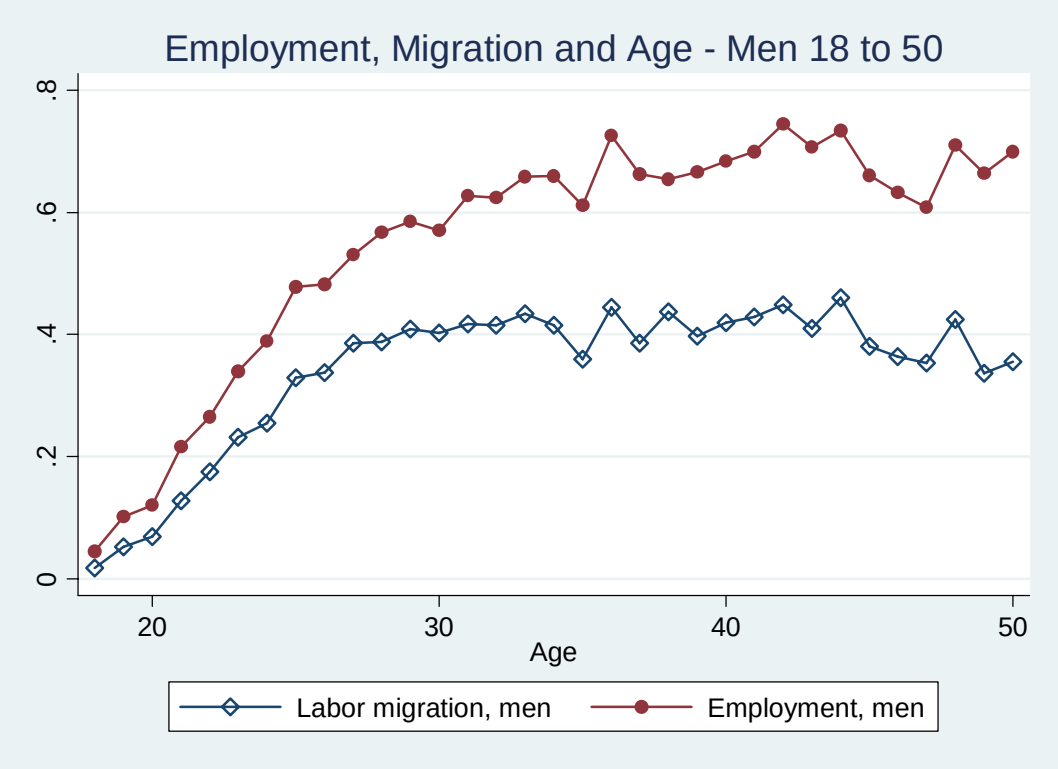
Figure 1. Age patterns in employment and migration



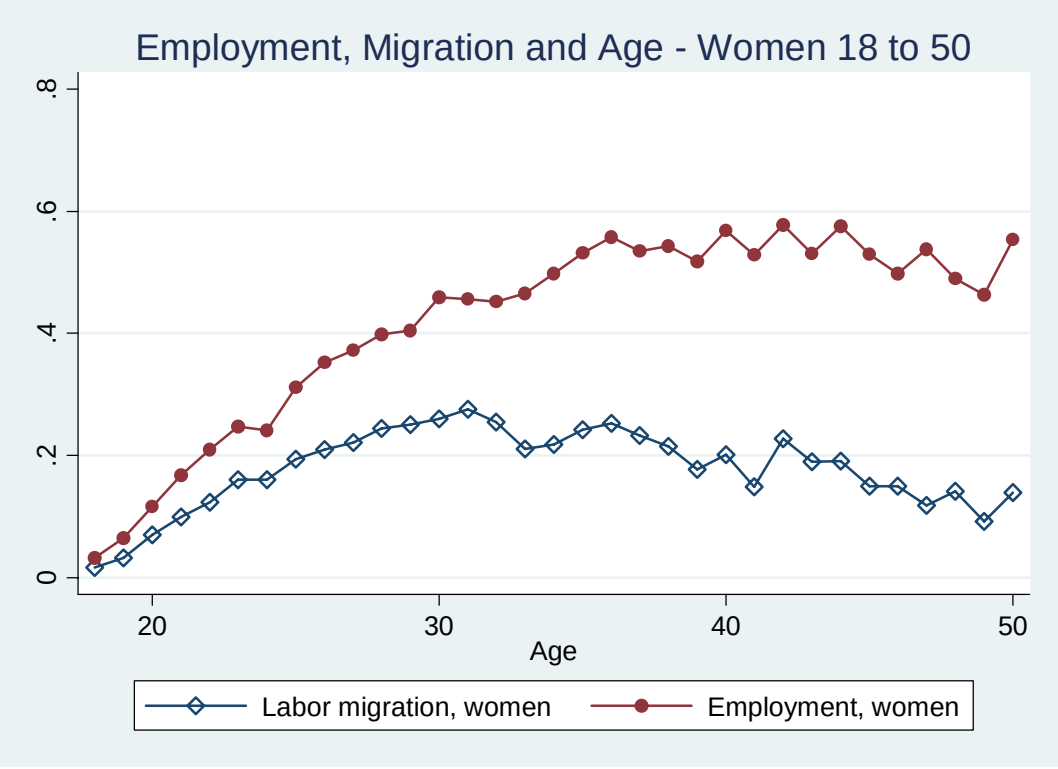
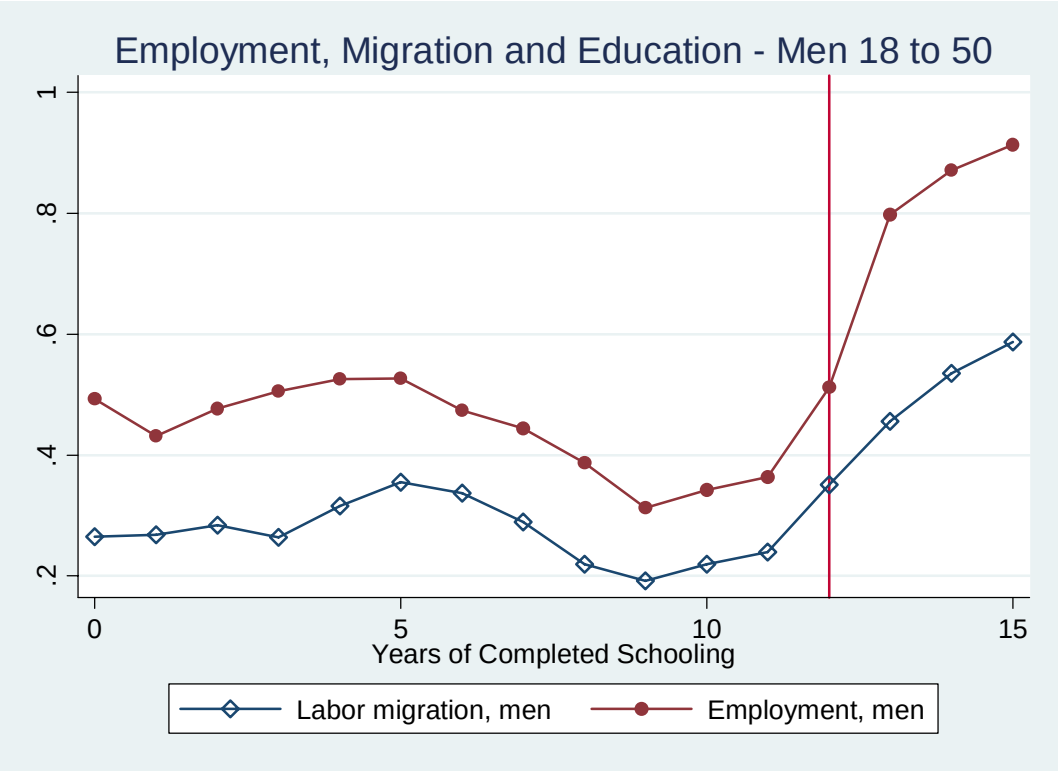


Figure 2. Education patterns in employment and migration



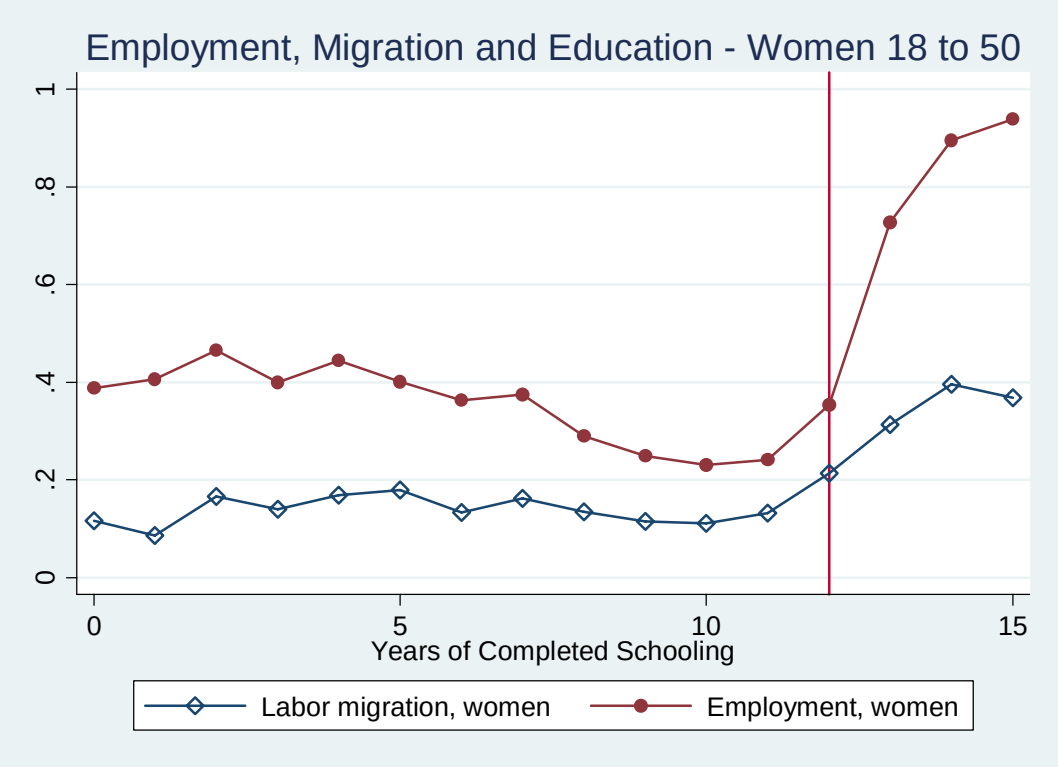


Table 1. Households characteristics in the Africa Centre Demographic Surveillance Area

	Never had a pension	Always had a pension	Lost pension status from HSE1 to HSE2	Gained pension status from HSE1 to HSE2
Number of households	5597	2594	315	498
Number of members	7.67	10.17*	8.82*	9.54*
Number of resident members	5.24	6.77*	5.21	6.43*
Residents aged 0 to 5	0.75	0.87*	0.78	0.91*
Residents aged 6 to 17	2.05	2.37*	2.03	2.24*
Residents aged 18 to 50	2.09	2.16	2.13	1.95
Residents aged 51 +	0.36	1.37*	0.27*	1.32*
Number of labor migrants	0.70	1.12*	0.89*	1.10*
Number of assets	5.43	4.91*	4.70*	5.09*
Expenditure per resident member	306	180*	209*	185*
		Changes observed between HSE1 and HSE2		
Change in members	0.39	0.26*	–0.80*	0.71*
Change in resident members	0.09	–0.13*	–1.42*	0.61*
Change in resident members aged 0 to 5	–0.06	–0.14*	–0.17	0
Change in resident members aged 6 to 17	–0.01	0.02	–0.28*	0.07
Change in resident members aged 51+	0.08	–0.02*	–0.97*	0.40*
Change in number of labor migrants	0.05	0.01	–0.03	0.17*
Change in assets	0.63	0.52*	0.28*	0.73

Notes. Column 1 reports means for households that did not have a resident member age-eligible for the social pension at either wave of the household socioeconomic status module (HSE1 or HSE2). Column 2 reports on households that had an age-eligible member at both waves. Column 3 reports on households that had an age-eligible member at HSE1, but not at HSE2. Column 4 reports on households that did not have an age-eligible member at HSE1 but did at HSE2. Of those households that gained a pension between the waves, 80 percent had a resident member who aged into pension age between rounds of the survey. Labor migrants are household members reported to be working and non-resident in the DSA. Asterisks (*) denote that the difference between households that never had a pension and households of other types are significant at the 5 percent level.

Table 2. Adult members aged 18 to 50 at HSE2

	Never had a pension	Always had a pension	Lost pension status from HSE1 to HSE2	Gained pension status HSE1 to HSE2
Number of individuals	18072	9768	1582	1991
Female	0.54	0.50*	0.56	0.52*
Years of education	8.71	8.68	8.58	8.93*
Employed	0.41	0.41	0.39	0.39*
Labor migrant	0.20	0.27*	0.19	0.27*
Resident in the DSA	0.61	0.51*	0.62	0.52*
	Changes observed between HSE1 and HSE2			
Gained employment between HSE1-HSE2	0.15	0.15	0.14	0.16
Lost employment between HSE1-HSE2	0.09	0.11*	0.09	0.10
Became a labor migrant HSE1-HSE2	0.09	0.10*	0.08	0.12*
Stopped being a labor migrant HSE1-HSE2	0.05	0.07*	0.08*	0.06*

Notes. Column 1 reports means for individuals living in households that did not have a resident member age-eligible for the social pension at either wave of the household socioeconomic status module (HSE1 or HSE2). Column 2 reports on individuals in households that had an age-eligible member at both waves. Column 3 reports on individuals in households that had an age-eligible member at HSE1, but not at HSE2. Column 4 reports on individuals in households that did not have an age-eligible member at HSE1 but did at HSE2. Of those individuals represented in column 4 (gained pension, 63 percent had a resident member who aged into pension eligibility between rounds of the survey. Labor migrants are household members reported to be working and non-resident in the DSA. Asterisks (*) denote that the difference between individuals in households that never had a pension and households of other types is significant at the 5 percent level.

Table 3. Employment, migration and the presence of a pensioner at HSE2

	Employment		Migration
	Dependent variable: Employed at HSE2		Dependent variable: Labor migrant at HSE2
	Resident members only	All members	All members
Men and women	–0.025 (0.009)	0.003 (0.008)	0.045 (0.006)
	n=17885	n=30884	n=30884
Women only	–0.008 (0.012)	0.009 (0.010)	0.048 (0.008)
	n=10494	n=16359	n=16359
Men only	–0.046 (0.014)	–0.005 (0.011)	0.037 (0.010)
	n=7391	n=14525	n=14525

Notes. Table 3 reports the coefficients and standard errors from OLS regressions of employment (columns 1 and 2) and labor migration(column 3) on an indicator that a household has a resident member of pension age. Also included in each regression are the number of resident members ages 0 to 5, 6 to 17, 18 to 50, and aged 51 and above, a complete set of indicators for the member's years of completed schooling, and a quartic in the member's age. Unobservables are clustered at the household level. The sample is restricted to household members aged 18 to 50 at HSE2. In column 1, it is further restricted to resident members only.

Table 4. The effect of change in pension status on employment

	Dependent variable: Change in employment status HSE2 – HSE1		
	All members	Women	Men
Change in household pension status HSE2 – HSE1	0.019 (0.010)	0.011 (0.013)	0.028 (0.015)
Indicator: Household lost pension status HSE2 – HSE1	–0.024 (0.015)	–0.016 (0.020)	–0.033 (0.023)
Indicator: Household gained pension status HSE2 – HSE1	0.016 (0.013)	0.008 (0.018)	0.025 (0.020)
F-test: pension loss + gain = 0 (p-value)	0.13 (.7179)	0.09 (.7621)	0.06 (.8083)
Number of observations	26548	14152	12396

Notes. Table 4 reports the coefficients and standard errors from OLS regressions of change in employment status (HSE2–HSE1) on change in the presence of a resident member age-eligible for the pension (HSE2–HSE1). Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2.

Table 5. The effect of change in pension status on migration for work

	Dependent variable: Change in labor migrant status HSE2 – HSE1		
	All members	Women	Men
Change in household pension status HSE2 – HSE1	0.060 (0.008)	0.066 (0.010)	0.050 (0.012)
Number of observations	26548	14152	12396
Indicator: Household lost pension status HSE2 – HSE1	–0.087 (0.012)	–0.091 (0.015)	–0.080 (0.019)
Indicator: Household gained pension status HSE2 – HSE1	0.038 (0.011)	0.046 (0.014)	0.029 (0.016)
F-test: pension loss + gain = 0 (p-value)	8.81 (.0030)	4.69 (.0304)	3.87 (.0491)
Number of observations	26548	14152	12396
	Change in labor migrant status for those who were labor migrants at HSE1		
Indicator: Household lost pension status HSE2 – HSE1	–0.174 (0.028)	–0.205 (0.043)	–0.126 (0.037)
Indicator: Household gained pension status HSE2 – HSE1	0.006 (0.024)	0.014 (0.040)	0.002 (0.030)
Number of observations	5775	2302	3473
	Change in labor migrant status for those who were not labor migrants at HSE1		
Indicator: Household lost pension status HSE2 – HSE1	–0.052 (0.011)	–0.042 (0.013)	–0.062 (0.019)
Indicator: Household gained pension status HSE2 – HSE1	0.058 (0.010)	0.065 (0.012)	0.046 (0.017)
Number of observations	20773	11850	8923

Notes. Table 5 reports the coefficients and standard errors from OLS regressions of change in labor migrant status (HSE2–HSE1) on change in the presence of a resident member age-eligible for the pension (HSE2–HSE1). Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2.

Table 6. Changes in the probability of being a labor migrant

	Labor migrant at HSE1
Pension lost between HSE1 and HSE2	$\Delta \Pr(C=1 \mid F^*, pen_{t=2}=0, pen_{t=1}=1) + \Delta \Pr(F=1 \mid pen_{t=2}=0, pen_{t=1}=1)$
Pension gained between HSE1 and HSE2	$\Delta \Pr(F=1) = \Delta \Pr(C=1) = 0$
	Resident in the DSA at HSE1
Pension lost between HSE1 and HSE2	$\Delta \Pr(C=1 \mid F^*, pen_{t=2}=0, pen_{t=1}=1) \Pr(F_{t=1}=1) + \Delta \Pr(F=1 \mid pen_{t=2}=0, pen_{t=1}=1) \Pr(C_{t=1}=1 \mid F^*_{t=1})$
Pension gained between HSE1 and HSE2	$\Delta \Pr(C=1 \mid F^*, pen_{t=2}=0, pen_{t=1}=1) \Pr(F_{t=1}=1) + \Delta \Pr(F=1 \mid pen_{t=2}=0, pen_{t=1}=1) \Pr(C_{t=1}=1 \mid F^*_{t=1})$

Financial constraint: $F = 1 \quad if \quad Y_t^H - N_t z_r > z_u - w_{ut}$
$= 0 \quad otherwise$

Childcare constraint: $C = 1 \quad if \quad [1 - \mathrm{I}(R=1)] \times N_c = 0$
$= 0 \quad otherwise$

Table 7. Household socioeconomic status, pension status and migration

	Dependent variable: Change in labor migrant status HSE2 – HSE1	
	Women	Men
	Change in labor migrant status for those who were labor migrants at HSE1	
Indicator: household lost pension status HSE2 – HSE1	–0.309	–0.186
	(0.062)	(0.065)
Pension loss × high SES	0.198	0.090
	(0.082)	(0.078)
Indicator: household gained pension status HSE2 – HSE1	0.061	–0.051
	(0.071)	(0.055)
Pension gain × high status	–0.054	0.071
	(0.084)	(0.064)
Number of observations	2284	3455
	Change in labor migrant status for those who were not labor migrants at HSE1	
Indicator: household lost pension status HSE2 – HSE1	–0.073	–0.069
	(0.019)	(0.028)
Pension loss × high SES	0.053	0.009
	(0.025)	(0.037)
Indicator: household gained pension status HSE2 – HSE1	0.049	0.038
	(0.020)	(0.027)
Pension gain × high status	0.025	0.013
	(0.024)	(0.034)
Number of observations	11775	8852

Notes. Table 7 reports the coefficients and standard errors from OLS regressions of change in labor migrant status (HSE2–HSE1) on indicators for the total loss or initial gain of a pension, and those indicators interacted with a marker that the household is of high socioeconomic status. We use an indicator that someone in the household has at least a high school degree as our measure of high socioeconomic status. Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2.

Table 8. Children in the DSA and the status of labor migrants at HSE1

Dependent variable: Change in labor migrant status HSE2 – HSE1

	Labor Migrants at HSE1	
	Women	Men
Indicator: household lost pension status HSE2 – HSE1	–0.135	–0.097
	(0.047)	(0.040)
Pension loss × respondent has children aged 0 to 5 at HSE2	–0.387	–0.193
	(0.107)	(0.100)
Indicator: household gained pension status HSE2 – HSE1	0.033	–0.004
	(0.047)	(0.032)
Pension gain × respondent has children aged 0 to 5 at HSE2	–0.102	0.035
	(0.099)	(0.078)
***F*-test: joint significance of pension loss variables (p-value)**	**17.96**	**7.57**
	(0.000)	**(0.001)**
***F*-test: joint significance of pension gain variables (p-value)**	**0.59**	**0.11**
	(0.554)	**(0.900)**
Number of observations	2302	3473
	Not labor migrants at HSE1	
Indicator: household lost pension status HSE2 – HSE1	–0.016	–0.059
	(0.016)	(0.021)
Pension loss × respondent has children aged 0 to 5 at HSE2	–0.075	–0.021
	(0.026)	(0.052)
Indicator: household gained pension status HSE2 – HSE1	0.096	0.039
	(0.015)	(0.018)
Pension gain × respondent has children aged 0 to 5 at HSE2	–0.084	0.062
	(0.024)	(0.052)
***F*-test: joint significance of pension loss variables (p-value)**	**9.09**	**5.38**
	(0.000)	**(0.005)**
***F*-test: joint significance of pension gain variables (p-value)**	**20.76**	**4.37**
	(0.000)	**(0.013)**
Number of observations	11850	8923

Notes. Table 8 reports the coefficients and standard errors from OLS regressions of change in labor migrant status (HSE2–HSE1) on indicators for the loss of pension status and the gain of pension status, and those indicators interacted with an indicator that the respondent has children ages 0 to 5 resident in the DSA at HSE2. Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2. The top panel restricts the sample to those who were labor migrants at HSE1, and the bottom panel to those who were not.

Table 9. Residency, employment and change in household pension status

	Dependent variable:			
	Labor migrant at HSE1 had returned to the DSA at HSE2		Labor migrant at HSE1 remained away but was reported not working at HSE2	
	Women	Men	Women	Men
Indicator: household lost pension HSE2 – HSE1	0.273	0.081	–0.074	0.041
	(0.034)	(0.027)	(0.035)	(0.029)
Indicator: household gained pension HSE2 – HSE1	–0.007	–0.011	–0.006	0.010
	(0.032)	(0.022)	(0.033)	(0.023)
Number of observations	2338	3540	2338	3540

Notes. Table 9 reports the coefficients and standard errors from OLS regressions of change in the status of individuals who were labor migrants when observed at HSE1. These individuals can exit labor migrant status by returning to the DSA (columns 1 and 2), or by remaining away but stopping work (columns 3 and 4). Indicator variables for these outcomes are regressed on indicators for the loss and gain of a pension. Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2.

Table 10. The impact of a gain or loss of male and female pensioners on labor migration status of labor migrants

	Dependent variable: =1 if labor migrant at HSE2 =0 if not a labor migrant at HSE2			
	Women		Men	
Indicator: household lost female pensioner HSE2 – HSE1	–0.224 (0.045)	–0.290 (0.069)	–0.116 (0.041)	–0.132 (0.076)
Lost female pensioner × High SES		0.225 (0.087		0.065 (0.086)
Lost female pensioner × Children aged 0 to 5 at HSE1		–0.372 (0.117)		–0.175 (0.115)
Indicator: household lost male pensioner HSE2 – HSE1	–0.077 (0.062)	–0.002 (0.098)	–0.027 (0.046)	–0.149 (0.089)
Lost male pensioner × High SES		–0.069 (0.124)		0.177 (0.102)
Lost male pensioner × Children aged 0 to 5 at HSE1		–0.085 (0.163)		–0.023 (0.138)
Indicator: household gained female pensioner HSE2 – HSE1	–0.026 (0.041)	–0.012 (0.087)	–0.006 (0.031)	–0.036 (0.057)
Gained female pensioner × High SES		–0.014 (0.094)		0.025 (0.065)
Gained female pensioner × Children aged 0 to 5 at HSE1		0.029 (0.107)		0.115 (0.079)
Indicator: household gained male pensioner HSE2 – HSE1	0.088 (0.063)	0.029 (0.109)	0.055 (0.044)	–0.030 (0.080)
Gained male pensioner × High SES		0.098 (0.130)		0.165 (0.093)
Gained male pensioner × Children aged 0 to 5 at HSE1		–0.019 (0.175)		–0.153 (0.111)
***F*-test: Female pensioner loss coefficients (*p*-value)**		**14.27 (.000)**		**3.66 (.012)**
***F*-test: Male pensioner loss coefficients (*p*-value)**		**0.46 (.711)**		**1.09 (.353)**
***F*-test: Female pensioner gain coefficients (*p*-value)**		**0.10 (.959)**		**0.76 (.519)**
***F*-test: Male pensioner gain coefficients (*p*-value)**		**0.86 (.464)**		**2.20 (.086)**
Number of observations	2302	2284	3473	3455

Notes. Table 10 reports the coefficients and standard errors from OLS regressions of change in the labor migration status of individuals who were labor migrants when observed at HSE1. High SES is an indicator that a prime-aged household member has a high school degree. Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2 who were labor migrants at HSE1.

Table 1. Households characteristics in the Africa Centre Demographic Surveillance Area

	Never had a pension	Always had a pension	Lost pension status from HSE1 to HSE2	Gained pension status from HSE1 to HSE2
Number of households	5597	2594	315	498
Number of members	7.67	10.17*	8.82*	9.54*
Number of resident members	5.24	6.77*	5.21	6.43*
Residents aged 0 to 5	0.75	0.87*	0.78	0.91*
Residents aged 6 to 17	2.05	2.37*	2.03	2.24*
Residents aged 18 to 50	2.09	2.16	2.13	1.95
Residents aged 51 +	0.36	1.37*	0.27*	1.32*
Number of labor migrants	0.70	1.12*	0.89*	1.10*
Number of assets	5.43	4.91*	4.70*	5.09*
Expenditure per resident member	306	180*	209*	185*
		Changes observed between HSE1 and HSE2		
Change in members	0.39	0.26*	–0.80*	0.71*
Change in resident members	0.09	–0.13*	–1.42*	0.61*
Change in resident members aged 0 to 5	–0.06	–0.14*	–0.17	0
Change in resident members aged 6 to 17	–0.01	0.02	–0.28*	0.07
Change in resident members aged 51+	0.08	–0.02*	–0.97*	0.40*
Change in number of labor migrants	0.05	0.01	–0.03	0.17*
Change in assets	0.63	0.52*	0.28*	0.73

Notes. Column 1 reports means for households that did not have a resident member age-eligible for the social pension at either wave of the household socioeconomic status module (HSE1 or HSE2). Column 2 reports on households that had an age-eligible member at both waves. Column 3 reports on households that had an age-eligible member at HSE1, but not at HSE2. Column 4 reports on households that did not have an age-eligible member at HSE1 but did at HSE2. Of those households that gained a pension between the waves, 80 percent had a resident member who aged into pension age between rounds of the survey. Labor migrants are household members reported to be working and non-resident in the DSA. Asterisks (*) denote that the difference between households that never had a pension and households of other types are significant at the 5 percent level.

Table 2. Adult members aged 18 to 50 at HSE2

	Never had a pension	Always had a pension	Lost pension status from HSE1 to HSE2	Gained pension status HSE1 to HSE2
Number of individuals	18072	9768	1582	1991
Female	0.54	0.50*	0.56	0.52*
Years of education	8.71	8.68	8.58	8.93*
Employed	0.41	0.41	0.39	0.39*
Labor migrant	0.20	0.27*	0.19	0.27*
Resident in the DSA	0.61	0.51*	0.62	0.52*
	Changes observed between HSE1 and HSE2			
Gained employment between HSE1-HSE2	0.15	0.15	0.14	0.16
Lost employment between HSE1-HSE2	0.09	0.11*	0.09	0.10
Became a labor migrant HSE1-HSE2	0.09	0.10*	0.08	0.12*
Stopped being a labor migrant HSE1-HSE2	0.05	0.07*	0.08*	0.06*

Notes. Column 1 reports means for individuals living in households that did not have a resident member age-eligible for the social pension at either wave of the household socioeconomic status module (HSE1 or HSE2). Column 2 reports on individuals in households that had an age-eligible member at both waves. Column 3 reports on individuals in households that had an age-eligible member at HSE1, but not at HSE2. Column 4 reports on individuals in households that did not have an age-eligible member at HSE1 but did at HSE2. Of those individuals represented in column 4 (gained pension, 63 percent had a resident member who aged into pension eligibility between rounds of the survey. Labor migrants are household members reported to be working and non-resident in the DSA. Asterisks (*) denote that the difference between individuals in households that never had a pension and households of other types is significant at the 5 percent level.

Table 3. Employment, migration and the presence of a pensioner at HSE2

	Employment		Migration
	Dependent variable: Employed at HSE2		Dependent variable: Labor migrant at HSE2
	Resident members only	All members	All members
Men and women	–0.025 (0.009)	0.003 (0.008)	0.045 (0.006)
	n=17885	n=30884	n=30884
Women only	–0.008 (0.012)	0.009 (0.010)	0.048 (0.008)
	n=10494	n=16359	n=16359
Men only	–0.046 (0.014)	–0.005 (0.011)	0.037 (0.010)
	n=7391	n=14525	n=14525

Notes. Table 3 reports the coefficients and standard errors from OLS regressions of employment (columns 1 and 2) and labor migration(column 3) on an indicator that a household has a resident member of pension age. Also included in each regression are the number of resident members ages 0 to 5, 6 to 17, 18 to 50, and aged 51 and above, a complete set of indicators for the member's years of completed schooling, and a quartic in the member's age. Unobservables are clustered at the household level. The sample is restricted to household members aged 18 to 50 at HSE2. In column 1, it is further restricted to resident members only.

Table 4. The effect of change in pension status on employment

	Dependent variable: Change in employment status HSE2 – HSE1		
	All members	Women	Men
Change in household pension status HSE2 – HSE1	0.019 (0.010)	0.011 (0.013)	0.028 (0.015)
Indicator: Household lost pension status HSE2 – HSE1	–0.024 (0.015)	–0.016 (0.020)	–0.033 (0.023)
Indicator: Household gained pension status HSE2 – HSE1	0.016 (0.013)	0.008 (0.018)	0.025 (0.020)
F-test: pension loss + gain = 0 (p-value)	0.13 (.7179)	0.09 (.7621)	0.06 (.8083)
Number of observations	26548	14152	12396

Notes. Table 4 reports the coefficients and standard errors from OLS regressions of change in employment status (HSE2–HSE1) on change in the presence of a resident member age-eligible for the pension (HSE2–HSE1). Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2.

Table 5. The effect of change in pension status on migration for work

	Dependent variable: Change in labor migrant status HSE2 – HSE1		
	All members	Women	Men
Change in household pension status HSE2 – HSE1	0.060 (0.008)	0.066 (0.010)	0.050 (0.012)
Number of observations	26548	14152	12396
Indicator: Household lost pension status HSE2 – HSE1	–0.087 (0.012)	–0.091 (0.015)	–0.080 (0.019)
Indicator: Household gained pension status HSE2 – HSE1	0.038 (0.011)	0.046 (0.014)	0.029 (0.016)
F-test: pension loss + gain = 0 (p-value)	8.81 (.0030)	4.69 (.0304)	3.87 (.0491)
Number of observations	26548	14152	12396
	Change in labor migrant status for those who were labor migrants at HSE1		
Indicator: Household lost pension status HSE2 – HSE1	–0.174 (0.028)	–0.205 (0.043)	–0.126 (0.037)
Indicator: Household gained pension status HSE2 – HSE1	0.006 (0.024)	0.014 (0.040)	0.002 (0.030)
Number of observations	5775	2302	3473
	Change in labor migrant status for those who were not labor migrants at HSE1		
Indicator: Household lost pension status HSE2 – HSE1	–0.052 (0.011)	–0.042 (0.013)	–0.062 (0.019)
Indicator: Household gained pension status HSE2 – HSE1	0.058 (0.010)	0.065 (0.012)	0.046 (0.017)
Number of observations	20773	11850	8923

Notes. Table 5 reports the coefficients and standard errors from OLS regressions of change in labor migrant status (HSE2–HSE1) on change in the presence of a resident member age-eligible for the pension (HSE2–HSE1). Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2.

Table 6. Changes in the probability of being a labor migrant

	Labor migrant at HSE1
Pension lost between HSE1 and HSE2	$\Delta \Pr(C=1 \mid F^*, pen_{t=2}=0, pen_{t=1}=1) + \Delta \Pr(F=1 \mid pen_{t=2}=0, pen_{t=1}=1)$
Pension gained between HSE1 and HSE2	$\Delta \Pr(F=1) = \Delta \Pr(C=1) = 0$
	Resident in the DSA at HSE1
Pension lost between HSE1 and HSE2	$\Delta \Pr(C=1 \mid F^*, pen_{t=2}=0, pen_{t=1}=1) \Pr(F_{t=1}=1) + \Delta \Pr(F=1 \mid pen_{t=2}=0, pen_{t=1}=1) \Pr(C_{t=1}=1 \mid F^*_{t=1})$
Pension gained between HSE1 and HSE2	$\Delta \Pr(C=1 \mid F^*, pen_{t=2}=0, pen_{t=1}=1) \Pr(F_{t=1}=1) + \Delta \Pr(F=1 \mid pen_{t=2}=0, pen_{t=1}=1) \Pr(C_{t=1}=1 \mid F^*_{t=1})$

Financial constraint: $F = 1 \quad if \quad Y_t^H - N_t z_r > z_u - w_{ut}$
$= 0 \quad otherwise$

Childcare constraint: $C = 1 \quad if \quad [1 - \mathrm{I}(R=1)] \times N_c = 0$
$= 0 \quad otherwise$

Table 7. Household socioeconomic status, pension status and migration

	Dependent variable: Change in labor migrant status HSE2 – HSE1	
	Women	Men
	Change in labor migrant status for those who were labor migrants at HSE1	
Indicator: household lost pension status HSE2 – HSE1	–0.309	–0.186
	(0.062)	(0.065)
Pension loss × high SES	0.198	0.090
	(0.082)	(0.078)
Indicator: household gained pension status HSE2 – HSE1	0.061	–0.051
	(0.071)	(0.055)
Pension gain × high status	–0.054	0.071
	(0.084)	(0.064)
Number of observations	2284	3455
	Change in labor migrant status for those who were not labor migrants at HSE1	
Indicator: household lost pension status HSE2 – HSE1	–0.073	–0.069
	(0.019)	(0.028)
Pension loss × high SES	0.053	0.009
	(0.025)	(0.037)
Indicator: household gained pension status HSE2 – HSE1	0.049	0.038
	(0.020)	(0.027)
Pension gain × high status	0.025	0.013
	(0.024)	(0.034)
Number of observations	11775	8852

Notes. Table 7 reports the coefficients and standard errors from OLS regressions of change in labor migrant status (HSE2–HSE1) on indicators for the total loss or initial gain of a pension, and those indicators interacted with a marker that the household is of high socioeconomic status. We use an indicator that someone in the household has at least a high school degree as our measure of high socioeconomic status. Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2.

Table 8. Children in the DSA and the status of labor migrants at HSE1

Dependent variable: Change in labor migrant status HSE2 – HSE1

	Labor Migrants at HSE1	
	Women	Men
Indicator: household lost pension status HSE2 – HSE1	–0.135	–0.097
	(0.047)	(0.040)
Pension loss × respondent has children aged 0 to 5 at HSE2	–0.387	–0.193
	(0.107)	(0.100)
Indicator: household gained pension status HSE2 – HSE1	0.033	–0.004
	(0.047)	(0.032)
Pension gain × respondent has children aged 0 to 5 at HSE2	–0.102	0.035
	(0.099)	(0.078)
***F*-test: joint significance of pension loss variables (p-value)**	**17.96**	**7.57**
	(0.000)	**(0.001)**
***F*-test: joint significance of pension gain variables (p-value)**	**0.59**	**0.11**
	(0.554)	**(0.900)**
Number of observations	2302	3473
	Not labor migrants at HSE1	
Indicator: household lost pension status HSE2 – HSE1	–0.016	–0.059
	(0.016)	(0.021)
Pension loss × respondent has children aged 0 to 5 at HSE2	–0.075	–0.021
	(0.026)	(0.052)
Indicator: household gained pension status HSE2 – HSE1	0.096	0.039
	(0.015)	(0.018)
Pension gain × respondent has children aged 0 to 5 at HSE2	–0.084	0.062
	(0.024)	(0.052)
***F*-test: joint significance of pension loss variables (p-value)**	**9.09**	**5.38**
	(0.000)	**(0.005)**
***F*-test: joint significance of pension gain variables (p-value)**	**20.76**	**4.37**
	(0.000)	**(0.013)**
Number of observations	11850	8923

Notes. Table 8 reports the coefficients and standard errors from OLS regressions of change in labor migrant status (HSE2–HSE1) on indicators for the loss of pension status and the gain of pension status, and those indicators interacted with an indicator that the respondent has children ages 0 to 5 resident in the DSA at HSE2. Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2. The top panel restricts the sample to those who were labor migrants at HSE1, and the bottom panel to those who were not.

Table 9. Residency, employment and change in household pension status

	Dependent variable:			
	Labor migrant at HSE1 had returned to the DSA at HSE2		Labor migrant at HSE1 remained away but was reported not working at HSE2	
	Women	Men	Women	Men
Indicator: household lost pension HSE2 – HSE1	0.273	0.081	–0.074	0.041
	(0.034)	(0.027)	(0.035)	(0.029)
Indicator: household gained pension HSE2 – HSE1	–0.007	–0.011	–0.006	0.010
	(0.032)	(0.022)	(0.033)	(0.023)
Number of observations	2338	3540	2338	3540

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Indicator: household gained male pensioner HSE2 – HSE1	0.088 (0.063)	0.029 (0.109)	0.055 (0.044)	–0.030 (0.080)
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***F*-test: Female pensioner loss coefficients (*p*-value)**		**14.27 (.000)**		**3.66 (.012)**
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***F*-test: Male pensioner gain coefficients (*p*-value)**		**0.86 (.464)**		**2.20 (.086)**
Number of observations	2302	2284	3473	3455

Notes. Table 10 reports the coefficients and standard errors from OLS regressions of change in the labor migration status of individuals who were labor migrants when observed at HSE1. High SES is an indicator that a prime-aged household member has a high school degree. Also included in each regression are the change in the number of resident members, and the number of days that elapsed between HSE1 and HSE2. The sample is restricted to household members aged 18 to 50 at HSE2 who were labor migrants at HSE1.