Labor Force Withdrawal
of the Elderly in South Africa

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Introduction

The elderly in South Africa face a complex set of challenges. South Africans over age 50 spent most of their lives under apartheid. Levels of inequality in education between races and within races are far greater among these older cohorts than they are for younger South Africans. Elderly black South Africans lived their most productive years under the restrictions on employment, residency, and other opportunities that apartheid imposed. As they now enter retirement they face new pressures caused by the impact of HIV/AIDS and high unemployment on the next generation. At the same time, South Africa's elderly have access to an old age pension system that is among the most generous in the developing world. The old age pension helps lift many older South Africans out of the most extreme forms of poverty, and puts many of them in a position to support their children and grandchildren.

Decisions of the elderly about work and retirement are made in this complex set of circumstances. Older workers face an increasingly competitive labor market characterized by high unemployment, with limited opportunities for those with poor education and training. They often live in large extended households in which their own resources may be an important source of economic support. The pension provides such a source without necessarily competing with work.

The state old age pension program has spawned a considerable body of research. This research is reviewed in the next section of the paper. The review shows that state old age pension is the key plank of South Africa's social safety net, that these pensions are well targeted at the poor and, because of the large number of three-generation and skip-generation households in South Africa, this includes many poor children. In addition, it seems that many of the unemployed survive through their links to related pensioners. More recent research has begun to explore the impact of these pensions on labor participation behavior.

Given all of the above, the dearth of research on the elderly themselves is surprising. We know very little about the circumstances of the elderly, the health of the elderly and how they cope with the pressures placed on them by the importance of their pension income to their extended families. Two recent studies have begun to address these issues (Møller and Devey, 2003; Møller and Ferreira, 2003). The first of these studies compares older and younger households based on data from 1995 and 1998 national surveys, defining older households as those that include at least one member aged 60 or older. The second study is based on a 2002 survey of the living conditions, financial and health situations of 1,111 older non-white households in Cape Town and the rural Eastern Cape. Here, older was defined as households containing 1 person aged 55 or older.

The first study confirms that older households are larger and include larger numbers of dependents and unemployed members than younger households. In both 1995 and 1998 roughly half of older black households included three or more generations. Such households tend to be concentrated in rural areas. The Møller and Ferreira (2003) study shows that among black older households, the percentage of household members who were under 25 years of age was 58% in rural areas and 51% in urban areas. In contrast, less than a quarter of these household members were actually aged 55 or older. Less than 10 percent of older people lived alone.

Møller and Devey (2003) show that many older black households are poor. However, access to state old age pensions strongly decreases the probability that such household's fall into the lowest expenditure quintile. Pensioner households have better access to services and express significantly higher levels of satisfaction with their living conditions compared to non-pensioner older households.

Møller and Ferreira (2003) confirm the dominance of the state old age pension as the primary income source in older households. They find that pension income is often the sole

income in these households, especially in rural areas. They describe three elements of a "gradient of disadvantage" that makes older rural households worse off than older urban households. First, household well-being as measured by income or expenditure per capita is lower in the rural households. Second, the drain on the resources of the rural elderly through expenditures on other members of the household is higher in rural areas. Third, urban households are far more successful at accessing other government grants, such as the child support grants and disability grants for which the members of their household may be eligible. All in all this leads to a situation in which the elderly in urban areas are better placed to use their pensions for their own support.

Aside from work on the old age pension, the magnitude of South Africa's unemployment problem has spawned a growing body of work on labor force participation in South Africa. This work shows that South African participation rates are low by international standards; especially for women (Winter, 1998). However, participation rates, and female participation rates in particular, rose sharply in the 1990s despite the fact that many of these new participants did not move into employment but joined the ranks of the unemployed (Casale and Posel, 2002 and Klasen and Woolard, 2000). Research by Mlatsheni and Leibbrandt (2001) and Leibbrandt and Bhorat (2001) highlights the importance of education as a factor affecting female participation rates.

However, this literature on participation has given very little specific attention to the labor market behavior of the elderly. Given the considerable focus on the impact of the old age pension on work activity of non-elderly, it is surprising that the labor force behavior of those who actually receive these pensions has received so little attention. The fact that it is the elderly who are facing a retirement decision as part of this participation behavior would seem to make their labor force behavior especially interesting.

This paper provides a broad overview of the labor force activity of older workers in South Africa. We begin the paper with a discussion of important features of the social and economic environment that provide a background for the analysis. Drawing on excellent microdata, we then analyze the age profile of participation, focusing in particular on the possible effects of the old age pension on retirement. We look at several important variables that may affect the economic activity of the elderly, including marital status, living arrangements, the pension system, and education. We estimate probit regressions in order to look at key determinants of labor force activity.

Social and Economic Background

A number of features of South African society and economy are important to keep in mind in analyzing the economic activity of the elderly. In this section of the paper we discuss some of these important features, with particular focus on the old age pension system and patterns of household structure.

South Africa's Old Age Pension

No analysis of the elderly in South Africa would be complete without a discussion of the country's old age pensions system. Social assistance in South Africa consists of three main programs: pensions for the elderly, grants for the disabled and grants for the support of poor children. Old age and disability pensions are set at generous levels. The 2005 level is R780 per month, or about $120. Relative to this amount, the child support grant is set at a meager R180 or about $28 per month and are only payable for children up to and including the age of fourteen. All three grants are supposedly means-tested, but in practice the means test is rarely administered for applicants who appear poor. A total of between four and five million people (or 10% of the total population) receive one or other grant. South Africa's public welfare system is exceptional among developing countries, and is a major pillar in South Africa's

highly redistributive social policies (Van der Berg, 2001; Van der Berg and Bredenkamp, 2002; Seekings, 2002).

The state old age pension system is the most unique and important aspect of the South Africa social assistance system. It has an interesting history as it evolved from a grant that was paid exclusively to white South Africans to one that was paid to to all South Africans regardless of racial categorization. The grant was first introduced in 1928 as a form of income support for poor elderly whites (Sagner, 2000). Only in 1944 did the pre-apartheid state extend the social pension to include members of other race groups, and even then, pension payment size was legally determined by race at a ratio of 4:2:1 respectively for Whites relative to Indians/Coloreds relative to Africans. From the late 1970s the racial gap in pensions was significantly reduced through the allocation of large additional funds to this scheme by the apartheid state. During the 1980s, the size of pensions more than doubled for Africans while it declined by 40 percent (in real terms) for Whites (Ferreira, 1999). By 1985, White pensions were only 2.5 times higher than those of Blacks and 1.5 times higher than those for those categorized as Coloreds and Indians (Schlemmer and Moller, 1997). Take-up rates, particularly among elderly Black South Africans, increased markedly during this time. The Social Assistance Act of 1992 provided steps to deracialize pensions and achieve pension parity, which was finally achieved in 1993, just one year prior to the first democratic elections. By 1993, the take-up rate among eligible African men and women stood at 80 percent.

Case and Deaton (1998) provide a comprehensive analysis of the workings of the South African pension system. The key features of the system are that it is paid to females aged 60 and over and males aged 65 and over, with a means test that allows 80% of age-eligible Africans to receive the pension. Most receive the maximum benefit. The benefit was about 2.5 times median per capita income by 2000. The 2005 pension of 780 per month can be

compared to the minimum wage for domestic workers, which was set at R754 in rural areas in 2005.

The means test for the pension in 2004, if enforced, would have applied at annual income levels of about R18,000 for single individuals and about R34,000 for married couples. This implies that many elderly could receive the full value of the pension while continuing to work full time, even with the means test (below we will show that some elderly do in fact work while receiving the pension, although the percentages are low). Given the weak enforcement of the means test, the receipt of the pension does not have a direct negative incentive on work for many low-income elderly. The impact of the pension on labor supply is thus primarily an income effect.

Considerable research has been done on the impact of the old age pension. Duflo (2003) finds a positive effect of the pension on health outcomes of young girls in the household. Jensen (2004) finds that the pension tends to "crowd out" private transfers from family members living away from home. Looking at the impact of the pension on labor supply, Bertrand, Mullainathan, and Miller (2003) find that the pension tends to reduce the labor supply of working-age adults. Posel, Fairburn, and Lund (2004) find a more complex effect of the pension on labor supply, with the pension increasing the probability that prime-age adults migrate for work. Edmonds (2005) finds a negative effect of the pension on work activity of children. Given the attention focused on the pension's impact on the labor supply and other outcomes of prime-age adults and children, it is surprising that little attention has been given to the pension's impact on the labor supply of the elderly themselves. This is an issue we analyze in detail below.

Household Structure

As noted above, another dimension of South African society that is important in analyzing the economic activity of the elderly is the complex extended household structure

that is common among African households. As noted by Case and Deaton (1998), one of the reasons the pension system is so effective in reducing poverty in South Africa is that the elderly recipients of the pension often live in households with young children. While these complex extended household patterns have long historical roots in South Africa, they have taken on new importance as HIV/AIDS and high unemployment have weakened the ability of prime age adults to support their families. Edmonds, Mammen and Miller (2005) remind us as to how unusual this situation is when they note that the standard literature on old age pensions focuses on how pensions enable the elderly to maintain their independence. They conclude that the arrival of a state old age pension into a black South African household leads to the departure of prime age working women and the arrival of children under 5 years of age and females of child-bearing age. They see this behavior as evidence of the household making use of the pension to reshape itself according to the comparative advantage for work within and outside the household. In line with this behaviour we would expect that the labor supply decisions of the elderly are therefore often being made simultaneously with decisions about living arrangements. We will look at the links between household structure and the labor force activity of the elderly in some detail. While we will not identify the causal links between household structure and the work activity of the elderly, we will see below that there appear to be important links between these variables.

Data

We use two main data sets for our analysis, each with strengths and weaknesses. We use the 10% sample of the 2001 census for many of our estimates, taking advantage of the large sample size. With roughly 4 million total observations, the census gives us thousands of observations at single years of age, even at ages from 60 to 70. For example, the number of individuals in the 70-74 age group in the census sample is over 12,800 African males, 25,000 African females, 4,500 white males, and 6,000 white females. The census provides standard

information on employment status, along with information on schooling, household structure, and marital status. For comparative purposes we also use the 10% sample of the 1996 census.

The other important data set used in our analysis is the South Africa Labour Force Survey (LFS), a nationally representative household survey of about 30,000 households collected by Statistics South Africa. We use the September 2000 LFS for some of our analysis because it has greater detail than the census for variables such as work activity and pension receipt. The drawback of the LFS is the smaller sample size. For example, in the 50-79 age group we have roughly 4,000 African males and 6,000 African females, making it difficult to look at fine age detail and making it almost impossible to look at any population group other than Africans. For certain parts our analysis we pool the LFS data for September 2000 and September 2001, giving us a larger sample size. Although the LFS is designed with a rotating panel structure, a new sample was introduced in September 2001. Therefore, there is no overlap in the two waves that we pool. We also merge the September LFS with the 2000 Income and Expenditure Survey (IES), allowing us to look at the impact of pension income on total household income.

Age Profiles of Labor Force Participation

Figure 1 shows the age profile of labor force participation and employment for men and women aged 45-75 who identify themselves as Black/African in the 1996 and 2001 census.[1] The ages of eligibility for the state old age pension (65 for men and 60 for women) are indicated on the figure for reference. The measure of labor force participation used in Figure 1 follows standard international definitions, counting labor force participants as those who were either working, on vacation or sick leave from work, or looking for work. The

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[1] The census asked the following question for each household member: "How would (the person) describe him/herself in terms of population group?" The possible responses and proportions giving each response were "Black/African" (79%), "Coloured" (9%), "Indian or Asian" (3%), and "White" (9%). We will refer to the Black/African group, which is our main focus, as African.

"Working" series includes those who were working and those who were on vacation or sick leave during the week before the census. Work is defined broadly, including any work for pay, profit, or family gain.[2] One of the stark features of Figure 1 is the large gap between the "In labor force" and "Working" series, confirming the high rates of unemployment for both men and women in South Africa. The unemployment rate at age 50 in 2001, for example, is 34% for men and 40% for women.[3]

Figure 1 shows a relatively rapid rate of withdrawal from the labor force for both males and females after age 50. In the 2001 census male participation rates fall from around 75% at age 50 to 47% at age 60 and 10% at age 70. Participation rates for females in 2001 fall from around 55% at age 55 to about 20% at age 60 and below 5% at age 70. The percentage who are actually working is well below the participation rate for both men and women around age 50, but, like the participation rate, it falls steadily with age. The percentage of men working in 2001 is about 50% at age 50, falls to 30% at age 60, and is below 10% at age 70. Put another way, if we could interpret this cross-sectional relationship as the life cycle work profile of a cohort of men, it would imply that over half of the men who were working at age 50 stopped working several years before they reached the age of eligibility for the state old-age pension.

Comparisons between 1996 and 2001 census data are interesting for a number of reasons. First, it helps to disentangle age and cohort effects that would be impossible to separate in a single cross-section. In this paper we will often interpret the age patterns in labor force

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[2] The wording of the census questionnaire is the following: "Does (the person) work (for pay, profit, or family gain)? Answer yes for formal work for a salary or wage. Also answer yes for informal work such as making things for sale or selling things or rendering a service. Also answer yes for work on a farm or the land, whether for a wage or as part of the household's farming activities. Otherwise answer no."

[3] The standard definition of the unemployment rate is the number of unemployed (actively searching) divided by the number in the labor force. In Figure 1 this is the difference between the "In labor force" and "Working" values divided by the "In labor force" value. For men age 50 this is 0.25/0.74=0.34.

activity as indicating changes over the life cycle. But it is important to remember that the age patterns we observe may be affected by differences in the behavior of different cohorts. For example, as we will document below, younger cohorts are considerably better educated than older cohorts, especially among Africans. This may lead to differences in life cycle labor force behavior that will show up in the age profile of participation at any given point in time. By looking at two censuses five-years apart we can be clearer about age and cohort effects, and more certain about whether we are seeing life cycle labor force behavior. The age profiles from the 1996 census shown in Figure 1 suggest that the basic shape of the age profile in work and participation did not change much between 1996 and 2001, although both work and participation rates for males dropped at all ages. Looking at the figure for females, the 1996 and 2001 lines are almost indistinguishable for both labor force participation and work.

Figure 1 shows that there are sharp drop-offs in labor force participation and work for both males and females around the age of eligibility for the old-age pension (age 60 for women and age 65 for men). These declines around the pension age are larger in 2001 than they are in 1996. The decline in labor force participation rate for men between age 64 and age 66 is 13.6 percentage points in 1996 and 16.9 percentage points in 2001. This implies that 54.5% of those still in the labor force at age 64 have left the labor force by age 66 in 2001. Exit from work is at a similar rate, with the percentage of men working at age 66 being roughly half of the percentage working at age 64. The figure for women shows a similar discontinuity around the pension age in rates of labor force participation and employment. The decline in labor force participation rates for women between age 59 and 61 is 18.4 percentage points, or 57% of the age 59 rate. The decline in the percentage working is 10.3 percentage points, or 52% of the age 59 rate.

Appendix Figure A shows participation rates for all four of the major population groups. As this figure shows, there are relatively small racial differences in participation rates for males at all ages. Participation rates are somewhat lower for African and Coloured males from age 45 to 55, with similar rates of decline in participation for all groups from age 55 to 65. Participation rates for women are considerably lower at all ages, falling from around 60% at age 45 to 20% at age 60 and under 5% at age 70. Racial differences in participation rates are larger for females than for males, with Indian women having the lowest rates. Participation rates for African and white women are almost identical up to age 59, with participation of African women showing a larger drop in participation at age 60. Participation rates above age 65 are between 10% and 20% for men, rates that are much lower than the 65% participation rate reported for southern Africa in a cross-national analysis of 1980 data (Clark and Anker, 1993). Participation rates of older men in South Africa are somewhat higher than those for most European countries, however. As shown in the cross-national study of retirement in OECD countries coordinated by the National Bureau of Economic Research (NBER), participation rates for men aged 60-64 were below 20% in France, Belgium, and the Netherlands around 1995 (Gruber and Wise, 1999). We will discuss comparisons to OECD countries in more detail below.

Components of Labor Force Activity

Figure 2 shows the 2001 distribution of labor force activity in more detail for African males, white males, African females, and white females. Four categories of activity are shown. The two components of labor force participation –working and unemployed – are shown separately. In the 2001 census respondents were asked to give the reason for not working for all those who were not working in the previous seven days. Two of these categories are included in Figure 2: the percentage reported as being a "pensioner or retired

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person/too old to work" and the percentage reported as "unable to work due to illness or disability." Additional possible reasons for not working that are not included in Figure 2 include student, housewife/homemaker, and "does not choose to work." Figure 2 once again shows the high rate of unemployment for African males and females, even in what would usually be considered prime working years. Over 20% of both African males and African females age 45-55 reported that they were unemployed and looking for work in 2001. These high rates of unemployed are an important characteristic of the South African labor market that must be kept in mind throughout our analysis.

The percentage of African men and women who are unemployed declines steadily with age, with many of these individuals presumably reclassifying themselves as retired as they get older. The percentage of men who are reported as "pensioner or retired/too old to work" climbs steeply after age 65, reaching about 80% by age 66. Women show an even sharper jump in the percentage reported as being retired around age 60, with the percentage jumping from 30% to 70% between age 59 and age 61. The age profiles for white males and females show steady declines in participation and steady increases in the percentage retired with increasing age, but the changes around age 60 and age 65 are less sharp than the changes for Africans.

The percentage of males and females of either racial group reported as disabled is relatively low, reaching highs of around 10% for African males and females approaching retirement age. It is interesting to compare this to the significantly higher rates of disability reported for many OECD countries in the NBER study (Gruber and Wise, 1999). For example, in the Netherlands, a country with generous disability insurance, well over 20% of men aged 60-64 were reported as being disabled in 1994 (Kapteyn and de Vos, 1999). Disability rates for Africans drop at the retirement ages, as men and women presumably reclassify themselves from disabled to retired.

Further detail on the economic activity of older workers is provided in the Labour Force Survey, which asks a series of separate questions about specific types of economic activity. In addition to providing greater detail than the census, these questions may elicit higher levels of economic activity than the single question used in the census. Table 1 shows detailed breakdowns of work activity for African males and females in five-year age groups using the merged September 2000 and September 2001 LFS. Due to small cell sizes we do not attempt this breakdown for other population groups. Column 2 shows the percentage engaged in work for pay, excluding domestic workers. About 54% of men are in this category in the merged 2000-2001 LFS data. This percentage drops to 41% in the 55-59 age group, then drops sharply to 26% in the 60-64 age group and 11% in the 65-69 age group. Column 3 shows the percentage employed as domestic workers, an occupation that is, not surprisingly, concentrated among women. Combining the first two columns for women, about 37% are engaged in work for pay in the age group 45-49. There is a sharp drop from 29% to under 10% between the 55-59 and 60-64 age groups.

Column 5 in Table 1 shows the percentage reporting that they work on a family plot or farm.[4] This is an activity that is counted as economically active in many surveys, including the LFS and census. While under 4% of men report that they work on a family plot in the 45-49 age group, this rises to about 10% among 65-69 year-olds and remains at about that level through the 75-79 age group. Column 7 in Table 1 shows the percentage working in any of the categories in Columns 2-6. Although the categories in Columns 2-6 are not mutually exclusive, the total percentage working in Column 7 is calculated to eliminate double counting. Comparing the estimates of percentage working from the LFS in Table 1 with the estimates from the census in Figure 2, it appears that the specific questions about work on

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[4] Specifically, the LFS asks whether in the past seven days a person "did any work on his/her own or the family's plot, garden, cattle post or kraal or help in growing produce or in looking after animals for the household."

family plot in the LFS lead to higher estimates of work activity for older workers than the census, even though the census question should theoretically include the same components as those included in Table 1. For example, the total percentage of men working in the 65-69 age group is 25% in the LFS figures in Table 1, while the percentage is under 20% for the census in Figure 2. We suspect that the difference is the result of higher response to the specific question directed at work on a family plot in the LFS.

Hazard Rates for Withdrawal from Labor Force

A useful way of focusing on withdrawal from the labor force is to calculate hazard rates for exit from the labor force. Figure 3 shows hazard rates of leaving the labor force for African and white males and females. These are calculated using the proportions who are economically active (those working and those unemployed by the narrow definition) at each age shown in Figure 1. The hazard rate can be thought of as an estimate of the probability of leaving the labor force at a given age, conditional on being in the labor force in the previous year. It is important to keep in mind that it is being estimated from cross-sectional rather than longitudinal data, however, and therefore does not show the actual retirement experience of individuals. In our data it is simply the percentage decline in the proportion who are economically active between age x and age $x+1$.

Figure 3 shows the annual hazard rate of retirement for African males and females in the 2001 census. For African women the hazard rate has a very sharp peak of about 40% at age 60, the age at which women become eligible for the old age pension. If we estimated this hazard rate for women between age 59 and 61, the rate would be 57%. That is, the labor force participation rate for women at age 61 is 57% smaller than the rate at age 60. The hazard rate for women remains at over 20% at ages 61-63, drops to 10% at age 64, then rises again to a second peak of around 30% at age 65.

For African men the hazard rate for leaving the labor force is below 5% until age 60, reaches 10% to 15% between age 60 and 64, then jumps to over 30% at ages 65 and 66. Calculated between age 64 and age 66 – one year before the pension age to one year after – the probability of retiring, conditional on being in the labor force at age 64, is 55%. As can be seen in Figure 1, these hazard rates would be very similar if estimated for employment rather than labor force participation. The proportion of men working and the proportion of men in the labor force both fall by over 50% between age 64 and 66.

These hazard rates can be compared to the rates estimated in NBER's cross-national comparative study of OECD countries (Gruber and Wise, 1999). One of the striking results in that study is the very high hazard rates of labor force exit at particular ages in many countries. These high hazard rates are typically observed at ages associated with strong incentives to retire due to features of the retirement system. For example, they estimate hazard rates of over 60% at age 60 in France, and hazard rates of almost 70% at age 65 in Spain and the United Kingdom. The South African hazard rates at the age of eligibility for the old age pension are not quite as high as those observed at key pension policy age thresholds in France, Spain or the UK. The South African spikes in retirement at age 60 for women and 65 for men are very high, however, in spite of the fact that the direct incentive to retire (or tax on continued work) associated with South Africa's old age pension is much lower than in the OECD countries. The sharp increases in retirement for both men and women around the age of pension eligibility suggest that South Africa's elderly do adjust their labor market behavior is response to the old age pension.

Comparative Estimates of Unused Productive Capacity

A useful summary measure of the labor force participation rates of older workers is the measure of unused productive capacity used in the Gruber and Wise (1999) NBER study. Figure 4 plots this measure for 11 OECD countries included in the NBER study, along with

two measures for South Africa. The measure is calculated by summing the proportions out of the labor force between age 55 and 65 and dividing by 11. The measure of 60 for France in Figure 4, for example, can be interpreted as meaning that a cohort experiencing the participation rates for France would only work 40% of the potential number of person-years available for work between ages 55 and 65. As emphasized in the Gruber and Wise volume, this measure of unused capacity varies substantially across OECD countries, from a low of 22% in Japan to a high of 67% in Belgium. A major focus of the NBER project is to document a strong positive relationship between this measure of unused capacity and a measure of the implicit tax on working built into each country's pension system.

Above we documented very high unemployment rates for South Africans in this age range. Therefore, in the South African case it is not correct to assume that all retirees would have been productively employed if they had continued their participation in the labor market. This makes the notion of 'unused capacity' more problematic in the South African context than it is in the OECD countries. While we need to bear this caution in mind, it remains a useful comparative exercise to calculate these measures of formal retirement from the labor market in South Africa. Two measures of participation for South Africa are used to compare to the OECD countries. The narrow measure of participation is a standard measure that should be comparable to that used in the OECD countries. It corresponds to the measure used in Figure 1, counting labor force participants as those who report that they are employed or unemployed and looking for work. The broader measure of participation also includes those who report that they would be willing to work, even though they are not actively looking for work. Using either of these measures, South Africa compares favorably to Canada and the United States, two countries on the lower end of unused capacity in the NBER study, with between 38% and 44% of men aged 55-65 out of the labor force.

A second simple measure of labor force withdrawal shown in Figure 4 is the percentage of men who are out of the labor force at age 59. This measure gives a fairly similar picture to that of the unused labor capacity measure. South Africa is once again between Canada and the United States, with less than 40% of men having withdrawn from the labor force by age 59 by either the broad or narrow measures of participation. South Africa would presumably fare worse in these comparisons if we used the proportion working rather the proportion in the labor force. The high unemployment rates shown in Figure 2 imply that the percentage of unused capacity between age 55 and 65 would be much higher if the unemployed were included in unused capacity. We do not attempt to address this issue here, in part because many OECD countries also have fairly high unemployment rates, and in part because we want to maintain comparability with the estimates in the Gruber and Wise study. While any estimate of unused capacity will have limitations, we present these comparisons here simply to demonstrate that the age profile of withdrawal from the labor force observed in South Africa is not unusual in its shape or in the level of participation observed in the 55-65 age group.

Determinants of Elderly Labor Supply

We now look at some of the important variables that are likely to be related to the economic activity of the elderly. These include household structure, marital status, public and private pensions, and education. After discussing these variables in isolation, we will estimate probit regressions to estimate the relationship between these variables and work activity of the elderly. It is important to keep in mind that a number of these variables may be endogenous outcomes of joint decisions about living arrangements and residential location. The point of our analysis is not necessarily to identify causal determinants of elderly labor

supply, but to identify the important patterns that are associated with the economic activity of elderly South Africans.

Household Structure and Marital Status

One of the important differences between the elderly in South African and the elderly living in the United States or Europe is that South Africa's elderly often live in large extended households. Table 2 presents details on household living arrangements and marital status for African and white males and females using the 2001 census. The table documents large differences in living arrangements for Africans and whites. African women age 60-64, for example, live in households with 5.5 household members, compared to 2.6 household members for white women the same age. Especially striking is the number of children living with elderly Africans. African women age 60-64 have an average of 2.3 co-resident household members under age 18, compared to an average of 0.25 0-18 year-olds living with white women age 60-64. This tendency to live in extended households is further demonstrated in the proportions living alone or with only a spouse. For African women the percentage living alone stays at around 6-7% in all age groups from age 30-34 to 70-74. White women, by contrast, show the kinds of large increases in the probability of living alone that are observed in the United States. The percentage of white women living alone stays around 5% or less until the age group 50-54, then rises steadily with age, reaching over 30% for the 70-74 age group.

The last three columns of Table 2 show the distribution of marital status. Marriage is defined broadly, including any kind of formal or informal cohabiting partnership. African males and females are less likely to be married than whites at all ages. The combined effect of higher male mortality and the age gap between husbands and wives is evident in the proportions married and widowed at older ages. Males of both races who are still alive in the older age groups are very likely to be married. Only about 14% of African men and 10% of

white men age 70-74 are widowed, while 55% of African women and 45% of white women age 70-74 are widowed.

Looking at age groups around the age when many men and women leave the labor market, Table 2 indicates that the great majority of men still have living partners at these ages. About 80% of African men and 85% of white men are still married in the 60-64 and 60-65 age groups. The situation for women is considerably different. Only 45% of African women are married at age 60-64, with 36% widowed and 5% divorced or separated (the remainder were never married). Among white women aged 60-64, 67% are married, 20% are widowed, and 9% divorced or separated.

Public and Private Pensions

As noted above, South Africa's state old age pension program plays an important role in the lives of elderly South Africans. Figure 5 shows the percentage of African and white males and females who report that they were receiving the state old age pension in the September 2000 LFS. The top panel shows the high prevalence of the pension among elderly Africans, with over 80% of males and females aged 70 and above receiving the pension. The age eligibility rules appear to be fairly strictly enforced for females, with sharp increases in the percentage receiving the pension at ages 60 and 61. Something over 5% of females in the 55-59 age group report receiving the pension, in spite of not having reached the official age of eligibility of 60. Possible explanations for these anomalies, as noted by Case and Deaton (1998), are age misreporting in the census or exercise of local discretion in eligibility criteria. The percentage of African women receiving the pension increases to 40% at age 60 and 70% at age 61, rising to about 90% from age 66 and higher. An even larger discrepancy between the technical age eligibility rules and the report of pension receipt is observed for African males. About 15% of men are reported as receiving the pension between the ages of 60 and 64, in spite of not having reached the official age of eligibility of 65. The proportion of men

receiving the pension jumps to 50% at age 65, then continues rising until it reaches a peak of 90% at age 75.

The bottom panel of Figure 5 shows the percentage of whites receiving the state old-age pension. These percentages are much smaller than those for Africans, although they are not inconsequential. Small cell sizes make these estimates at single years of age for whites somewhat erratic, but about 30% of women and 25% of men report receiving the pension above age 64.

Figure 6 documents the importance of pensions in the economic situation of African households. The figure shows the proportion of total household income attributable to the old age pension for individuals at every age from 50 to 80. It is derived by merging the September 2000 LFS with income data for the same households from the October 2000 Income and Expenditure Survey. The pension income of all household members is included in the calculation. The figure shows that pension income accounts for more than 50% of household income for both men and women beginning around age 70. There is a sharp increase for women beginning at age 60, the age at which those women themselves begin receiving the pension. Similarly, we see a sharp increase in the proportion of household income attributable to pension income for men beginning at age 65, the age at which the men begin receiving the pension. Recalling from Figure 5 that at least 10% of African men and women do not receive the pension, the levels in Figure 6 suggest that pension income accounts for an even higher fraction of household income in those households that do receive the pension.

Figure 7 shows the percentage of African and white males and females receiving employer-provided pensions. The top panel shows that employer-provided pensions are very uncommon for Africans, with fewer than 10% of men and 5% of women receiving them at most ages. The bottom panel shows that private pensions are much more important for

whites. The percentage of white men receiving private pensions rises from around 10% at age

54 to well over 50% above age 64. The percentage of women receiving private pensions

(presumably in the form of spouse benefits in many cases) is also high, reaching levels of

around 40% above age 65. The most pronounced age spike in receipt of private pensions for

white men occurs at age 64, where there is an increase from about 20% to 50% receiving

pensions.

An important features of the South African old age pension system is that receiving the

pension is not necessarily incompatible with working. This is true both because the means

test does not preclude work and because the rules of the system may be somewhat flexibly

applied. Table 3 analyzes the extent to which African individuals work and receive the

pension at the same time, as reported in the September 2000 LFS. Two definitions of work

are used in Table 3. One is a broad definition that includes the family plot category used in

Column 5 of Table 1. The second is a narrower definition that excludes those working only

on a family plot. Looking at males aged 65-69, a group in which all men have reached

pension age, Table 3 shows that the employment rate among men who are not receiving the

pension is 47% by the broad definition and 41% by the narrower definition. The employment

rate among 65-69 year-old men who *are* receiving the pension is considerably lower, 22% by

the broad measure and 7% by the narrow measure. At older ages almost 20% of men

receiving pensions are reported as working by the broad measure, but these men are almost all

working only on a family plot. A similar result is observed for women. Although 21% of

women receiving the pension in the 60-64 age group are working by the broad definition, only

7% are working by the narrow definition. These results suggest that while we do observe

individuals working and receiving the pension at the same time, employment rates are much

lower among pension recipients than among non-recipients. Using a narrow employment

measure we estimate employment rates of less than 10% for pension recipients.

Schooling

Schooling is an important determinant of employment at all ages, affecting both labor demand and labor supply. In many countries it is observed that better educated workers have later ages of retirement (Peracchi and Welch, 1994). There is a strong effect of schooling on both wages and the probability of employment for prime age workers in South Africa (Anderson, Case, and Lam, 2001; Mwabu and Schultz, 1996). It is therefore natural to look at the impact of schooling on the work activity of the elderly.

Table 4 shows summary statistics for the distribution of schooling for African males and females by five-year age groups. As the table clearly shows, levels of schooling among the elderly in South Africa are very low. Over 45% of males and over 50% of females aged 60 and above in the 2001 census had zero years of schooling. The percentage completing seventh grade is under 30% for those 60 and older, and the percentage completing secondary school is below 5% for all age groups aged 55 and older. Although males have more schooling than females in older age groups, the gender gap is relatively small compared to many African countries, and narrows substantially at younger ages. As shown by Anderson, Case, and Lam (2001), a female advantage in schooling has clearly emerged among younger cohorts. Table 4 shows the substantial improvements in schooling that have taken place in South Africa over time, with mean years of schooling more than doubling from the 60-64 age group to the 30-34 age group.

Figure 8 shows the age profile of employment for African males and females, dividing the sample into those with less than seven years of schooling and those with at least seven years of schooling. The better educated group has higher rates of employment at all ages for both males and females. Less educated males begin to withdraw from employment at a faster rate in their late 50s, dropping to employment rates below 30% by age 60. The gap in employment between the schooling groups is much larger for African females, where there is

about a 20 percentage point difference in employment rates between the education groups at ages up to 60. The better educated females appear to have a steeper rate of decline in employment beginning at age 60, with both groups falling to employment rates of below 10% by age 65. The combination of large improvements in schooling over time and the strong positive relationship between schooling and employment should create a tendency for increasing employment rates for older South Africans over time. This may be especially true for females, where the impact of schooling on employment is particularly large.

Probit Regressions

In order to get a clearer picture of the variables affecting the work activity of the elderly in South Africa, we use the 2001 census data to estimate probit regressions of the probability of employment The dependent variable is one if the individual was working in the week prior to the census and zero for everyone else, whether or not they are in the labor force. The regressions are estimated for the sample of Africans aged 50-75, with separate regressions estimated for males and females. Two specifications are used in the regressions. The first includes years of schooling, dummy variables for marital status, a flexible parameterization of age, and dummy variables for province and urban residence. The second regression adds measures of household composition. As noted above, living arrangements are likely to be endogenous, determined jointly with decisions about labor supply, so these variables are included simply to indicate the association between living arrangements and elderly labor supply and not as indicators of causation.

Table 5 presents the estimates of these probit regressions. Regressions 1 and 2 present estimates of the first specification for females and males, respectively. As suggested by Figure 8, the coefficient on years of schooling is positive and highly significant for both males and females. The marginal effects (*dF/dx*) column indicates that one year of additional

schooling is associated with about a one percentage point increase in the probability of working for both males and females, evaluated at the sample means of the independent variables. This translates into a similar percentage point increase in schooling for males and females, although it is a smaller proportional change for males given their higher levels of employment.

The marital status dummies, with married as the omitted category, indicate that unmarried women are significantly more likely to work, controlling for all of the other variables in the regression, with the largest effect for divorced women. Evaluated at sample means, the percentage increase in the probability of work compared to married women is 0.5 percentage points for widows, 8 percentage points for divorced women, and 4 percentage points for women who have never married. The effects of marriage for men go in the opposite direction, with married men having significantly higher probabilities of employment than widowed, divorced, or never married men. Married men have probabilities of employment at least 10 percentage points higher than men in any of the other categories of marital status, even with very flexible controls for age.

We use a cubic function of age to permit a flexible shape for the age-employment profile. We also include two dummy variables permitting shifts in the age profile at ages 60 and 65. The age 60 dummy is equal to one for age 60 and above; the age 65 dummy is equal to one for age 65 and above. For women we estimate a decline of 3.4 percentage points in employment probabilities at age 60, the age at which women become eligible for the state old age pension. We also estimate a positive effect of the age 65 dummy for women, with a decline in the probability of employment of 2.9 percentage points. For men the coefficient on the age 60 dummy is not statistically significant, but we estimate a significant negative effect of the age 65 dummy. This suggests that men speed up their withdrawal from employment

when they reach the age of pension eligibility, with a predicted drop of 7.2 percentage points in the probability of employment at age 65.

The coefficient on the urban dummy indicates that both men and women are significantly more likely to work in urban areas, with a larger coefficient for women. We observe substantial differences in employment across provinces with significantly lower probabilities of employment for both women and men in Eastern Cape, Northern Cape, Kwa-Zulu Natal, and Northern Province when compared to Western Cape. Gauteng has higher rates of employment than Western Cape for women, but differences between Gauteng and Western Cape are not statistically significant for men. We caution that none of the locational variables can be considered exogenous, since the decision about where to live may be made jointly with the decision about whether to retire.

Regressions 3 and 4 add three household composition variables to the regression – the number of household members under the age of 18, the number of males aged 18-59, and the number of females aged 18-59. The number of household members under age 18 is negatively associated with the employment of both men and women, with a larger coefficient for women. This may reflect a tradeoff between labor market work and caring for grandchildren, especially for women. The number of adult men in the household is negatively associated with the employment of women, but positively associated with the employment of men, although both effects are extremely small. The effect of the number of adult females in the household is slightly positive on the employment of women and statistically insignificant in its effect on employment of men. Since we have controlled for the presence of children, the positive effect of females aged 18-59 on the employment of females may indicate that older females are less needed for childcare responsibilities if the children's mother is in the household.

As with the locational variables, we caution again that household living arrangements are likely to be endogenous with respect to the labor supply decisions of potential household members. Unobserved variables, such as the health of elderly household members, are likely to affect both living arrangements and work activity. Since the living arrangements of the elderly are likely to be influenced by many of the same unobservable variables that affect labor supply, the coefficients on these household composition variables should not be given a causal interpretation.

Conclusions

Above we have referred to the large literature showing the importance of the non-contributory old age pension for poor households in South Africa. Those elderly who do not have pension income are among the poorest South Africans. Many of those with a pension live in three-generation or skip-generation households. Indeed, we have made reference to a literature arguing that this extended household structure may in part be a response to the pension. Leaving aside these difficult issues of endogenous household structure, the fact remains that the African elderly are usually in the minority in their own households and their pension income is available to support large numbers of children and working age adults. This makes the state old age pension a key element in South Africa's social safety net and a central plank in overall social welfare policy. It also implies that an unusual burden is placed on South Africa's elderly. Given this, it strikes us as an omission that the existing literature has devoted so much attention to the impact of the pension on labor supply and other outcomes of the non non-elderly without interrogating the impact on the elderly themselves. This paper has sought to fill in this gap by examining the labor supply behavior of the elderly.

Our analysis of South African census and survey data indicates that withdrawal from the labor force occurs at a fairly rapid rate above age 45. According to the 2001 census, male

participation rates fall from around 80% at age 45 to 50% at age 60 and 10% at age 70, with only modest differences across the four main population groups. Participation rates for women are lower at all ages, with participation rates for African women falling from around 60% at age 45 to 20% at age 60 and 5% at age 70. Using the metric of unused productive capacity developed by Gruber and Wise (1999), this pattern of labor force withdrawal leads to somewhat less unused capacity than most European countries and slightly more unused capacity than the United States.

For African South Africans the non-contributory old age pension system is triggered almost entirely by simple age eligibility rules, with women becoming eligible at age 60 and men becoming eligible at age 65. The fraction of women receiving the pension jumps from under 10% at age 59 to almost 70% at age 61, with the pension becoming almost 50% of household income for women aged 61. Although the pension does not necessarily imply a tax on work, especially for low-wage workers, we find that the age of pension eligibility is associated with increased rates of retirement. Reaching the age of pension eligibility leads to an increase in the hazard rate of leaving employment for women from 5% at age 58 to over 40% at age 60. Men also retire at a faster rate when they reach the pension-eligibility age of 65, with the hazard rate rising to over 30% at ages 65 and 66. While this is a sharp jump in retirement, it is not as large as observed in many European countries, where hazard rates can be as high as 60% at key program eligibility ages.

We find large effects of schooling on employment of the elderly. Our probit regressions imply about a one percentage point increase in the probability of employment for each year of schooling for both men and women. Since schooling levels rise rapidly from older ages to younger ages, especially for Africans, this implies that employment rates at older ages may increase in the future. Employment rates at older ages may also be pushed upward by the fact

that younger cohorts are more likely to live in urban areas, since we estimate a substantial positive effect of urban residence on employment.

It is beyond the scope of this paper to fully explain the patterns in labor force withdrawal that we have documented. While some factors, such as the age eligibility for the old age pension, appear to play an important role, many questions remain. For example, even if the pension helps explain sharp drops in labor force participation immediately around the pension age, it presumably cannot explain the steady declines participation that begin around age 45. Health may be important in these declines, but existing data sources provide limited information on health and disability. The lack of panel data also complicates interpretation of our results, especially as they relate to the high level of unemployment. Does the decline in participation result from individuals retiring from their jobs, or from individuals losing their jobs and deciding not to search for a new one? Further research on the labor supply of the elderly in South Africa would clearly benefit from longitudinal data that includes data on health and disability.

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Table 1. Percentage in various categories of labour market status, African Males and Females, 2000-01 Labour Force Survey

Age Group	Percent Working by Category of Work						Percent Unemployed		Percent In Labor Force	
	Work for pay (not domestic)	Work as domestic worker	Work in own business	Work on family plot	Unpaid family business	Total	Narrow	Broad	Narrow	Broad
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Males										
45-49	53.9%	2.1%	10.6%	3.7%	0.5%	68.6%	14.4%	22.1%	83.3%	91.0%
50-54	47.6%	2.8%	10.0%	5.5%	0.3%	63.6%	11.9%	20.9%	75.8%	84.8%
55-59	41.3%	2.9%	10.9%	6.5%	0.1%	59.3%	10.5%	17.8%	70.4%	77.7%
60-64	26.1%	3.5%	10.6%	7.1%	0.4%	45.8%	5.1%	10.6%	51.4%	56.8%
65-69	10.6%	0.4%	5.9%	9.9%	0.1%	25.3%	1.5%	5.0%	27.2%	30.7%
70-74	3.5%	1.3%	5.2%	8.9%	0.5%	18.2%	0.7%	2.2%	19.0%	20.5%
75-79	2.0%	0.4%	3.3%	9.5%	0.0%	15.2%	0.6%	1.5%	16.1%	16.9%
Females										
45-49	22.5%	15.1%	11.4%	5.3%	0.7%	52.7%	13.1%	27.4%	66.2%	80.5%
50-54	20.5%	14.2%	11.7%	5.3%	0.5%	49.9%	8.4%	19.7%	58.7%	70.0%
55-59	15.6%	12.8%	9.5%	5.4%	0.3%	41.7%	5.7%	14.5%	47.8%	56.6%
60-64	5.2%	4.2%	5.4%	7.3%	0.4%	21.9%	1.6%	4.1%	23.8%	26.4%
65-69	1.8%	1.8%	4.1%	6.7%	0.3%	13.7%	0.7%	2.4%	14.5%	16.2%
70-74	0.8%	0.4%	2.7%	5.5%	0.2%	9.5%	0.1%	0.8%	9.8%	10.5%
75-79	0.4%	0.1%	1.1%	6.0%	0.0%	7.4%	0.3%	0.6%	7.9%	8.2%

Note: Columns 2-6 are not mutually exclusive. Column 7 is based on answers to questions shown in columns 2-6, but avoids double counting; Column 10 is sum of 7+8; Column 11 is sum of 7+9

Table 2. Household Living Arrangements and Marital Status, 2001 Census

Age Group	N	Number living in household				Percent living alone	Percent living only with spouse	Marital status		
		Total	Under age 18	Age 18-59	Pension eligible			Percent Married	Percent Widowed	Percent Divorced
African females										
30-34	111,649	5.22	2.40	2.57	0.23	5.9	7.3	52.0	1.9	2.5
35-39	104,057	5.20	2.49	2.49	0.20	5.9	6.9	58.5	3.8	4.5
40-44	85,041	5.24	2.31	2.73	0.18	5.9	6.8	59.1	6.9	6.4
45-49	69,747	5.23	2.13	2.92	0.15	6.4	6.9	58.5	11.1	7.4
50-54	51,689	5.33	2.10	2.99	0.16	6.7	6.3	55.5	17.4	7.3
55-59	37,598	5.40	2.13	2.94	0.20	6.6	5.9	51.2	24.8	6.3
60-64	38,096	5.51	2.29	1.88	1.26	5.9	4.9	44.8	35.5	4.7
65-59	30,209	5.52	2.33	1.89	1.27	5.8	4.1	38.6	46.1	3.5
70-74	25,055	5.50	2.36	1.89	1.23	5.9	3.5	32.7	55.2	2.4
African males										
30-34	94,925	4.40	1.45	2.70	0.22	15.6	9.7	47.7	0.4	1.2
35-39	84,697	4.38	1.67	2.48	0.20	15.2	9.9	63.6	0.8	2.4
40-44	70,770	4.51	1.80	2.52	0.18	15.0	9.8	71.1	1.3	3.7
45-49	56,565	4.68	1.80	2.73	0.14	14.5	10.1	75.7	1.9	4.5
50-54	43,290	4.86	1.77	2.95	0.13	13.8	10.0	77.7	3.1	4.6
55-59	29,538	5.03	1.80	3.08	0.14	13.0	9.8	78.7	4.6	4.4
60-64	24,179	5.28	1.95	2.06	0.26	11.4	9.5	78.5	7.2	3.8
65-59	16,413	5.46	2.06	1.94	1.45	9.3	9.0	77.8	10.2	3.6
70-74	12,759	5.57	2.14	1.88	1.54	8.6	8.4	75.7	13.7	3.0
White females										
30-34	13,063	3.76	1.43	2.18	0.11	4.4	11.7	79.2	0.9	7.3
35-39	12,946	3.98	1.62	2.19	0.14	3.9	7.7	80.9	1.5	9.5
40-44	13,068	3.90	1.26	2.47	0.15	3.8	8.7	80.4	2.6	11.2
45-49	12,144	3.47	0.66	2.65	0.14	5.1	17.3	79.4	4.3	11.5
50-54	11,373	3.04	0.33	2.49	0.14	7.3	30.4	77.6	7.4	11.2
55-59	9,884	2.68	0.22	1.99	0.19	11.1	43.3	74.8	11.7	9.8
60-64	8,442	2.57	0.25	0.64	1.41	16.2	44.8	67.0	20.2	9.2
65-59	6,714	2.42	0.23	0.56	1.58	22.7	43.8	59.4	31.0	6.4
70-74	5,815	2.30	0.20	0.58	1.50	30.9	36.5	47.1	45.1	4.8
White males										
30-34	12,218	3.50	1.11	2.25	0.11	6.5	16.6	76.8	0.2	4.5
35-39	11,767	3.84	1.49	2.18	0.14	5.7	9.7	82.7	0.4	6.0
40-44	12,061	3.94	1.42	2.36	0.15	5.1	8.6	85.7	0.6	6.9
45-49	10,948	3.77	0.95	2.67	0.14	4.6	12.8	86.2	0.8	7.9
50-54	10,558	3.33	0.50	2.69	0.13	5.5	25.4	87.0	1.6	7.0
55-59	9,156	2.96	0.29	2.51	0.15	5.9	40.6	87.9	2.2	6.2
60-64	7,602	2.71	0.22	1.07	0.41	6.3	52.9	87.8	3.6	5.2
65-59	5,726	2.58	0.20	0.66	1.72	8.2	58.9	85.9	6.7	4.6
70-74	4,521	2.46	0.16	0.49	1.80	9.7	62.5	84.3	9.4	3.6

Table 3. Percentage working by pension status, African males and females,
September 2000 LFS

Age Group	N	Percent receiving pension	Not receiving pension			Receiving pension		
				Percent working			Percent working	
			N	Broad	Narrow	N	Broad	Narrow
Males								
50-54	1,253	1.6	1,233	67.2	62.3	20	13.6	7.1
55-59	884	2.4	857	66.7	61.0	27	20.8	9.1
60-64	776	14.6	653	53.8	47.1	123	13.0	6.8
65-69	548	63.8	201	46.6	41.0	347	21.9	6.6
70-74	415	84.4	66	26.3	17.0	349	18.7	7.9
75-79	228	86.9	31	20.2	20.2	197	17.6	3.3
Total	4,104	24.9	3,041	61.9	56.4	1,063	18.9	6.5
Females								
50-54	1,520	1.8	1,487	55.3	49.5	33	28.2	13.1
55-59	1,136	6.8	1,064	46.4	40.7	72	14.0	4.3
60-64	1,253	62.9	459	43.1	33.7	794	20.7	7.5
65-69	859	85.2	127	27.4	22.5	732	16.7	5.5
70-74	768	90.4	75	11.3	7.7	693	11.8	3.0
75-79	380	93.1	25	21.3	2.0	355	9.1	1.4
Total	5,916	43.6	3,237	48.5	42.2	2,679	15.5	4.9

Note: Broad measure of work includes work on family plot; narrow measure does not.

Table 4. Schooling Attainment of African Males and Females by Age Group, 2001 Census

| Age Group | Mean Years of Schooling | | Percentage completing | | | | | | | |
| | Female | Male | Zero schooling | | At least 4 years | | At least 7 years | | At least 12 years | |
			Female	Male	Female	Male	Female	Male	Female	Male
30-34	8.20	8.33	14.4	11.9	82.0	83.7	70.8	71.1	30.5	31.4
35-39	7.03	7.38	20.1	15.9	74.7	78.5	60.0	62.7	20.6	22.4
40-44	6.06	6.54	25.7	20.2	67.7	72.5	50.6	54.6	14.7	16.6
45-49	5.18	5.70	30.9	25.2	61.1	66.1	42.8	46.9	9.8	12.0
50-54	4.42	4.86	37.2	31.9	54.1	58.5	35.5	39.0	6.6	8.2
55-59	3.97	4.29	41.7	37.0	49.6	52.8	31.7	33.9	5.1	6.3
60-64	3.04	3.56	53.1	45.8	38.6	44.0	23.0	27.1	3.5	4.9
65-59	2.66	3.16	58.0	51.5	33.8	39.0	19.9	24.0	2.9	4.5
70-74	2.12	2.64	65.4	57.9	27.0	32.4	15.2	19.3	2.2	3.8

Table 5. Probit regressions for employment, Africans age 50-75, 2001 Census

Variable	Probit regression coefficients and robust standard errors											
	Female Regression 1			**Male** Regression 2			**Female** Regression 3			**Male** Regression 4		
	b	*SE*	*dF/dX*	*b*	*SE*	*dF/dX*	*b*	*SE*	*dF/dX*	*b*	*SE*	*dF/dX*
Years of schooling	0.064	(0.001)***	0.010	0.032	(0.001)***	0.011	0.062	(0.001)***	0.010	0.031	(0.001)***	0.010
Widowed	0.030	(0.010)***	0.005	-0.329	(0.019)***	-0.098	0.030	(0.011)***	0.005	-0.345	(0.019)***	-0.102
Divorced	0.388	(0.021)***	0.080	-0.426	(0.031)***	-0.120	0.370	(0.021)***	0.074	-0.463	(0.031)***	-0.129
Never married	0.203	(0.011)***	0.036	-0.655	(0.015)***	-0.178	0.181	(0.012)***	0.032	-0.678	(0.015)***	-0.182
Age >=60	-0.207	(0.023)***	-0.034	-0.017	(0.022)	-0.005	-0.206	(0.023)***	-0.034	-0.011	(0.022)	-0.004
Age >=65	-0.185	(0.030)***	-0.029	-0.228	(0.027)***	-0.072	-0.188	(0.030)***	-0.029	-0.228	(0.027)***	-0.072
Age-50	0.023	(0.008)***	0.004	0.001	(0.008)	0.000	0.021	(0.008)***	0.003	0.001	(0.008)	0.000
(Age-50) squared	-0.008	(0.001)***	-0.001	-0.005	(0.001)***	-0.002	-0.008	(0.001)***	-0.001	-0.005	(0.001)***	-0.002
(Age-50) cubed	0.000	(0.000)***	0.000	0.000	(0.000)***	0.000	0.000	(0.000)***	0.000	0.000	(0.000)***	0.000
Urban	0.265	(0.011)***	0.045	0.038	(0.011)***	0.012	0.244	(0.011)***	0.041	0.025	(0.011)**	0.008
Eastern Cape	-0.355	(0.028)***	-0.050	-0.660	(0.026)***	-0.186	-0.344	(0.028)***	-0.048	-0.647	(0.026)***	-0.182
Northern Cape	-0.258	(0.050)***	-0.035	-0.080	(0.043)*	-0.026	-0.256	(0.050)***	-0.035	-0.079	(0.043)*	-0.025
Free State	-0.035	(0.029)	-0.006	-0.117	(0.027)***	-0.037	-0.035	(0.029)	-0.005	-0.117	(0.027)***	-0.037
KwaZulu-Natal	-0.204	(0.027)***	-0.031	-0.402	(0.026)***	-0.121	-0.170	(0.027)***	-0.026	-0.377	(0.026)***	-0.114
North West	-0.161	(0.028)***	-0.024	-0.144	(0.026)***	-0.046	-0.158	(0.028)***	-0.023	-0.156	(0.026)***	-0.049
Gauteng	0.115	(0.026)***	0.020	0.023	(0.024)	0.008	0.104	(0.026)***	0.017	0.012	(0.025)	0.004
Mpumulanga	0.049	(0.029)*	0.008	0.024	(0.027)	0.008	0.064	(0.030)**	0.011	0.031	(0.027)	0.010
Northern Province	-0.096	(0.029)***	-0.015	-0.344	(0.027)***	-0.104	-0.083	(0.029)***	-0.013	-0.325	(0.027)***	-0.098
Number <18							-0.058	(0.007)***	-0.009	-0.037	(0.004)***	-0.012
Males 18-59							-0.009	(0.005)*	-0.002	0.003	(0.000)***	0.000
Females 18-59							0.004	(0.001)***	0.001	0.000	(0.003)	0.001
Constant	-0.943	(0.031)***		0.108	(0.029)***		-0.807	(0.036)***		0.174	(0.030)***	
Sample size	172,241			118,858			172,241			118,858		
Pseudo R-squared	0.208			0.156			0.214			0.160		
Log likelihood	-56986			-62038			-56569			-61759		

Notes: Robust standard errors in parentheses. Significance levels: ***=.01, **=.05, *=.1. Omitted categories: Married, Western Cape.

Figure 1. Percentage working and participating in labor force, 1996 and 2001 Census

African Males
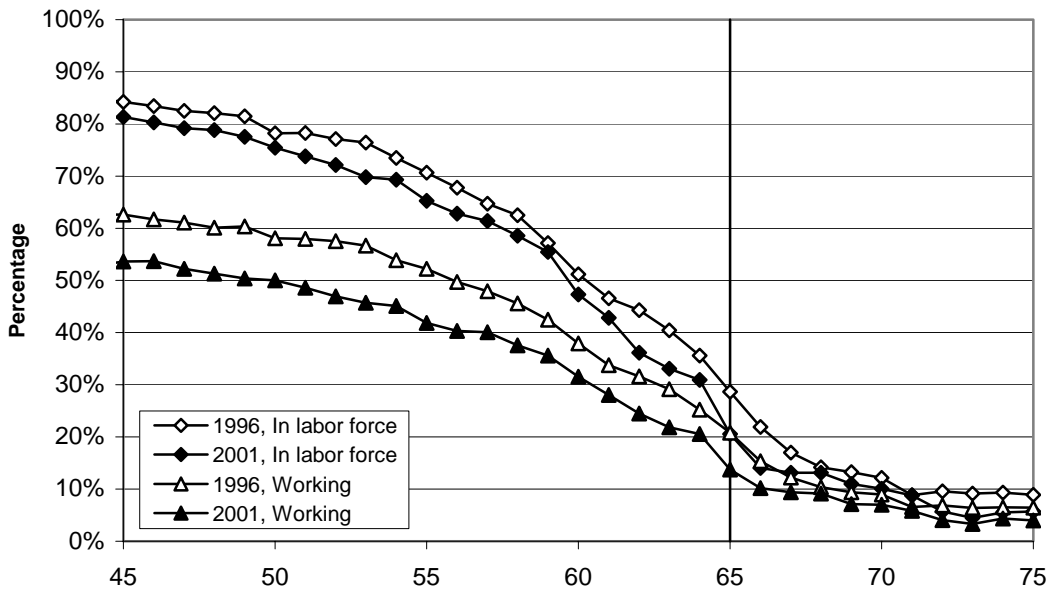
African Females

Figure 2. Distribution of Labor Force Activity by Age, African and White Males and Females South Africa, 2001 Census
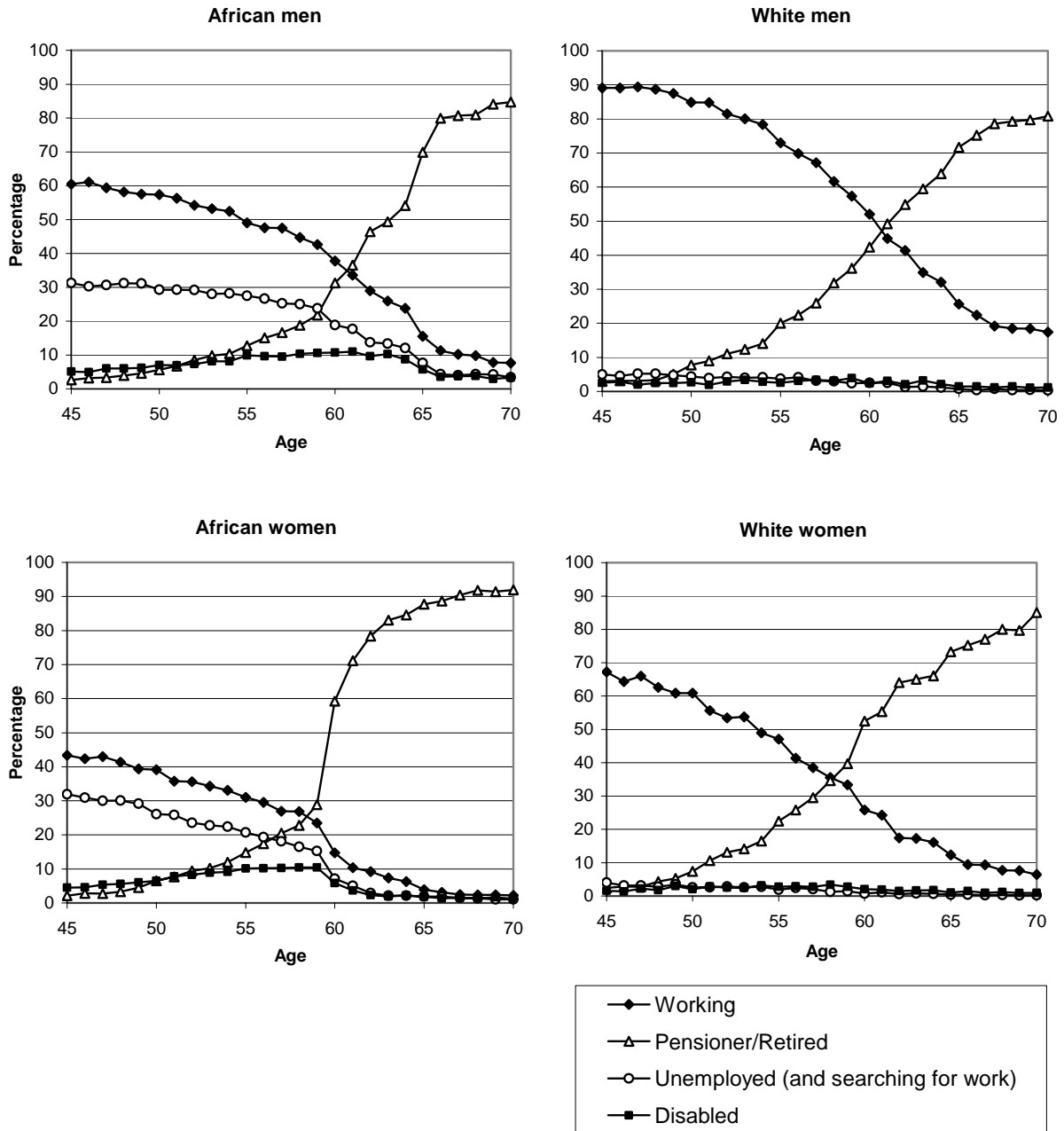
Figure 3. Hazard Rate for Leaving Employment by Age,
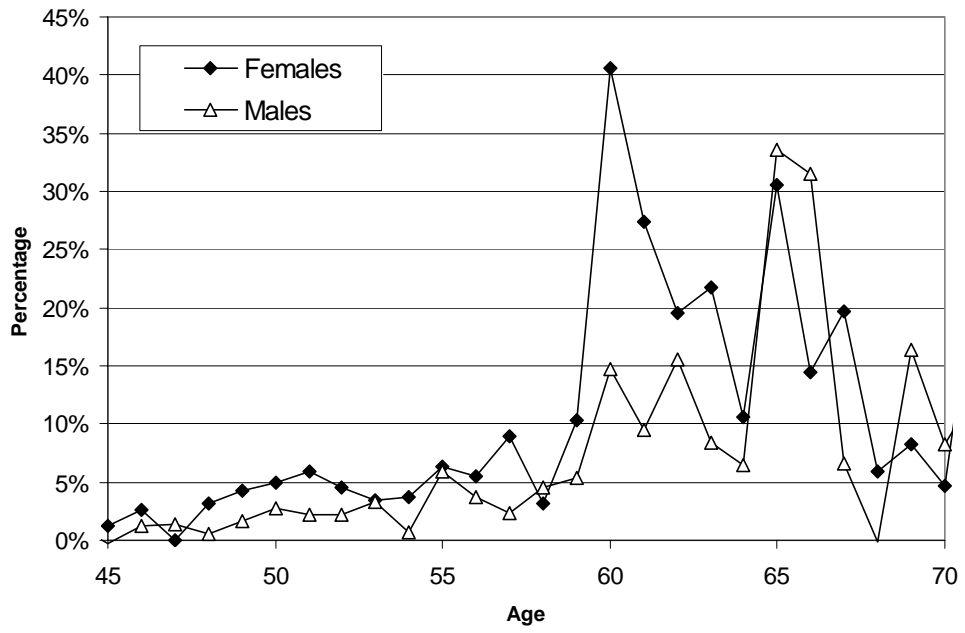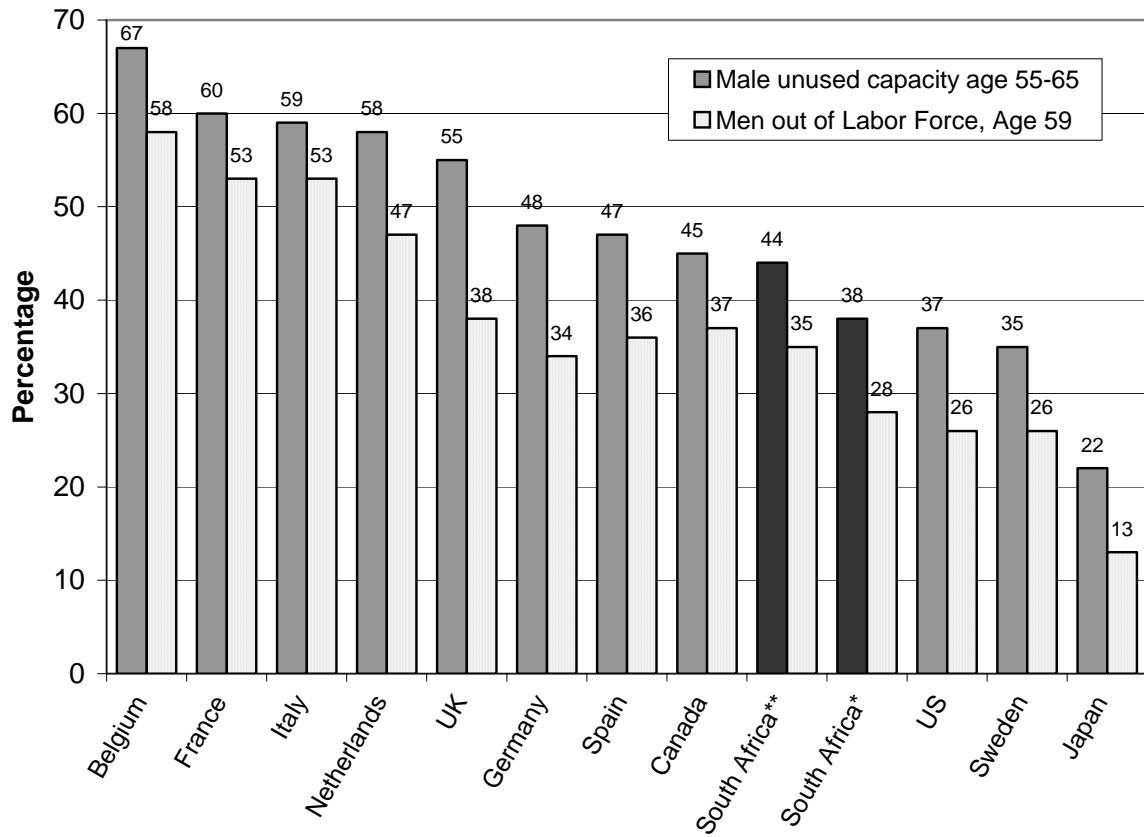African Males and Females, South Africa, 2001 Census

Figure 4. Measures of Unused Productive Capacity for OECD Countries and South Africa

Notes: OECD estimates taken from Gruber and Wise, 1999; South Africa estimates are based on 2000-01 Labour Force Survey; *Narrow measure of participation; **Broad measure of participation

Figure 5. Percentage Receiving Old-Age Pension, September 2000 LFS
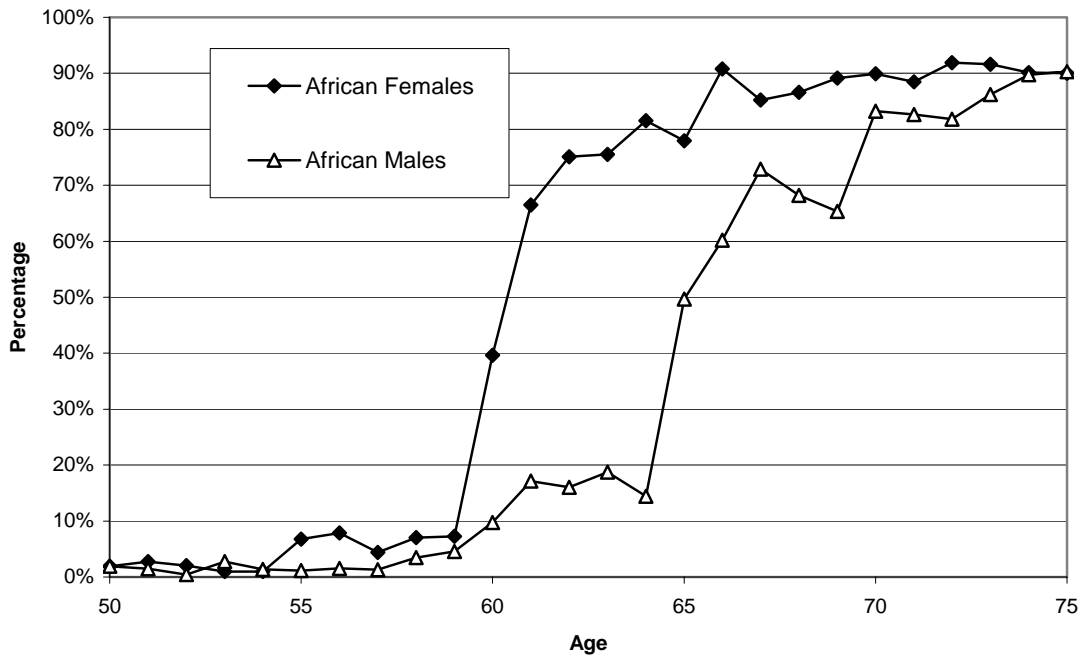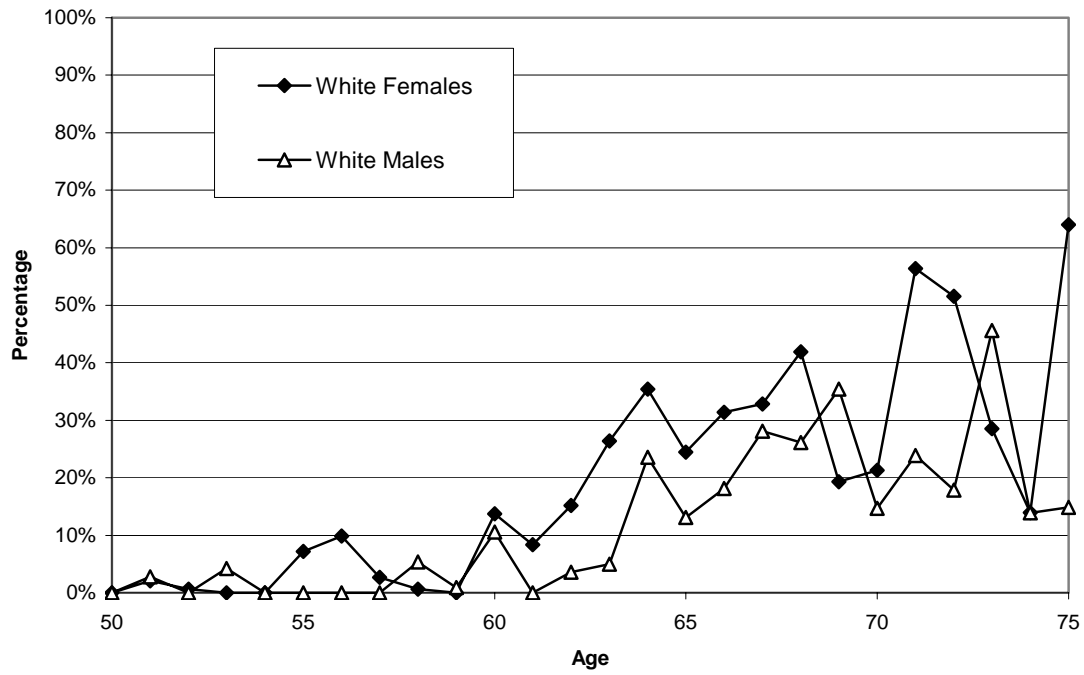
Africans

Whites

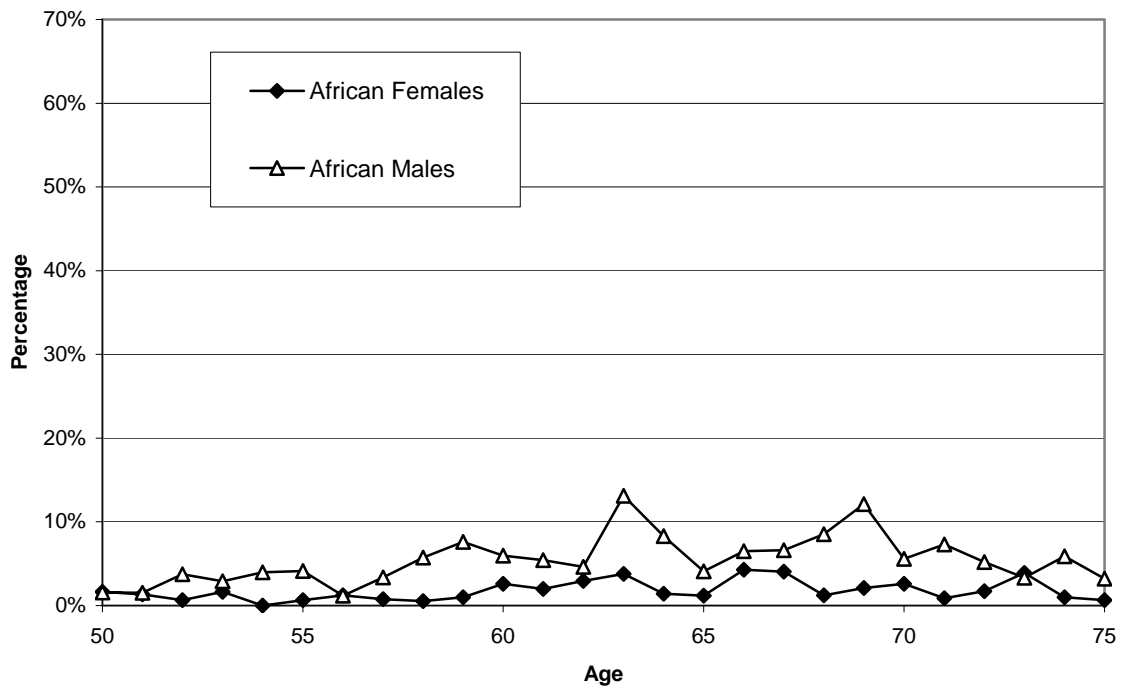**Figure 6. Mean proportion of household income derived from Old Age Pension, LFS/IES September 2000**
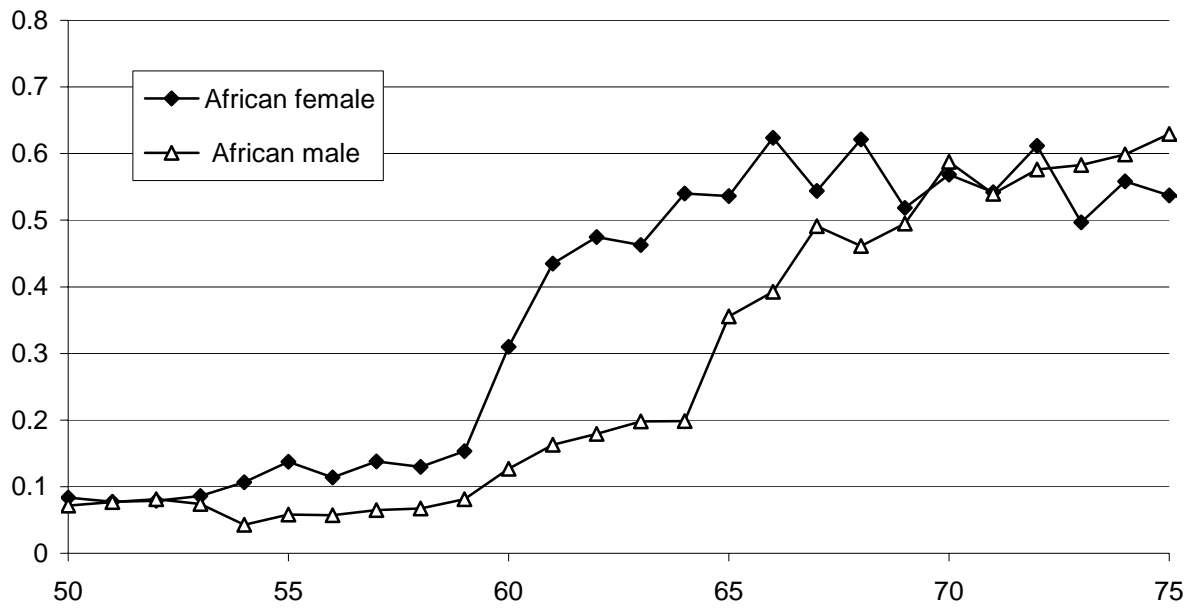
Figure 7. Percentage Receiving Employer-Provided Pension, September 2000 LFS
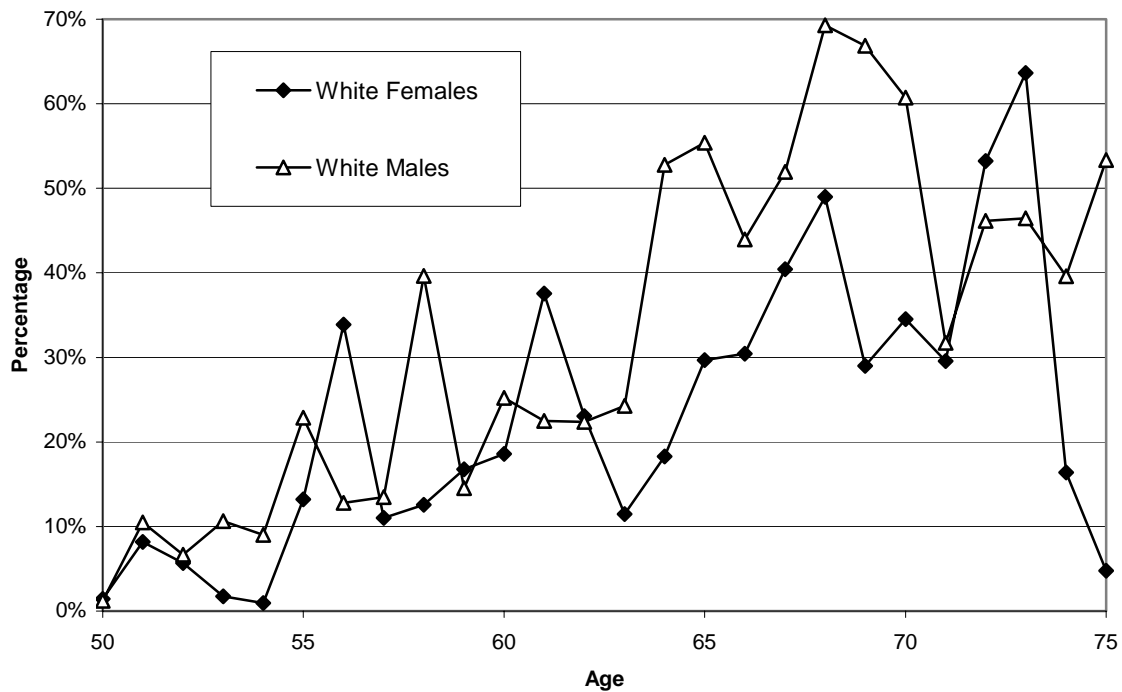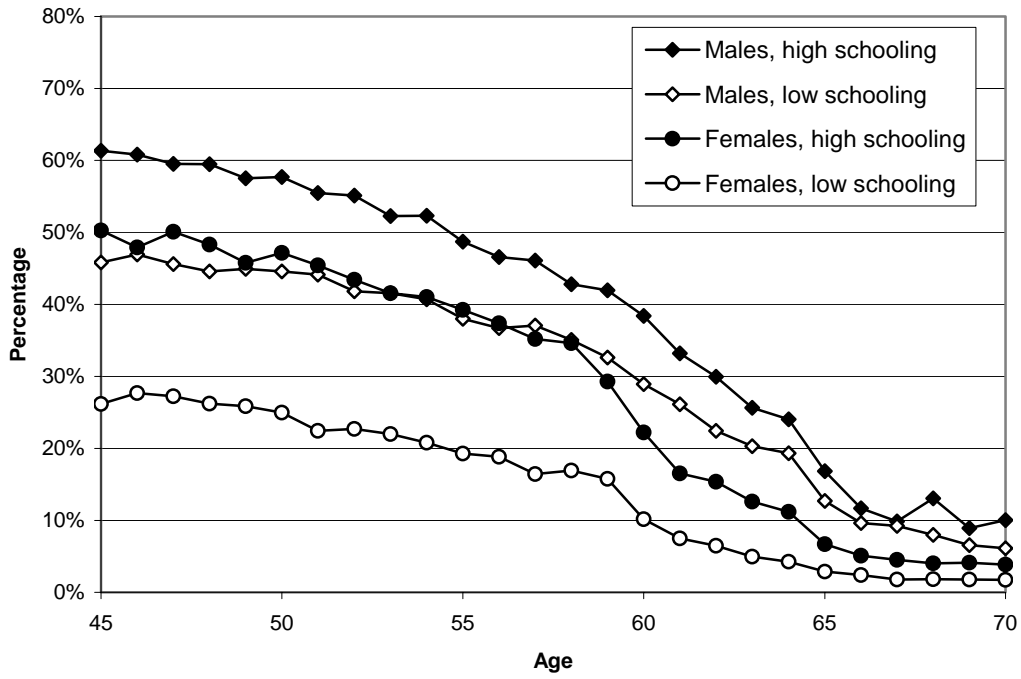
Africans

Whites

Figure 8. Percentage Working by Years of Schooling, 2001 Census

Note: High schooling is 7 or more years of schooling; low schooling is under 7 years

Appendix Figure A. Labor Force Participation Rates by Age and Population Group, 2001 South Africa Census

Males

Females