

## Labor Supply Responses to Large Social Transfers: Longitudinal Evidence from South Africa<sup>†</sup>

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*We quantify the labor supply responses of prime-aged adults to the presence of pensioners in their households, using longitudinal data collected in South Africa. We compare households and individuals before and after pension receipt and pension loss, which allows us to control for a host of unobservable household and individual characteristics that may determine labor market behavior. We find large cash transfers to the elderly lead to increased employment among prime-aged adults, which occurs primarily through labor migration. The pension's impact is attributable to the increase in household resources it represents, which can be used to stake migrants until they become self-sufficient, and to the presence of pensioners who can care for small children, which allows prime-aged adults to look for work elsewhere. (JEL H23, H55, I38, J22, O15)*

In many parts of the developing world rural areas exhibit high rates of unemployment and underemployment. Understanding what prevents people living in rural areas from migrating to find better jobs is central to the development process. This issue is especially salient in South Africa, where differences in earnings and employment rates between rural and urban areas are large and persistent (Doubell Chamberlain and Servaas van der Berg 2002; Phillippe G. Leite, Terry McKinley, and Rafael Guerreiro Osório 2006; Abhijit Banerjee et al. 2007). In this paper, we examine whether binding credit and childcare constraints limit the ability of households to send labor migrants, and whether the arrival of a large, stable source of

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income—here, the South African old-age pension—helps households overcome these constraints.

The South African old-age social pension has been studied at length by researchers and policy makers, in part for the larger lessons that might be learned about behavioral responses to cash transfers in developing countries. A noncontributory 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 940 Rands) to women and men who reach pension age without access to a private pension. (See Case and Angus Deaton 1998 for details.) Africans often live in three or four generation households, so that the social pension (which we 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 predicted very well by age eligibility, we can use age eligibility to define treatment status, allowing us to sidestep issues of selection into treatment. The pension is also generous enough to potentially change 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 or potential work seekers who need financial support to look for jobs, then social transfers like the pension may promote employment and help households 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. Marianne Bertrand, Sendhil Mullainathan, and Douglas 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, Dorrit Posel, James A. Fairburn, and Frances Lund (2006) 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 the need potential migrants have for an adult to be at home to care for children left behind—a role that could be played by 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 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 the findings of the earlier cross-sectional analyses. When we turn to longitudinal analysis, however, we find a small, positive increase in the employment of prime-aged adults once pension receipt begins in their household. The larger effects regard where that employment takes place. Prime-aged adults are significantly more likely to be labor migrants after pension receipt begins in the household. 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. Our results suggest that the pension plays a large role in lessening both credit and childcare constraints, allowing prime-aged adults to migrate for work.

The paper proceeds as follows. Section I presents details on the Africa Centre Demographic Information System (ACDIS) with which we will evaluate the behavioral response to the pension. Section II demonstrates that our results match those found in earlier cross-sectional analysis. Section III presents descriptive results in which we map the changes in employment and labor migration that we observe in households before and after pension receipt and before and after the withdrawal of the pension. Section IV presents a model of migration decision-making that can explain our descriptive findings, and evidence that our results are due to resource constraints and to the needs of households that must care for young children. Section V tests assumptions of the model and alternative explanations for our findings, and Section VI concludes.

### **I. 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 the 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 area administered by a tribal authority.

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, the data distinguish between an individual's membership in a household and his or her residency at a homestead. (See Hosegood and Ian M. Timæus 2005; and Hosegood, Justus Benzler, and Geoff Solarsh 2005.) In every round of the ACDIS, a knowledgeable household member names all individuals currently recognized as "household members." Membership does not depend on the number of nights an individual sleeps at a homestead, or how often he or she eats from the household pot. Membership is a social construct, and a household is free to name all individuals it recognizes as members.<sup>1</sup> As noted by Posel, Fairburn and Lund 2006, in a country in which migrant work is a dominant feature of the labor market, it is essential to understand the behavior of resident and nonresident 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 2003–2004. We refer to the first round of household socioeconomic 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. 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.

Table 1 presents relevant characteristics of individuals and households in the DSA at the time of the second socioeconomic survey, for households that existed in both periods. 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. Five percent became pension households between rounds of the socioeconomic survey, and 4 percent lost pension status. (As a shorthand, we will refer to individuals who are members of households that became pension 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 can lose pension status either because a pensioner leaves the household or dies. In 77 percent of cases in which prime-aged adult households lost pension status, this occurred because a pensioner died. In 11 percent of the cases, it occurred because the pensioner left the demographic surveillance area (coded as an

<sup>1</sup> That said, it seems likely that labor migrants who remit back to the household of origin are more likely to be identified as members, although it is difficult to confirm this with any of the South African data sets currently available. (See Posel and Daniela Casale 2003 for a good discussion of this.)

TABLE 1—HOUSEHOLD AND INDIVIDUAL CHARACTERISTICS IN THE AFRICA CENTRE DSA

	Never had a pension	Always had a pension	Lost pension status from HSE1 to HSE2	Gained pension status from HSE1 to HSE2
<i>Household characteristics</i>				
Number of households	5,625	2,661	342	465
Number of members	7.48	9.93*	8.80*	9.28*
Number of resident members	5.34	6.94*	5.57	6.61*
Residents aged 0 to 5	0.78	0.92*	0.87	0.98*
Residents aged 6 to 17	2.09	2.44*	2.13	2.28*
Residents aged 18 to 50	2.12	2.20*	2.27	2.01
Residents aged 51+	0.36	1.37*	0.30	1.33*
Number of labor migrants	0.77	1.14*	0.92*	1.15*
Number of assets	5.45	4.90*	4.80*	5.15*
<i>Individual characteristics</i>				
Number of individuals	14,397	8,466	1,044	1,364
Female	0.55	0.51*	0.51*	0.50*
Years of education	8.54	8.57	8.59	9.10*
Employed	0.48	0.45*	0.42*	0.47
Labor migrant	0.23	0.31*	0.25	0.33*
Resident in the DSA	0.59	0.49*	0.53*	0.46*

*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.

\*Denotes that the differences between households or individuals that never had a pension and other types of households are significant at the 5 percent level.

“external individual out migration”). And, in 9 percent of cases it occurred because the pensioner left the household but not the surveillance area (an “internal individual migration”).

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 must 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 households that never had a pension. Pension households at HSE2 also report a greater number of prime-aged members who are working migrants. Households that were never observed with a pensioner are wealthier, measured by the number of assets owned by the household. 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, and Eric V. Edmonds, Kristin Mammen, and Miller 2005).

Our focus will be on the behavior of prime-aged adults, which we define as men and women older than 17 years of age at HSE1 and younger than 51 years of age at HSE2. Characteristics for these individuals are presented in the bottom panel of Table 1. 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



FIGURE 1. AGE PATTERNS IN EMPLOYMENT AND MIGRATION

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 significantly less likely to be female (51 versus 55 percent). Both waves of the HSE asked whether each adult in the household did “anything to earn money.” The household respondent is prompted to remember both formal and informal employment. There is significantly greater employment reported for individuals living in households that never had a pension (48 percent versus 45 percent for those in households that always had a pension). In contrast, we find prime-aged members of pension households to be significantly and substantially more likely to be working migrants (31 percent of prime-aged adults in households that always had a resident pensioner, compared with 23 percent in households that never did). Adults in households that gained a pension between the rounds of the survey are the most likely to report being labor migrants (33 percent).

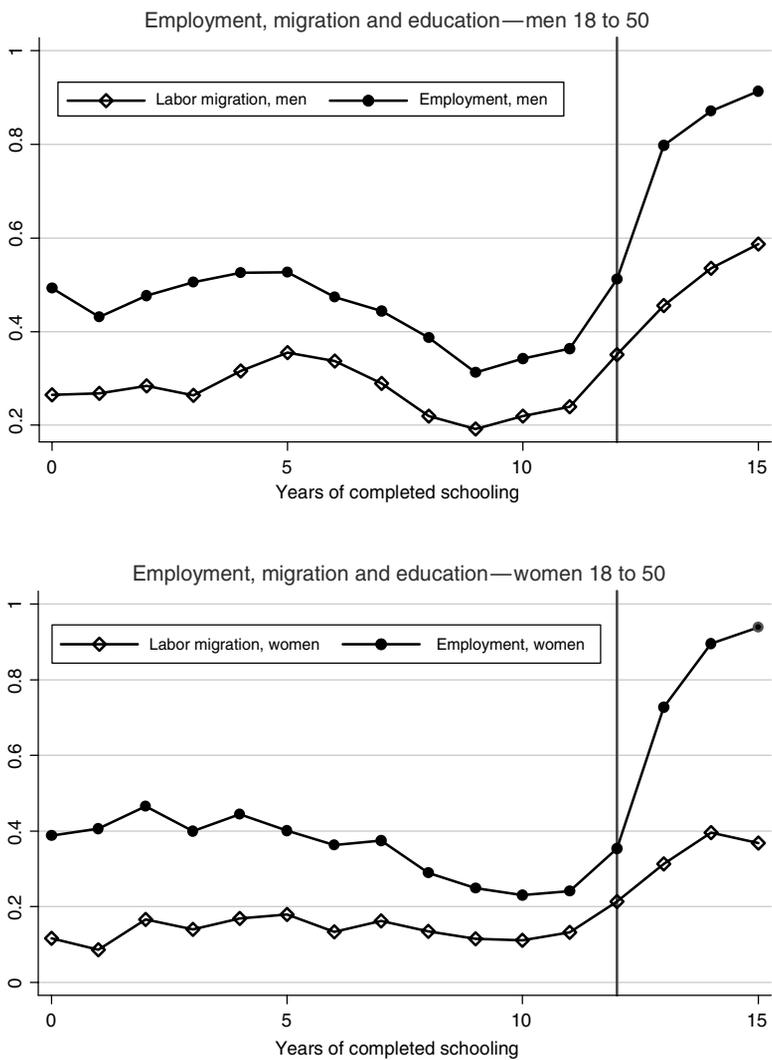


FIGURE 2. EDUCATION PATTERNS IN EMPLOYMENT AND MIGRATION

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 and significantly larger numbers of nonresident working members.

**II. 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 and resident and nonresident who were ages 18 to 50 years old 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-30s. Labor migration, again defined as working and being a nonresident in the DSA, also increases with age. By their

late 20s, approximately 40 percent of men and approximately 20 percent of women are reported to be labor migrants. After age 30, labor migration rates for women begin to decline, so that by their late 40s only 10 percent of women are reported to be labor migrants. In what follows, we include polynomials in age when estimating employment and migration regressions that do not include individual fixed effects. These age variables 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 high school graduation (matric) plays in 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:

$$(1) \quad y_{iht}^o = \beta P_{ht} + \gamma X_{iht} + \varepsilon_{iht}^o, \quad o = e, m.$$

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 nonresident 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  $\beta$ . If the presence of a pensioner is associated with a lower probability of employment among prime-aged household members, for example, we would expect  $\beta$  to be negative and significantly different from zero.

In Table 2, we present cross-sectional regression results of the association between the presence of a pensioner and employment and migration at HSE2. Each coefficient presented is an estimate of  $\beta$  from a different regression. Employment results are presented in the first two rows for resident members (row 1) and all members (row 2). Labor migration results are presented in the last row, where the dependent variable is equal to one if the individual is a nonresident in the DSA and is working. The first column 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 column presents results for women estimated separately, and the third column reports results for men alone. Results reported in the first three columns are from regressions that 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, these regressions include a quartic in age, indicators for years of completed schooling, and (in column one) an indicator for sex.

TABLE 2—EMPLOYMENT, MIGRATION, AND THE PRESENCE OF A PENSIONER AT HSE2

	Women and men	Women only	Men only	Bertrand et al. specification	
				Women only	Men only
<i>Dependent variable: Employment at HSE2</i>					
Resident members only:	-0.027 (0.009) <i>n</i> = 21,103	-0.009 (0.011) <i>n</i> = 12,314	-0.051 (0.013) <i>n</i> = 8,789	-0.017 (0.013) <i>n</i> = 5,090	-0.059 (0.019) <i>n</i> = 2,988
Resident and nonresident members:	0.003 (0.007) <i>n</i> = 35,842	0.014 (0.009) <i>n</i> = 19,103	-0.012 (0.010) <i>n</i> = 16,739		
<i>Dependent variable: Labor migrant at HSE2</i>					
Resident and nonresident members:	0.045 (0.006) <i>n</i> = 35,842	0.051 (0.008) <i>n</i> = 19,103	0.034 (0.009) <i>n</i> = 16,739		

*Notes:* Table 2 reports the coefficients and standard errors from OLS regressions of employment (rows 1 and 2) and labor migration (row 3) on an indicator that a household has a resident member of pension age. The sample is restricted to household members greater than age 17 and less than age 51 at HSE2. In row 1, it is further restricted to resident members only. In columns 1 to 3, regressions include controls for the number of resident members aged 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. In columns 4 and 5, regressions are based on the sample selection rules and control variables used in Bertrand et al. (2003). The sample is restricted to individuals living in three generation households and the regressions include the number of resident members; the number of resident members aged 0 to 5, 6 to 15, 16 to 18, 19 to 21, and 22 to 24; an indicator that the member has completed at least grade 8; and a quartic in the member's age. For all regressions, estimated standard errors allow for correlation in the unobservables of individuals who are members of the same household.

We adjust our estimated standard errors to allow for correlation in the unobservables of individuals who are members of the same household.

Using this specification, but restricting the sample to resident members only, we find that the presence of a resident pensioner is associated with a 3 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 columns of Table 2. For women, the association is very small (-0.009) and not significantly different from zero. In contrast, holding all else constant, we find that prime-aged men living in pension households are 5 percentage points less likely to be employed, and that this effect is significantly different from zero.

Our specification differs from that reported in Bertrand, Mullainathan, and Miller (2003) in ways that could affect results, but in practice do not.<sup>2</sup> For comparison with

<sup>2</sup> Bertrand, Mullainathan, and Miller (2003) control for education by including an indicator variable that an individual has completed at least grade eight. 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. Bertrand, Mullainathan, and Miller (2003) 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, if we were to restrict our sample to three generations. ACDIS stopped asking about the employment of 16 and 17 year olds half-way through data collection for HSE2, because the probability that they were employed was virtually zero. For this reason, we cannot include teens in this age group in the sample we use to estimate results presented in columns 4 and 5.

this earlier work, columns 4 and 5 present estimates of the pension coefficient from regressions using the Bertrand, Mullainathan, and Miller (2003) sample selection rules and regression specification. Restricting our sample to three-generation households and controlling for the Bertrand, Mullainathan, and Miller (2003) education and resident member indicator variables, we find (as did these researchers) that living with a resident pensioner is associated with a 4 percentage point lower probability of employment among prime-aged adults, with the effect larger and significant for men, and smaller and insignificant for women.

Posel, Fairburn, and Lund (2006) focus on the fact that restricting analysis to resident household members will miss an important group of working household members—labor migrants. Following Bertrand, Mullainathan, and Miller (2003), in order to make their results as comparable as possible, Posel, Fairburn, and Lund (2006) 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, Fairburn, and Lund (2006) do not show how the probability of employment for all prime-aged adults (resident and nonresident alike) corresponds to the presence of a pensioner in the household. We provide this information for our sample in row 2 of Table 2. Once nonresident 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 (columns 2 and 3) or jointly (column 1). The results for men are particularly interesting. Including nonresident 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 row 3 of Table 2. 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. Prime-aged men are 3 percentage points more likely. Evidence in Table 2 is consistent with a model in which the presence of a pensioner allows prime-aged adults a greater opportunity to leave for work elsewhere.

### III. Panel Estimates of the Impact of Pension Receipt on Employment and Migration

Data collected in the 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 as

$$(2) \quad \varepsilon_{iht}^o = \alpha_i^o + u_{iht}^o, \quad o = e, m,$$

TABLE 3—THE EFFECT OF CHANGE IN PENSION STATUS ON EMPLOYMENT

	Dependent variable: Change in employment status HSE2–HSE1			
	Resident members only	All members	All members Women	All members Men
Change in household pension status HSE2–HSE1	0.005 (0.016)	0.033 (0.011)	0.029 (0.015)	0.036 (0.016)
Indicator: Household lost pension status HSE2–HSE1	–0.011 (0.024)	–0.042 (0.017)	–0.048 (0.024)	–0.036 (0.025)
Indicator: Household gained pension status HSE2–HSE1	–0.001 (0.023)	0.026 (0.015)	0.015 (0.021)	0.037 (0.021)
Observations	12,222	24,921	13,183	11,738

*Notes:* Table 3 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 older than age 17 at HSE1 and younger than age 51 at HSE2. The sample in column 1 is restricted to members who were resident at both HSE1 and HSE2.

where  $\alpha_i^o$  is an individual-specific fixed effect for labor market outcome  $o$ . This effect will absorb all determinants of employment ( $\alpha_i^e$ ) or migration ( $\alpha_i^m$ ) 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 (generally) 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 pension status and changes in characteristics that may change through time,

$$(3) \quad y_{iht}^o - y_{iht,t-1}^o = \beta(P_{ht} - P_{h,t-1}) + \gamma(X_{iht} - X_{ih,t-1}) + (u_{iht}^o - u_{ih,t-1}^o).$$

Table 3 presents estimates of  $\beta$  from equation (3) for the employment outcomes of prime-aged members, from regressions that also 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. The first column of Table 3 restricts the sample to prime-aged household members who were resident at both HSE1 and HSE2. With this restriction, results in column 1 can be interpreted as the first-difference analog to those presented by Bertrand, Mullainathan, and Miller (2003). We find no significant association between change in household pension status and change in employment for members who were resident in both periods.

The remainder of Table 3 presents evidence of the impact of change in pension status on the employment of all members—resident and nonresident alike. Opening our analysis to all prime-aged members, we find a small, positive, and significant relationship between pension receipt and employment for both men and women. A change in pension status is associated with a 3 percentage point change in employment status, on average.

With fixed effect estimation, the only individuals who contribute information for the estimate of  $\beta$  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 3 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 3. 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 is associated 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 the estimates for pension gain are not statistically significant for men and women estimated jointly or for women estimated alone.

Overall, the results in Table 3 provide modest support for a positive impact of pension receipt on prime-aged adults' employment. These results provide no evidence to support claims that the arrival of the pension has a negative causal effect on work. This result stands in contrast to the earlier cross-sectional results of Bertrand, Mullainathan, and Miller (2003) and our results in Table 2.

One of the reasons why the cross-sectional and panel data results differ is because the introduction of a pension has a causal effect on household composition. Specifically, the presence of a pension attracts new members who vary in their characteristics from those attracted to nonpension households. We explore this in Table 4, where we present characteristics and time-use information on individuals who joined pension households (column 1) or nonpension households (column 2) between HSE1 and HSE2. We find that prime-aged individuals who became resident members of pension households have significantly less education. They are also significantly less likely to be employed. Twenty-two percent of new resident members of pension households report they are working at HSE2, while 29 percent of those who joined nonpension households report working at HSE2. In addition, new resident members of pension households are 5 percentage points more likely to report that they are "doing nothing" at HSE2 than are new members of nonpension households. They are also significantly more likely to report being sick or injured. These results are consistent with those of Stephan Klasen and Ingrid Woolard (2000), who find the location decisions of the unemployed throughout South Africa are strongly influenced by the availability of economic support, often in the form of the social pension.<sup>3</sup>

<sup>3</sup> Unless original and new household members can be correctly identified in cross-sectional data, even the best Regression Discontinuity Design cannot overcome this treatment-induced selection into the household.

TABLE 4—CHARACTERISTICS OF INDIVIDUALS AGED 18 TO 50 WHO JOINED AND LEFT HOUSEHOLDS BETWEEN HSE1 AND HSE2

	Joined as resident members between HSE1 and HSE2: Characteristics at HSE2		Ended membership between HSE1 and HSE2: Characteristics at HSE1	
	Pension household HSE2	Nonpension household HSE2	Pension household HSE1	Nonpension household HSE1
<i>Number of individuals</i>	1,573	2,418	2,031	2,934
Age	28.35	27.80*	29.82	28.27*
Female	0.57	0.60	0.54	0.57
Years of education	8.40	8.79*	7.69	8.01*
<i>Individual is reported to be:</i>				
Employed	0.22	0.29*	0.40	0.40
Looking for work	0.25	0.25	—	—
Studying	0.12	0.12	0.12	0.14*
Pregnant or caring for own child	0.05	0.06	—	—
Sick or injured	0.05	0.03*	—	—
Caring for other children	0.00	0.01	—	—
Caring for sick	0.00	0.00	—	—
Doing nothing	0.25	0.20*	—	—
Resident at HSE1	—	—	0.47	0.50*

*Notes:* Column 1 reports means for individuals aged 18 to 50 who became resident in a household with a resident member who is age eligible for the social pension at HSE2. Column 2 reports on individuals aged 18 to 50 who became resident in households that did not have an age eligible resident member at HSE2. Individuals in columns 1 and 2 were either nonresident members of households at HSE1 or were not a member of any household in the DSA at HSE1. Column 3 reports means for individuals aged 18 to 50 who ended membership of a household with a resident member age eligible for the social pension at HSE1. Column 4 reports on individuals aged 18 to 50 who ended membership of a household that did not have an age-eligible resident member at HSE1.

\* Denotes that the differences between individuals who joined pension or nonpension households are significant at the 5 percent level (column 2); analogously, this denotes differences for those who ended membership in pension or nonpension households (column 4).

It does not appear that new resident members joined to care for the elderly or for children. Virtually no new members report caring for the sick or caring for the children of others. Neither does it appear that the arrival of the pension caused these new members to stop working. Nearly 60 percent of these new unemployed members in pension households reported that they had never worked before, and almost 90 percent reported that they had not worked in the last year (results estimated but not reported in Table 4). Instead, it appears that pension households are significantly more likely to attract nonworking resident members.

The balanced panel of the ACDIS allows us to look at differences in individuals over time. However, it does not allow us to follow changes for individuals who exited demographic surveillance between the waves of the survey. The last two columns of Table 4 provide information on the prime-aged individuals who were present at HSE1, but who lost membership in any ACDIS household between the waves. Comparing these individuals with those observed in both periods (Table 1), we find that individuals who leave are no more or less likely to have been employed at HSE1. They are, however, significantly more likely to be female, and are slightly but significantly younger and less well educated than individuals followed in both periods. Marie Wentzel, Johan Viljoen, and Pieter Kok (2006) find, in their analysis of the South African Human Sciences Research Council 2001–2002 migration survey, that women are significantly more likely to report migrating to move in with a partner,

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	0.046 (0.009)	0.056 (0.011)	0.037 (0.013)
Observations	24,921	13,183	11,738
Indicator: Household lost pension status HSE2–HSE1	–0.049 (0.013)	–0.061 (0.017)	–0.038 (0.020)
Indicator: Household gained pension status HSE2–HSE1	0.045 (0.012)	0.053 (0.015)	0.036 (0.018)
Observations	24,921	13,183	11,738
	Change in labor migrant status for those who were labor migrants at HSE1		
	All members	Women	Men
Indicator: Household lost pension status HSE2–HSE1	–0.052 (0.031)	–0.061 (0.052)	–0.040 (0.039)
Indicator: Household gained pension status HSE2–HSE1	0.021 (0.026)	0.022 (0.044)	0.022 (0.032)
Observations	5,283	2,033	3,250
	Change in labor migrant status for those who were not labor migrants at HSE1		
	All members	Women	Men
Indicator: Household lost pension status HSE2–HSE1	–0.038 (0.013)	–0.045 (0.016)	–0.037 (0.021)
Indicator: Household gained pension status HSE2–HSE1	0.070 (0.011)	0.079 (0.014)	0.052 (0.018)
Observations	19,638	11,150	8,488

*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 greater than age 17 at HSE1 and less than age 51 at HSE2.

or to move because a partner is moving. In a different demographic surveillance site, in Limpopo Province South Africa, Mark A. Collinson, Stephen M. Tollman, and Kathleen Kahn (2007) also find women are more likely to become what they call “permanent migrants”—that is, ones who leave with no intention of returning. They note that permanent migration is more likely for family reasons, and that temporary migration is more likely for employment (Collinson, Tollman, and Kahn 2007, 80). While we cannot quantify the extent to which those who exit surveillance are permanent migrants who have gone to live with partners elsewhere, these findings from other datasets provide a plausible explanation for why younger, adult women are more likely to exit between the waves. Results in the last two columns of Table 4

also suggest that characteristics of individuals who exited are largely similar by household-pension status at HSE1.<sup>4</sup>

Estimates of the impact of change in pension status on labor migration are provided in Table 5. Both the arrival and withdrawal of an old-age pension are significantly associated with change in migrant labor status for both men and women. On average, individuals from households that lost pension status were 4 to 6 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 4 to 5 percentage points more likely to become or remain migrants.

A change in pension status could have different effects on current labor migrants and household members who could, potentially, become migrants. We examine whether this is the case 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). In the last panel, we restrict our analysis to individuals who were not labor migrants at HSE1. Dividing migrants and potential migrants highlights the fact that, on average, pension gain has a larger impact on potential migrants. Although for current migrants pension gain takes a positive coefficient—associated with maintaining migrant status, and pension loss takes a negative coefficient—associated with losing migrant status, the estimated coefficients are not significantly different from zero. In contrast, for potential migrants, we find prime-aged adults in households that lost pension status are 4 percentage points less likely to become migrants between waves, while those in households that gained pension status are 7 percentage points more likely to become migrants.

In summary, we find that prime-aged household members are significantly more likely to be employed following pension gain, and that this effect works through the increased probability that prime-aged members become labor migrants upon pension receipt. We also find an asymmetry with respect to the pension's effect on labor migrants and nonmigrants, with the change in pension status having a significant effect on the behavior of potential migrants, but not on those who were already working and not resident at HSE1. In the next section, we present a model of migration decision-making which we use to interpret these results.

#### IV. A Model of Migration Decision-making<sup>5</sup>

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

<sup>4</sup> Entire households that leave ( $n = 1761$ ) or arrive ( $n = 1872$ ) in the DSA between HSE1 and HSE2 are also excluded from the analysis by design. These households are significantly smaller than households that appear in the DSA for both rounds of the HSE ( $n = 9093$ ). Nonpension households that enter or exit have significantly higher fractions of prime-aged adults employed than do nonpension households present in both periods. This is not true of pension households, where employment differences relative to households present in both periods are insignificant.

<sup>5</sup> A more detailed version of this model is presented in Ardington, Case, and Hosegood (2007).

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

We initially assume that women's and men's roles in the household and their labor market opportunities are the same, and that households pool resources and make decisions jointly. We assume that individuals face credit constraints and cannot borrow against future earnings. To reflect the reality of labor market prospects in rural South Africa, we assume that wages offered in the DSA are stagnant, paying just well enough to meet individuals' minimum living expenses.<sup>6</sup> If an individual migrates to find work, he or she receives initial wage offers that do not meet the costs of migrating to the urban sector and the costs associated with living there. 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 expenses are met. With labor market experience, or through job search once in the urban sector, wages in the urban sector are expected to grow, so that at some point labor migrants become self-supporting. When wages exceed living expenses in the urban sector, utility is higher for labor migrants than nonmigrants. At this point, labor migrants may begin to send remittances, increasing the utility of household members in the DSA.<sup>7</sup>

For households to be able to send and support migrants for some period of time, two constraints must be met:

- *Financial constraint:* Total household income must exceed that necessary to meet resident members' basic needs by more than the migrant's income shortfall. Each period following migration this condition is easier to meet, given expected growth in urban sector wages.
- *Childcare constraint:* The household must ensure that its young children in the DSA are being cared for. The childcare constraint will not bind either if there are no children in need of care, or if there is an adult in the DSA who could care for young children.

Meeting financial and childcare constraints are necessary but not sufficient conditions for households to send a labor migrant. The financial constraint may be met, but if household members do not pool income, potential migrants may not be

<sup>6</sup> Using data from the 2004 South African Labour Force Survey, Leite, McKinley, and Guerreiro Osorio (2006) find that earnings of rural workers ages 25 to 54 are less than half those of urban workers. Using data from the 2003 Labour Force Survey, Banerjee et al. (2007) find employment rates in rural areas that are exceptionally low by world standards, and are substantially lower than those in urban areas (31 versus 47 percent for 16 to 64 year olds). Many households who need to borrow money in the DSA are forced to turn to money lenders, who charge usurious interest rates. In ongoing research on the costs of illness and funerals in the DSA, we are finding that more than half of all households that report borrowing money to pay for medical care or a funeral borrowed from a money lender. This is consistent with qualitative work discussed by Themba Mbhele (2007) in the Dondotha Area Study, which also documents exorbitant interest rates charged by money lenders. Although intention to reform such practices was a theme of the Finance Minister's annual budget report in 1999 (see Trevor A. Manuel 1999), these practices are still widely observed in KwaZulu-Natal.

<sup>7</sup> We do not have data on remittances, and so we do not explicitly model remittances. However, adding remittances to the model would, in general, strengthen the household's incentives to send migrants. For the large role played by remittances in rural households in KwaZulu-Natal see Posel (2001).

guaranteed the support they need to sustain themselves in the urban sector until they find their feet. The childcare constraint may be met, but if adults in the DSA household who could mind children do not agree to do so, the household's childcare needs may prohibit a potential migrant from leaving the DSA. In what follows, these conditions help us to better understand the barriers that exist for labor migration and how those barriers change with the presence and withdrawal of pensioners.

Pension income generally increases total household income, 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 could care for children.

We expect pension gain and loss to have asymmetric effects on current labor migrants and potential labor migrants. Labor migrants at HSE1 are meeting their financial and childcare constraints. We would not have observed them as labor migrants at HSE1 otherwise. For current labor migrants, the change in the probability of meeting the financial constraint upon pension loss may be small if the migrant has experienced sufficient wage growth in the urban sector. Once the migrant is self-supporting, the change in the probability of meeting the financial constraint will be zero, given a loss of pension status. However, even self-supporting migrants may find that pension loss brings them back to the DSA, through the effect pension loss may have on the probability of meeting childcare constraints.

Labor migrants from households that gain pension status between waves of the survey should experience no change in the probability that they remain labor migrants. These migrants had already been meeting the financial and childcare constraints necessary for migration. 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. The arrival of the pension simply reinforces a migrant's ability to meet these constraints. Table 5 shows that this is born out in our data ( $\beta = 0.021$  for this group, and is not different from zero).

In contrast, among potential migrants, pension gain should increase the probability of labor migration, as these constraints are less likely to bind. Pension loss should reduce the probability of labor migration subsequent to the loss of a pensioner, as both the financial and childcare constraints are less likely to be met. For nonmigrants at HSE1, changes in the probability of meeting financial and childcare constraints are symmetric with respect to pension gain and loss. As a result, we would expect the effect of gaining pension status between the rounds to be equal and opposite to the effect of losing pension status, all else held equal for this group. Table 5 suggests that this is also the case. In results for both men and women, we cannot reject, at a 5 percent level, that the effects are equal and opposite.

## V. Testing the Model's Assumptions

The model suggests additional tests of the ACDIS data. If there are children in need of care in the DSA, we would expect their presence to influence the probability of sending or sustaining a labor migrant upon loss of pension status. In the absence of children, we would expect the impact of pension loss would depend only on its effect on the probability of meeting the financial constraint. We examine this in

TABLE 6—PENSION STATUS AND THE IMPACT OF SMALL CHILDREN ON LABOR MIGRATION

	Dependent variable: Change in labor migrant status HSE2–HSE1			
	Labor migrants at HSE1	Not labor migrants at HSE1		
	All	All	Women	Men
Household lost pension status HSE2–HSE1	0.043 (0.055)	–0.042 (0.022)	–0.033 (0.029)	–0.064 (0.034)
Household lost pension status × household has children 0 to 5	–0.139 (0.066)	0.005 (0.027)	–0.018 (0.034)	0.042 (0.042)
Household gained pension status HSE2–HSE1	0.032 (0.040)	0.077 (0.019)	0.113 (0.025)	0.030 (0.029)
Household gained pension status × household has children 0 to 5	–0.018 (0.051)	–0.011 (0.023)	–0.046 (0.030)	0.035 (0.036)
<i>F</i> -test: Pension loss variables ( <i>p</i> -value)	3.65 (0.026)	4.62 (0.010)	4.38 (0.013)	2.10 (0.123)
<i>F</i> -test: Pension gain variables ( <i>p</i> -value)	0.41 (0.662)	19.51 (0.000)	18.08 (0.000)	4.51 (0.011)
Observations	5,283	19,638	11,150	8,488

*Notes:* Table 6 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 greater than 17 years old at HSE1 and less than 51 years old at HSE2.

Table 6, where we add an interaction term between pension loss and an indicator that the household had any resident children aged 0 to 5 at HSE1, and a similar interaction term for pension gain. The interaction terms absorb the childcare effects, while the pension loss and gain indicators standing alone absorb the financial constraint effects.<sup>8</sup>

Beginning with the latter, we find, for households without young children (so that the interaction term is zero), that current labor migrants who lose pension status are not significantly more likely to lose labor migrant status between HSE1 and HSE2 than are other labor migrants. Indeed, the point estimate on the pension loss variable is positive (0.043), but is not significantly different from zero. In contrast, potential labor migrants at HSE1 that lost pension status in households without small children are 4.2 percentage points less likely to be observed as labor migrants at HSE2 than are other potential labor migrants. This difference in the impact of pension loss between current and potential labor migrants is consistent with an asymmetry in the change in the probability that current and potential labor migrants meet their financial constraints when the pension is lost.

<sup>8</sup> We use the presence of children aged 0 to 5 years at HSE1 as an instrument for the presence of children in need of care at HSE2. We believe the initial presence of children is more likely to be uncorrelated with the unobservables driving change in migration status between the waves of the survey than is the presence of children at the second wave.

Among current labor migrants, we find that the presence of young children in the DSA reduces the probability that the migrant is able to maintain his or her labor migrant status upon loss of pension status. Relative to other labor migrants, these individuals are 14 percentage points more likely to lose their labor migrant status upon pension loss, suggesting that the childcare constraint binds for some fraction of these labor migrants, even if the financial constraint is met. These effects are equally large for male and female labor migrants. In results estimated but not shown, the coefficient is  $-0.145$  for women and  $-0.122$  for men.

Among potential labor migrants, we find that while the loss of pension status reduces the probability of being observed as a labor migrant at HSE2, the presence of small children does not interact significantly with pension loss. For these prime-aged household members, the childcare or financial constraint may already bind. To the extent that these individuals were not labor migrants because they could not meet their childcare constraint, the loss of the pension has an insignificant additional impact on the probability of meeting this constraint. If the presence of the pensioner was not allowing the potential migrant to meet the childcare constraint, the withdrawal of the pensioner should not be expected to change that.

Table 6 also supports the hypothesis that current labor migrants are insensitive to pension gain, while potential migrants are highly sensitive to the arrival of a pension. The  $F$ -test of the joint significance of pension gain variables for current migrants is small and insignificant ( $F = 0.41$ ,  $p$ -value = 0.66), while the  $F$ -test of pension gain variables for potential migrants is large ( $F = 19.51$ ,  $p$ -value = 0.00).

For potential migrants, we find significantly different effects of pension gain on labor migration for men and women. Pension arrival leads to an 11 percentage point increase in labor migration for women, which is significantly larger than the 3 percentage point increase observed for men. However, women in households with small children are observed with a slightly smaller (7 percentage point) increase, relative to other women—a difference not observed for men.

The model is also built on the assumption that credit constraints are a formidable barrier to labor migration. Unfortunately, it is difficult to test this assumption in cross-sectional data. One could measure the association between household asset holdings and the household membership of a labor migrant, for example, to assess the importance of credit constraints. In the cross-section, however, it is not clear how to interpret a positive association between the two. Wealthier households may be less likely to be bound by credit constraints, and the relationship between assets and migration may reflect wealthier households' ability to stake migrants. Alternatively, if migrants send home remittances, households may use them to purchase assets, in which case the direction of causality may well run from migration to household socioeconomic status.

The longitudinal data from the ACDIS allow us to test for the presence of credit constraints in a different way, by interacting pension gain and loss with an indicator for household socioeconomic status. If credit constraints represent a significant barrier, we would expect that the loss of a pensioner would have a larger effect on poorer households' ability to send or sustain migrants. Wealthier households may not have had to rely on pension income to support the working members outside the DSA.

TABLE 7—HOUSEHOLD SOCIOECONOMIC STATUS, PENSION STATUS, AND MIGRATION

	Labor migrants at HSE1	Not labor migrants at HSE1
Household lost pension status HSE2–HSE1	–0.107 (0.042)	–0.028 (0.017)
Household lost pension status HSE2–HSE1 × high SES	0.118 (0.061)	–0.022 (0.025)
Household gained pension status HSE2–HSE1	0.005 (0.033)	0.089 (0.014)
Household gained pension status HSE2–HSE1 × high SES	0.038 (0.051)	–0.053 (0.023)
<i>F</i> -test: joint significance of Pension loss variables ( <i>p</i> -value)	3.25 (0.039)	4.90 (0.007)
<i>F</i> -test: joint significance of Pension gain variables ( <i>p</i> -value)	0.59 (0.554)	22.29 (0.000)
Observations	5,238	19,451

*Notes:* Table 7 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 greater than 17 years old at HSE1 and less than 51 years old at HSE2.

Table 7 provides a test of household financial constraints by adding interaction terms to the labor migration regressions presented in Table 5. Here, indicators that the household gained or lost a pension are interacted with a marker that the household was of relatively high socioeconomic status (SES). We use, as our measure of household SES, an indicator that the household owned more than five assets at HSE1. Using this definition, just over one-third of prime-aged individuals in our sample are categorized as being from a high SES household. (The results are robust to different definitions of high SES.) The main effect of our SES measure will be absorbed in the individuals' fixed effects.

For current labor migrants, we find that having come from a household of higher SES protects labor migration status upon the loss of a pension. For labor migrants at HSE1, those who came from lower SES households and lost pension status were 11 percentage points less likely to remain as labor migrants than were other labor migrants. However, labor migrants from higher SES households who lost pension status face no greater risk of losing their labor migrant status than do any other labor migrants. The effect for migrants from high SES households that lost pension status is small ( $-0.107 + 0.118 = 0.011$ ) and not significantly different from zero. Consistent with the model discussed above, we find no significant effects of a household gaining pension status on the probability of current labor migrants maintaining their migrant status, regardless of their DSA household's SES.

Results for potential migrants are more mixed. Those living in households that gained pension status between survey waves are significantly more likely to migrate. Consistent with the theory, this effect is significantly larger for individuals residing in lower SES households. Individuals in higher SES households who had not

migrated prior to HSE2 may have faced other constraints—such as childcare constraints. They were less likely to have been held back by a credit constraint. Potential migrants whose households lost pension status between the waves were significantly less likely to be observed as labor migrants at HSE2. However, this effect is not significantly different for individuals from higher and lower SES backgrounds. Overall, the results in Table 7 support the assumption that credit constraints play an important role in sending and sustaining labor migrants.

We can also use ACDIS data to explore whether labor migrants with better jobs are significantly more likely to continue to meet their financial constraint upon pension loss. Once labor migrants are self-supporting, the financial constraint becomes irrelevant for their migration decisions. For this reason, we might expect the loss of a pensioner to have a more muted effect on migration decisions for migrants with better jobs. We do not have information on how much labor migrants earn. However, we do know the migrant's occupation and education. If people in higher status occupations with more education have higher urban wages, then the financial constraint is more likely to be met for this set of migrants.

We examine this in the first two columns of Table 8. Restricting the sample to individuals who were labor migrants at HSE1, we regress change in migration status between the waves on an indicator of pension loss, on an interaction of pension loss with being in a low-status occupation (domestic work or unskilled work), and on an interaction of pension loss with the migrant's own education. We find that individuals in lower-status occupations are 14 percentage points more likely to lose their labor migrant status upon the loss of a pension than are labor migrants in higher status occupations. In addition, we find that better educated migrants are significantly more likely to maintain their status as labor migrants following pension loss than are less-educated migrants.

We can also use the ACDIS data to examine, in households that become pension eligible between the waves, which potential migrants at HSE1 become labor migrants at HSE2. A potential migrant's level of education should be predictive of whether it will be profitable to send this individual to the city. Moreover, within households, the relative levels of education observed for different adults should effect which household members are sent, upon the arrival of the pension, if the household cannot afford to stake all potential migrants.

We examine the impact of both absolute and relative education on migration status in the last four columns of Table 8, where we restrict our sample to individuals who were not labor migrants at HSE1. In column 3 of Table 8, we add an interaction between gain of pension status and years of completed education. We find that individuals with greater levels of education are significantly more likely to become labor migrants, upon the arrival of the pension. We also want to test whether relative education predicts migrant status within household. To do so in a meaningful way, we need to restrict our sample to individuals in households with more than one prime-aged adult resident at HSE1. Column 4 suggests that this sample restriction has little effect on results. Although taken individually, our pension gain variables are no longer significant, an *F*-test reveals that these variables remain jointly, highly significant (*F*-test = 11.5, *p*-value = 0.000). In column 5, we interact pension gain with individuals' deviations from mean household education, calculated using prime-aged resident members at HSE1. We find that, within household, potential migrants who

TABLE 8—MIGRANT CHARACTERISTICS AND CHANGE IN MIGRANT STATUS

	Dependent variable: Change in labor migrant status HSE2 – HSE1					
	Labor migrants at HSE1		Not labor migrants at HSE1			
	All	All	All	More than one adult resident at HSE1		
Household lost pension status HSE2–HSE1	-0.206 (0.093)	-0.219 (0.093)	—	—	—	—
Household lost pension status × own-education	0.018 (0.009)	0.014 (0.009)	—	—	—	—
Household lost pension status × Low status occupation HSE1	-0.143 (0.080)	-0.136 (0.080)	—	—	—	—
Household lost pension status × high SES household HSE1	—	0.099 (0.068)	—	—	—	—
Household gained pension status HSE2–HSE1	—	—	0.020 (0.028)	0.025 (0.033)	0.060 (0.013)	0.053 (0.043)
Household gained pension status × own-education	—	—	0.006 (0.003)	0.004 (0.003)	—	0.003 (0.005)
Household gained pension status × (own minus household mean educ)	—	—	—	—	0.009 (0.005)	0.006 (0.007)
Household gained pension status × high SES household HSE1	—	—	—	—	—	-0.048 (0.027)
F-test: Pension loss variables (p-value)	4.45 (0.004)	3.87 (0.004)	—	—	—	—
F-test: Pension gain variables (p-value)	—	—	21.27 (0.000)	11.51 (0.000)	12.34 (0.000)	6.92 (0.000)
Observations	4,879	4,879	18,484	13,893	13,893	13,893

Notes: Table 8 reports the coefficients and standard errors from OLS regressions of change in labor migrant status (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 greater than 17 years old at HSE1 and less than 51 years old at HSE2. The sample in columns 4–6 is restricted to members resident in the DSA at HSE1 who live with at least one other resident adult at HSE1.

are relatively better educated are significantly more likely to be chosen to migrate at HSE2. When both absolute and relative education variables are entered jointly neither is significant. However, taken jointly, the pension gain variables remain significantly different from zero ( $F$ -test = 6.92,  $p$ -value = 0.000). While these results suggest that education is a determinant of which potential migrants are sent, we would need additional data to draw conclusions about the importance of individuals’ absolute versus relative (within household) education.

The data available in ACDIS allow us to separate the effects of getting a pension from the effects of living with an older adult. In regressions run, but not reported, we find that the presence of an older adult too young for the pension, but within five-years of age eligibility, has no significant effect on labor migration for either men or women. In addition, we ran regressions in which we included the arrival of a resident member who was within five years of pension age eligibility between HSE1 and HSE2, and this indicator interacted with the presence at HSE1 of children aged 0 to 5 years in the household. Neither the arrival of a member just shy of pension age nor the interaction between this and the presence of small children were significant predictors of change in labor migration status between the waves for either men or

women for current labor migrants or potential labor migrants. These results suggest that changes in labor migration status do not take place in anticipation of pension receipt, which is what we would expect if credit constraints bind, and if non-pensioners are less available to care for young children.

In summary, we find evidence of financial constraints and childcare constraints limiting labor migration. Both pension status—relaxing the financial constraint—and the presence of pensioners—relaxing the childcare constraint—affect the ability of households to send and maintain labor migrants.

#### *A. Are All Pensioners Created Equal?*

Almost 80 percent of cases in which pension status is lost occur because a pensioner dies. An alternative explanation for the impact of pension loss on labor migration status is that the death of a pensioner induces migrants to return home.

We investigate whether death is the driving force behind our results on pension loss, by examining separately the three main ways in which a pensioner leaves a household in the DSA. In 77 percent of cases, it is because a pensioner dies. In 11 percent of cases, it is because the pensioner has left the household and the DSA. And in 9 percent of the cases, it is because the pensioner has left the household but continues to reside in the DSA. Together these account for 97 percent of cases in which pension status was lost. Table 9 restricts attention to these three types of pension loss and presents results on the impact of change in pension status by category on change in prime-aged adult labor migration. For both women and men, we find that pension loss through death of the pensioner, and pension loss through the pensioner leaving the surveillance site, have the same negative and significant effect on labor migration status. Both lead to a reduction in the probability of labor migration at HSE2 of 6 percentage points. In results run, but not shown, we find this to be true for current labor migrants estimated separately ( $F$ -tests for these are presented in panel 2) and for potential labor migrants (panel 3).

The fact that the death of a pensioner is statistically indistinguishable from that of the out migration of the pensioner suggests that the results we have found are not due to a death, but due instead to the absence of a pensioner and his or her pension. That said, it does not help us to distinguish between the physical presence of a pensioner and that of the pension. It is possible that a pensioner still in the DSA (but no longer resident in the household) could care for children and could continue to contribute to the support of labor migrants. We are, however, able to distinguish between the death of an older adult who dies before reaching pension age and the loss of a pensioner. We find the death of a resident household member who died within five years of age eligibility for the pension between waves generally has no significant effect on labor migration status for either current migrants or potential migrants (results not shown).<sup>9</sup> This is consistent with a model in which it is the pension, and not simply the presence of an older adult, per se, that determines labor migration.

<sup>9</sup> The one exception is that men who are potential migrants at HSE1 are less likely to migrate if someone within five years of pension receipt dies in the DSA household. This result, however, is not robust to the window chosen for “near pension deaths.”

TABLE 9—CHANGE IN LABOR MIGRATION STATUS BY TYPE OF PENSION LOSS

	Dependent variable: Change in labor migrant status HSE2–HSE1		
	All members	Women	Men
Pension loss through death of pensioner	–0.065 (0.015)	–0.078 (0.020)	–0.053 (0.023)
Pension loss through external individual out migration of pensioner	–0.061 (0.039)	–0.056 (0.050)	–0.065 (0.060)
Pension loss through internal individual migration of pensioner	0.068 (0.042)	0.065 (0.057)	0.067 (0.064)
Pension gain	0.045 (0.012)	0.053 (0.015)	0.036 (0.018)
<i>F</i> -test: death = external out-migration ( <i>p</i> -value)	0.01 (0.9121)	0.17 (0.6845)	0.03 (0.8362)
Observations	24,873	13,162	11,711
	Change in labor migrant status for those who were labor migrants at HSE1		
	All members	Women	Men
<i>F</i> -test: death = external out-migration ( <i>p</i> -value)	0.72 (0.3967)	0.09 (0.7622)	2.04 (0.1536)
Observations	5,275	2,031	3,244
	Change in labor migrant status for those who were not labor migrants at HSE1		
	All members	Women	Men
<i>F</i> -test: death = external out-migration ( <i>p</i> -value)	1.82 (0.1769)	0.62 (0.4309)	1.34 (0.2473)
Observations	19,598	11,131	8,467

*Notes:* Table 9 reports the coefficients and standard errors from OLS regressions of change in labor migrant status (HSE2–HSE1) on pension loss by cause. 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 greater than age 17 at HSE1 and less than age 51 at HSE2.

### B. Relatedness

We can also examine whether the degree of relatedness between pension recipients and prime-aged household members affects prime-aged members' labor migrant status, as suggested by kin-altruism models. Samuel Bowles and Posel (2005), for example, find relatedness to be a significant predictor of migrant remittances in South Africa. Although we do not have data on remittances, and have limited information on the degree of relatedness between household members, we can identify whether pension recipients are the father or mother of prime-aged household members. Of the 1,364 prime-aged members whose households gained pension status between HSE1 and HSE2, two-thirds (939) were a son or daughter of the household member who became a pensioner.

We can test whether pension gain differentially affects the children of pensioners, relative to other prime-aged adults in the household, by adding interaction terms to our labor migrant regressions. Specifically, we add interaction terms for pension loss

and gain interacted with an indicator that the pensioner is the prime-aged member's parent. We find, for both men and women, that pension gain has a larger and more significant effect on the probability of potential migrants becoming labor migrants when the person newly receiving the pension is a parent. Relative to other types of members, when parents become pensioners this leads to a 7 percentage point increase in the probability of becoming a labor migrant. (Results available upon request.)

We found no additional effects of pension loss or gain by a parent on the behavior of those adults who were labor migrants at HSE1. However, given the asymmetries between potential and current migrants discussed above, we would not expect to find effects here. Even if parents are more important than other household members in staking current migrants until these migrants become established, once the migrants are self-supporting, the loss of a parent pensioner may have little financial effect on this group.<sup>10</sup>

### *C. Male and Female Pensioners: Who Pools?*

We can also use the ACDIS data to examine whether male and female pensioners are equally likely to stake migrants. Related work has suggested that pension money in the hands of women may have a greater impact on household outcomes than pension money in the hands of men (Esther Duflo 2003; Posel, Fairburn and Lund 2006). Table 10 presents evidence on the difference between female and male pensioners. For both prime-aged men and women, the loss of a female pensioner has a significant negative effect on the probability of becoming a labor migrant between waves of the survey, while the loss of a male pensioner has no significant effect on either. The gain of a female pensioner between waves is associated with greater labor migration for both men and women. However, labor migration for men is also closely linked with the receipt of pension income for an older male in the household. We have tested whether the differential effect of male pensioners on the labor migration status of potential migrants is due to the fact that households that gain a male pensioner are significantly more likely to also house a female pensioner. We find no evidence for this explanation for the difference in the impact of male and female pensioners. It appears that the presence of a woman pensioner promotes labor migration for both men and women, consistent with female pensioners pooling their income with prime-aged members of both sexes, and that the presence of a male pensioner promotes labor migration, but for prime-aged men only.

### *D. Timing of Pension Gain*

We are interested in whether gain of pension status has an immediate effect on labor migration, or only appears to work with a lag. To investigate this, we created an indicator for pension recipients who had only been pension-eligible for two years

<sup>10</sup> It is possible that as parents and other older adults in the household become frail, labor migrants might be called back to the DSA to care for them. However, we find no evidence for this in our data. In pension households, both male and female prime-aged members were significantly more likely to be labor migrants at HSE2 the *older* were the pensioners in their households. (Results available upon request.)

TABLE 10—THE IMPACT OF A GAIN OR LOSS OF MALE AND FEMALE PENSIONERS ON LABOR MIGRATION

	Labor migrants at HSE1		Not labor migrants at HSE1	
	Women	Men	Women	Men
Household lost female pensioner HSE2–HSE1	–0.050 (0.055)	–0.041 (0.042)	–0.032 (0.016)	–0.049 (0.022)
Household lost male pensioner HSE2–HSE1	–0.047 (0.061)	–0.003 (0.043)	–0.009 (0.020)	0.008 (0.026)
Household gained female pensioner HSE2–HSE1	–0.014 (0.042)	0.029 (0.033)	0.087 (0.014)	0.039 (0.019)
Household gained male pensioner HSE2–HSE1	0.057 (0.066)	0.052 (0.045)	0.032 (0.020)	0.093 (0.028)
Observations	2,033	3,250	11,150	8,488

*Notes:* Table 10 reports the coefficients and standard errors from OLS regressions of change in the labor migration status. Also included in each regression are variables for 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 greater than age 17 at HSE1 and less than 51 at HSE2.

or less. In regressions run, but not reported, this indicator variable is insignificant when a control for pension status of any length is included. From this, we conclude that migration status responds quickly to change in household pension status.

## VI. Conclusion

Much of the discussion on the behavioral changes induced by government cash transfers centers on the effects such transfers may have on both the recipients of these transfers and the household members who live with them. (Excellent reviews of the literature are provided by Anthony B. Atkinson and John Micklewright 1991, and Robert Moffitt 1992.) Our results, which highlight the importance of including non-resident household members in models of economic behavior, suggest some refocus is warranted. In the South African case, the reach of the old-age pension is well beyond the grounds of the pensioner's homestead.

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