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## Working Paper No. 367

### The Persistence of Hardship Over the Life Course

by

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#### I. INTRODUCTION

The economic well-being of the elderly, as measured by the poverty rate, has improved dramatically over the past 40 years. The poverty rate for the elderly was 35.2 percent in 1959, but was only 10.2 percent in 2000--considerably lower than that for children. The main source for the improvement in economic well-being of the elderly is the increase in Social Security benefit levels over the years. The average real monthly Social Security retired worker benefit for men in 1960 was \$400 (1999 dollars) and by 1999 it had grown to \$934. Another source of this improvement has been increased pension coverage.

However, the elderly are not a homogeneous group and poverty rates for various subgroups reflect this heterogeneity. For example, the 2000 poverty rate was 4.5 percent for married elderly people, 16.5 percent for elderly widows, and 22.3 percent for elderly African Americans. Even focusing on a more narrow age group (65 to 69 years) to minimize cohort and age effects, the same heterogeneity is observed in poverty rates: 4.2 percent for married people, 17.6 percent for widows and 16.8 percent for African Americans. While pension coverage has increased since 1959, many workers still retire with little or no pension income which explains some of this heterogeneity or inequality among the elderly.

The elderly are also heterogeneous along other dimensions. While the young elderly (ages 65 to 69) appear to be slightly better off economically (8.3 percent poverty rate) than all the elderly, almost a third report being in poor or fair health, 28 percent are not married and about 7 percent receive means-tested benefits.<sup>1</sup> Again there are considerable differences between various demographic groups. Almost half (45 percent) of African Americans report being in poor or fair health as do 35 percent of widows and a quarter of married individuals. About a quarter of African Americans and one in five widows receive means-tested benefits compared to less than 10 percent of married individuals.

Often quality of life is taken to mean economic well-being with the poverty threshold generally taken as the standard. Mayer and Jencks (1989), however, argue that material hardship (e.g., poor nutrition, dilapidated housing, reduced access to health care) should also be considered when examining quality of life issues--an argument echoed by Beverly (2000). Lawton (1997) argues that quality of life is a collection of dimensions and is an attribute of "the person-environment system." Furthermore, the World Health Organization argues that there are six broad domains of the quality of life: physical health, psychological, level of independence, social relations, environment and spirituality. This paper examines well-being over part of the life course: the persistence of hardship from middle-age to old-age. Furthermore, the focus is not limited solely to economic hardship with a poverty threshold standard, but rather a broader definition is used which includes marital status, mortality, housing adequacy, and health. The paper is organized as follows: the theoretical and empirical literature is reviewed in the next section; the data and methods are described in section 3; the results are reported in section 4; and concluding remarks are offered in the final section.

## II. THEORETICAL BACKGROUND AND LITERATURE REVIEW

Heterogeneity has generally been interpreted as economic heterogeneity with an emphasis on income inequality and poverty. Economists and sociologists have established that income inequality is higher among the elderly than among prime-aged adults in the U.S. (e.g., Crystal and Shea 1990, and Hurd 1990). Hurd and Shoven (1985), in an examination of income and wealth, note that there is a wide diversity in the economic positions of the elderly which is hidden by a focus on the mean or median--an observation echoed by Dannefer and Sell (1988).

Maddox (1987, p. 564) has argued that "much of the heterogeneity we observe in later life is the product of ways societies have allocated their material and social resources over the life course in the past." For example, the level of retirement income depends to a large extent on experiences, wages and decisions made during the prime working years. However, the increased heterogeneity among the elderly could be the result of life course effects, cohort effects or period effects which need to be separated (Dannefer and Sell 1988).

Three hypotheses have been proposed to explain heterogeneity as a life course effect. First, Henretta and Campbell (1976) suggest that the facts are consistent with a status persistence model and argue that earlier attainments largely determine income in old age. Consequently, an individual's place in the economic distribution is determined early and persists through old-age. Henretta and Campbell construct synthetic cohorts from cross-sectional data and show that variables influencing retirement income are the same that influence income before retirement.

Dannefer and Sell (1988) suggest that a model of the cumulation of advantage and disadvantage is a plausible hypothesis consistent with the facts. Crystal and Shea (1990) argue that early life advantages as well as disadvantages cumulate over the life course which leads to increased heterogeneity or inequality as a cohort ages.<sup>2</sup> In essence, the rich get richer and the poor get poorer. They state their empirical results "suggest that the cumulative advantage-disadvantage model reasonably reflects the pattern of economic well-being after retirement" (p. 442)--results further supported by Crystal, Shea and Krishnaswami (1992). In a refinement to this model, O'Rand (1996) discusses the structural and institutional arrangements that work to stratify a cohort and "anchor diverse trajectories in old age."

A third hypothesis, the status leveling or income redistribution hypothesis, argues that the social welfare system (e.g., Social Security) through progressive benefit formulas work to reduce income inequality in old-age. Of course, this life course hypothesis critically depends on the strength of a country's social welfare system and other institutional arrangements. Crystal and Shea (1990), and Crystal, Shea and Krishnaswami (1992) using the 1984 SIPP panel as a cross-section find that the Gini coefficient for income rises for successive age groups. They also find that the leveling influence of the public pension (Social Security) is outweighed by other sources of retirement income such as pension income and asset income. However, if in-kind benefits such as Medicare were factored in then the U.S. social welfare system would probably exert a greater leveling influence. Prus (2000), using a series of cross-sections to create a synthetic cohort, finds the opposite is true for Canada--inequality decreases within a cohort as it ages. The Canadian retirement income system exerts a strong leveling influence, demonstrating the important role of institutional factors.

These models imply that two phenomena will be observed. The first is changing heterogeneity or inequality over the life course (e.g., income inequality will be greater, lower or unchanged in old-age compared to younger ages). In the U.S., income inequality appears to increase as a cohort ages, while other countries have different life course patterns of inequality (Deaton and Paxson 1994, and O'Rand and Henretta 1999).

The second phenomenon is stratification of economic status over the life course, that is, little or no mobility within the income distribution over the life course. Many studies have examined mobility, but most examine fairly short observation windows of 5 to 15 years. Hungerford (1993) examines income mobility over 10 year periods and finds a fair amount of mobility within the income distribution but the movements generally are not far. Furthermore, he finds that mobility was basically the same in the 1970s and 1980s. Buchinsky and Hunt (1999, p. 366) find that wage mobility among younger workers has declined over time (from the 1980s to the 1990s) and "a significant increase in the staying probabilities at each and every quintile." These studies, however, do not focus on the period around retirement.

There are a few studies that follow older men into their early retirement years. Two studies use the same data but reach different conclusions. Pampel and Hardy (1994) argue that their results tend to support the status persistence hypothesis, though they also find some support for the income redistribution hypothesis. Crystal and Waehrer (1996, p. S316), on the

other hand, find a great deal of mobility within the income distribution and conclude these results "tend to disconfirm the claim that later-life outcome are characterized by 'status maintenance.'" However, their transition matrix shows that while slightly over half in the poorest income quintile move up in the income distribution over a 15-year period, about 70 percent of these men were in the poorest two quintiles 15 years later. Again, considerable mobility but it tends not to be far.

Crystal and Johnson (1998) look at income mobility among women and their families over 13 to 25 year periods (depending on cohort). Their results suggest that income mobility has declined over time and that, within a cohort, income inequality sharply increases after age 50. They further find that "recent cohorts of women may be less able to overcome early-life disadvantages . . . than earlier cohorts of women" (p. 33). Choudhury and Leonesio (1997) looked at the poverty dynamics of women from middle- to old-age and found that many poor older women were also poor earlier in life.

The evidence tends to support the cumulative advantage-disadvantage hypothesis for the U.S. However, the studies supporting this are not above reproach. The studies using strictly cross-sectional data (Crystal and Shea 1990, and Crystal, Shea and Krishnaswami 1992) cannot separate life course effects from cohort and period effects. The studies that create synthetic cohorts with repeated cross-sections (Henretta and Campbell 1976, and Prus 2000) do not control for compositional changes over time (death, immigration and emigration). The longitudinal studies (Crystal and Waehrer 1996, and Pampel and Hardy 1994) typically examine only a small proportion of the life course (5 to 15 years) or focus only on women (Choudhury and Leonesio 1997, and Crystal and Johnson 1998). Furthermore, all of the studies examine only one facet of well-being, namely income.

### III. DATA AND METHODS

The source of the data used in this study is the University of Michigan Panel Study of Income Dynamics (PSID). The PSID is a nationally representative longitudinal data set of the U.S. population that has been ongoing since 1968 (Hill 1992). The PSID interviewed a national sample of 4,800 households in 1968 and the number interviewed has grown to over 7,000 today. The replacement mechanism of the PSID for births is designed to yield a representative sample of the nonimmigrant population in each year.

Information is drawn for individuals for the years 1968 to 1996 (waves I to XXIX). The PSID oversamples low-income households because it was created by combining the Survey of Economic Opportunity (SEO), a survey of low income households, with a representative group of households from the Survey Research Center (SRC) national sampling frame. Consequently, family weights are used throughout the analysis. The data was limited to the survey years before 1997 because part of the original SEO sample was dropped from the PSID after 1996. Only individuals who were born between 1924 and 1931 are included in the sample. Furthermore, all sample members participated in the PSID for at least five years while in their 40s and attained age 66 by 1996. Individuals who died before age 66 but would have attained age 66 by 1996 had they survived are also included in the sample.

The final analysis sample contains information on 1,031 individuals of whom 840 survived to age 66 (81.5 percent of the sample which is about what is predicted from a period life table). Three observations have missing state information and are dropped from the sample for the multivariate analyses described below leaving a sample of 837 elderly individuals. The characteristics of the total sample and those surviving to age 66 are shown in table 1. Slightly over half of the sample are women, two-thirds are white, about half have at least a high school education and slightly over half were born between 1928 and 1931. The characteristics of those surviving to age 66 conform to well-known patterns of mortality. Women, whites and individuals with more education are more likely to survive to age 66 than others.

The methodology is fairly straightforward. First, four measures of middle-age chronic hardship are created. The measures are (1) family income below 150 percent of the poverty threshold, (2) being unmarried, (3) being a renter, and (4) living in overcrowded housing. An individual experienced chronic hardship if they experienced these conditions at least 40 percent of the time they were in the PSID between the ages of 40 and 49 (e.g., four of 10 years, two of 5 years).<sup>3</sup> Only 37 percent of the sample was observed for all 10 years while they were in their 40s, but two-thirds were observed for at least eight years. The 40 percent threshold was chosen in part to obtain meaningful cell sizes for the empirical analysis and it is long enough to separate those experiencing longer term hardship from those experiencing just a temporary spell of bad luck.

Next six outcome measures of old-age hardship or adverse quality of life are created. Five of these measures are defined

at age 66: family income below 150 percent of the poverty threshold, being unmarried, being a renter, living in overcrowded housing, and reporting being in poor or fair health. These outcome measures are defined for a single year--the year the individual turns 66. Using a multi-year measure would reduce the sample size considerably because of attrition. The last outcome measure is death before age 66 (and after age 49).

Being poor or near-poor is the traditional measures of economic hardship. It is based on current income and reflects the amount of income necessary to maintain an adequate standard of living. Since many have argued that the poverty threshold is too low, income below 150 percent of the poverty threshold is used in this study.

Marital status is a multi-faceted measure of well-being. Being unmarried reflects, to some extent, on the quality and quantity of social relations (Ajrouch, Antonucci and Janevic 2001 and Myers 1999). Wilson and Oswald (2002, p. 24) conclude from their review of the literature that "marriage does make people less likely to suffer depression and psychological problems." Myers (1999) concludes from the psychology literature that the link between marriage and well-being is due to the beneficial effects of marriage. Additionally, Murray (2000) reports that marriage causes people to live longer and that healthier people select into marriage--marriage is both a signal of better health and a cause of better health--although widowhood is often not a choice. Furthermore, Mirowsky and Ross (1999) find that marriage decreases the expected level of economic hardship holding other things constant.

Living in rental housing can be an indication of the quality of the environment and the level of wealth owned by the family. Jargowsky (1997) notes that of the occupied housing units in ghetto neighborhoods, 75 percent are rental units compared to a third in low-poverty neighborhoods. Of course, this doesn't mean that most rental units are in ghetto neighborhoods so being a renter does not necessarily mean an individual lives in a ghetto. Apgar (1993), however, has shown that renters tend to be poorer than homeowners and that urban renters as a whole are becoming poorer. Home owners are more active in their communities (Green 2001) implying that renters are less connected to their neighborhoods resulting in little accumulation of social capital. Established neighborhood residents tend to view renters as uncommitted to the neighborhood, unpredictable and unreliable (Korbin and Coulton 1997). Green (2001, p. 27) summarizes the literature as finding "that home ownership produces desirable social outcomes: better neighborhoods, more civic participation, and more socially healthy children."

Furthermore, Sherraden (1991) notes that for many, especially blue-collar workers, home ownership is the most important way of accumulating wealth and Kennickell, Starr-McCluer and Surette (2000) find that homeowners have substantially more financial wealth than renters. Being a renter is probably indicative of owning little or no wealth. Rubin and Koelln (1996) find that renters (both elderly and nonelderly) spend more on housing and less on health care holding permanent income constant--rental housing may pose an excess financial burden on families.

Many argue that living in overcrowding housing is a direct measure of the adequacy of housing. Measures of crowding are objective measures but an overcrowding standard is necessarily subjective. Myers, Baer and Choi (1996) conclude that findings on the effects of overcrowding are uncertain. For example, they point out that after 100 years of studies there still is a debate over whether or not overcrowded housing has any physical or mental effects. But U.S. housing policy is based to some extent on the assumption that overcrowding is an indicator of substandard housing. The Department of Housing and Urban Development designates as overcrowded a housing unit with more than one person per room. However, this measure does not take family composition into account. An alternative measure which incorporates both family size and family composition has been proposed by Newman and Ponza (1981). Their measure of adequate housing takes a base of two rooms for a couple or single household head, with an additional room for each single person 18 years or older and for every two children of the same sex under 18 years of age. If the actual number of rooms is less than this measure then the family lives in overcrowded housing. This is the measure used in this paper.

Death before age 66 is also a multi-faceted measure of well-being. It could reflect something about the quality of the environment in which the individual lives (e.g., the level of violent crime in the neighborhood, and/or the quality of the air and drinking water). Menchik (1993) finds that differential mortality by economic status is present in the U.S. Also early mortality is highly correlated with health (Burtless 1987).

The last outcome measure is being in poor or fair health which is self-reported<sup>4</sup> (the PSID did not ask about health status until 1984 so the health measure is not available for middle-age). There is some question on what self-reported health actually measures. Hardy and Pavalko (1986) show that the "evaluative context" (e.g., occupational category, retirement status) can influence the consistency of self-reported health, and Idler and Angel (1990) find that self-reported health is

not associated with mortality among elderly men and women. But Maddox (1962, p. 184) concludes from his study that "the objective state of an elderly person's health is the most important single determinant of his self-assessment of health status," and Dwyer and Mitchell (1999) find that self-rated health status is not endogenously determined with labor supply (i.e., retirement decisions). Prus and Gee (2001), in an analysis of Canadian survey data, report that distress (e.g., feelings of sadness, hopelessness, worthlessness, nervousness) is a significant predictor of subjective health among older Canadians. Self-reported health appears to be related to both physical and psychological well-being.

These measures are, of course, correlated with one another but not perfectly so. Table 2 shows the correlation matrix between the middle-age hardship variables and the old-age hardship variables. The correlation, for example, between being a renter and being unmarried is about 0.30, and between being unmarried in middle-age and in old-age is 0.46. The other values range between 0.41 (being a renter in middle-age and in old-age) and 0.03 (between poor or fair health and overcrowded housing). Most of the correlations are statistically significant at the 5 percent level. Hardship is a multi-dimensional concept and these measures, while being somewhat related to each other, appear to be capturing distinct dimensions of hardship.

The proportion of the sample experiencing each of the middle-age hardship and old-age hardship measures is reported in table 3. On each measure, many of the observed patterns are predictable from previous research. African Americans and individuals with less education are more likely to experience low income (less than 150 percent of the poverty threshold), be unmarried, be a renter, living in overcrowded housing, die before age 66 and be in poor or fair health. Women are more likely to survive to age 66 than men, but are more likely to be poor, be unmarried and live in overcrowded housing in both middle- and old-age.

A simple and direct three-part empirical strategy is employed. The first part consists of dividing the sample into one of two groups based on whether or not they experienced a particular chronic middle-age hardship. This is done for each of the four middle-age hardship measures. The proportion of each of the two groups experiencing an old-age hardship outcome is estimated along with the associated standard errors. The proportions are compared and the hypothesis that the proportions are equal is tested using a 2-sided t-test. This procedure is used for the total sample and for subsamples based on sex, race, or education.

The second part of the empirical strategy is a multivariate analysis (logit estimation) of the probability of experiencing old-age hardship. In the logit model, each old-age hardship outcome (a binary variable) is a function of a middle-age chronic hardship measure, sex, race, education, and birth cohort. In addition, for all old-age hardship outcome logits except for dead before age 66, the following independent variables are also included: region of the country, the state unemployment rate, the state average fair market rent, the state ratio of elderly unmarried persons of the same sex to unmarried elderly persons of the opposite sex, number of children under 18 in the household, and the number of other adults (other than a spouse) in the household. These independent variables are measured in the year the individual is age 66. The variables control for differences in the business cycle, the state's cost of living, the marriage market for elderly persons, and family size and composition. This allows for an estimate of the effect of middle-age hardship on the likelihood of experiencing old-age hardship holding other factors constant. It should be emphasized that no structural model has been specified, consequently, the estimation results show if old-age hardship is related to middle-age chronic hardship not if middle-age hardship causes old-age hardship. Separate models are estimated for men and women.

In the last part of the empirical strategy, two simple index variables are created to measure the severity of hardship. The first is the sum of the four middle-age hardship variables; that is, it is the number of hardships the individual experienced in middle-age. The index varies from zero to four. The other index is the sum of the five old-age hardship variables (the number of hardships experienced in old-age). This index varies from zero to five. Death before age 66 is not included in this index and is treated separately in the analysis. Although the indices are easy to construct and to interpret, these indices suffer some well-known limitations. First, the individual hardships are equally weighted with the implicit assumption that each has the same effect on well-being (should being a renter and being poor, for example, be treated equally?). Second, to the extent that the hardships are similar, a particular facet of hardship may be over-weighted.

To determine the effect of the middle-age hardship index on old-age hardship is not a straightforward matter. The two indices could be treated as continuous variables and ordinary regression analysis employed. However, this method has the drawback of treating the difference between 0 and 1 old-age hardships the same as the difference between 5 and 6 old-age hardships. Furthermore, the estimated impact of each increment in the middle-age hardship index would be the same. To overcome these difficulties an ordered logit model is specified since the dependent variable takes on six discrete

values which are ordered. The middle-age hardship index takes on five discrete values. Consequently, four binary "dummy" variables are created with zero middle-age hardships as the omitted category. In this way the independent variables will have a different estimated effect on the likelihood that the old-age hardship dependent variable takes on each value and each increment of the middle-age hardship index will have a different impact on the dependent variable. The effects of the severity of middle-age hardship on death before age 66 are estimated by specifying a logit model.

Interaction terms between the middle-age hardship variables with sex and race were tried; the coefficient estimates of these interaction terms were generally very small and not statistically significant. Consequently, these interaction terms are not included in this analysis, but separate models are estimated for men and women.

A last word about the PSID is in order. After 29 years there has been considerable attrition in the original sample which could bias the results. However, several studies over the years and most recently by Fitzgerald, Gottschalk and Moffitt (1998) and by Lillard and Panis (1998) conclude that biases due to selective attrition are relatively small. Furthermore, in treating attrition (other than death) as a separate outcome variable and applying the present methodology shows that there are not statistically significant differences in attrition between those experiencing middle-age hardship and those who do not.

#### IV. RESULTS

The results of the three-part empirical strategy are presented in the next three subsections. Tables 4-10 displays the tabular results and t-tests, table 11 reports the logit results for the various individual middle-age and old-age hardship combinations, and tables 12 and 13 display the results for the severity of hardship.

##### Tabular Analysis--Persistence of Hardship

Tables 4-9 report the results for each of the six old-age hardships or adverse quality of life outcome measures. For the calculations reported in these tables the sample was divided into two groups--those experiencing chronic middle-age hardship (*chronic*) and those not experiencing chronic middle-age hardship (*non-chronic*). The proportion of each group experiencing old-age hardship was calculated and the difference in these proportions was calculated as well as the standard error of the difference. This was repeated for every combination of middle- and old-age hardship. The difference in proportions is shown in the top line of each cell in the table while the next line shows the proportion of each group experiencing old-age hardship (*chronic* and *non-chronic* respectively). The sample was further stratified by sex, race or educational attainment and these results are also reported in the tables.

Table 4 shows the results for being poor or near-poor at age 66. In the first cell, 37.5 percent of the individuals experiencing chronic poverty or near-poverty in middle-age were poor or near-poor at age 66. Likewise, 6.9 percent of the *non-chronic* group was poor or near-poor at age 66. The difference in proportions between these two groups is fairly large--31 percentage points--and is statistically significant (different from zero) at the 1 percent level. Furthermore, the *chronic/non-chronic* difference is statistically significant for every demographic subgroup. In each case, those who experience chronic poverty in middle-age are much more likely to be poor or near-poor in old-age than others (at least three times more likely).

The next column of table 4 shows the *chronic/non-chronic* results for middle-age marital status (being unmarried). For the total sample and every demographic subgroup the difference is positive (20 percentage points for the total sample) and statistically significant at the 1 percent level. This suggests that marriage not only affects current well-being but also future well-being. However, it may be that marriage affects the future likelihood of marriage which affects well-being.

The third column of table 4 displays the results for living in rental housing in middle-age (renter). For the sample as a whole and for each demographic subgroup, individuals who are chronic renters in middle-age are more likely to be poor or near-poor in old-age than others (the difference is statistically significant in all cases). Part of the reason for this persistence could be due to renters having lower income than homeowners and poverty persists from middle- to old-age. However, many renters are not poor or near-poor and the correlation between middle-age poverty and being a renter is modest at 0.19.

Lastly, in the final column of table 4 the results for middle-age overcrowded housing are reported. Overall, the *chronic/non-chronic* difference in the proportions experiencing old-age poverty is modest at eight percentage points but statistically significant. The difference, however, is not statistically significant for men and for those with 12 or more years

of education. In addition, the difference has the "wrong" sign for whites--those living in overcrowded housing in middle-age are less likely to be poor in old-age than other whites. For women, blacks and less educated people the differences have the "right" signs.

It is fairly well-known that unmarried elderly tend to be less well-off than those who are married. The results in table 5 show that those who tended to be less well-off in middle-age are more likely to be unmarried when elderly. Over half of those who experienced chronic middle-age poverty are unmarried at age 66 compared to 22 percent of the *non-chronic* group--a gap of 30 percentage points. About 80 percent of those who are unmarried in middle-age are also unmarried at age 66. Most of these *chronic/non-chronic* gaps are positive and statistically significant at the one percent level. The only exception is the *chronic/non-chronic* gap for living in overcrowded housing in middle-age for men which is negative but not statistically significant. In addition, the *chronic/non-chronic* gap for middle-age poverty for men is less than three percentage points and only significant at the 10 percent level. Part of the explanation for the gender differences could be differential mortality--poor men are more likely to die young than others and, consequently, don't have a chance to become unmarried in old-age, but their poor wives, however, become widows.

The results for old-age housing tenure (i.e., being a renter) are shown in table 6. The first row of the table shows that individuals experiencing any one of the chronic middle-age hardships are much more likely to be a renter in old-age. The *chronic/non-chronic* gaps are positive, fairly large (12 to 36 percentage points), and statistically significant at the one percent level. Subsequent rows show the results for the various demographic subgroups and in almost all cases the *chronic/non-chronic* gaps are positive and statistically significant.

The *chronic/non-chronic* results for old-age overcrowded housing are much different from that for other old-age hardships (see table 7). For the total sample, the *chronic/non-chronic* gaps are considerably smaller (all less than four percentage points) than for the other old-age hardships. Furthermore, the gaps, in some instances, are negative and statistically significant, but, nonetheless, quite small (about one percentage point). One reason for the small *chronic/non-chronic* gaps is relatively few--about one percent--elderly individuals live in overcrowded housing (see table 3).

The last two tables, tables 8 and 9, report the results for the two health outcomes: death before old-age and poor health. Mortality (i.e., death before age 66 and after age 49) is examined in table 8. In general, those experiencing chronic middle-age hardship are less likely to survive to age 66 than others. About a quarter of those who were chronically poor in middle-age died before reaching age 66. The *chronic/non-chronic* gaps for the total sample are all positive and statistically significant (see the first row). The *chronic/non-chronic* gap for unmarried in middle-age while statistically significant is relatively small--less than four percentage points. The *chronic/non-chronic* gaps for most demographic subgroups are both positive and statistically significant.

The last adverse quality of life outcome is self-reported health at age 66 (see table 9). As before, individuals experiencing chronic middle-age hardship are much more likely to report being in poor or fair health at age 66 than others. The *chronic/non-chronic* gap is largest for the middle-age poverty at 38 percentage points, and smallest for renting in middle-age at 10 percentage points. Furthermore the *chronic/non-chronic* gaps are positive and statistically significant for almost all demographic subgroups. The notable exception is for African-Americans and renting in middle-age.

Two patterns stand out in tables 4-9. First, regardless of the chronic middle-age hardship measure, those experiencing chronic middle-age hardship are much more likely to (1) experience hardship at age 66, and (2) die before reaching age 66 suggesting that hardship tends to persist through the life course. Second, the *chronic/non-chronic* gaps, while almost always positive and statistically significant, differ widely among the demographic subgroups--women, blacks, and the less educated are much more likely to experience both middle-age and old-age hardships than others.

### **Multivariate Analysis--Persistence of Hardship**

The *chronic/non-chronic* gaps reported in tables 4-9 control for, at most, a single demographic characteristic. The results of the multivariate analysis (logit estimation) are reported in table 10. Logit analyses were estimated for all possible combinations of middle-age and old-age hardship separately for men and women (48 in all). Rather than display the coefficient estimates, the marginal impact of a discrete change in the indicated middle-age hardship variable (from 0 to 1) on the likelihood of experiencing the old-age hardship holding all else equal is reported.<sup>5</sup> More formally, the difference in the probability of experiencing the old-age hardship between those who experience the chronic middle-age hardship and those who don't is reported, holding other factors constant.<sup>6</sup> Each cell in each row of table 10 shows the



*chronic/non-chronic* gap and corresponds to the cells in the second and third rows in tables 4-9. The top panel of table 10 (men) corresponds to the second row in tables 4-9 while the bottom panel (women) corresponds to the third row.

Several details stand out. First, in almost every case the *chronic/non-chronic* gap reported in table 10 is smaller than the corresponding entry in the relevant rows of tables 4-9. The main reason for this difference is the results reported in tables 4-9 do not control for other factors such as individual characteristics and the economic and social environment in which the individual lives. The results suggest that in many cases part of the *chronic/non-chronic* gap is due to differences in characteristics rather than the differences in middle-age hardship. This is especially true for living in overcrowded housing in old-age--none of the middle-age hardship marginal impacts are statistically significant and all are very small.

Second, with the exception of living in overcrowded housing in old-age, most of the entries are moderately large and most are statistically significant. Even after controlling for other factors, chronic middle-age hardship is positively related to old-age hardship--hardship tends to persist. For example, individuals experiencing chronic middle-age hardship (except living in overcrowded housing) are 2 to 17 percentage points more likely to be poor or near poor in old-age than others (as opposed to the 10 to 36 percentage points from the relevant rows of table 4).

Third, living in overcrowded housing in middle-age (see the last column of table 10) for women appears to be related only to being unmarried in old-age and death before age 66. The *chronic/non-chronic* gap in early mortality is 12 percentage points and is statistically significant at the 10 percent level. The *chronic/non-chronic* gap in being unmarried in old-age is over twice as large at 30 percentage points. The other estimated *chronic/non-chronic* gaps are fairly small and not statistically significant. Apparently for women housing conditions in middle-age are related to later health and social outcomes but not other (e.g., economic) outcomes.

Fourth, for the unmarried and renter chronic middle-age hardships the *chronic/non-chronic* gaps in the health-related old-age hardship outcomes are small and not statistically significant (see the last two rows in each panel of table 10) except in one instance. Women who live in rental housing in middle-age are 9 percentage points more likely to die before age 66 than homeowners. For chronic middle-age poverty, the *chronic/non-chronic* gaps in the health-related old-age outcomes range from 14 to 32 percentage points and all are statistically significant. Evidently, the middle-age economic-related hardship is related to the health-related old-age outcome whereas the more social-related middle-age hardships (being unmarried or a renter) mostly are not.

Lastly, the *chronic/non-chronic* gaps are generally larger for women than for men. For example, the *chronic/non-chronic* gap in old-age poverty (see the first row in each panel) is at least twice as large for women as for men. Also, with the exception of death before age 66, women are more likely to experience old-age hardship than men.

The unreported coefficient estimates for death before age 66 logit analysis tend support Menchik's (1993) finding that differential mortality by race is more due to racial differences in economic status rather than due to race per se since the coefficient estimate of the race variable is not statistically significant. The coefficient estimate of the birth cohort identifier variable in all logit analyses is never statistically significant suggesting that there are not any cohort effects in the persistence of hardship from middle- to old-age, at least not for these two cohorts. The coefficient estimates for education are generally, but not always, statistically significant in the analyses. Finally, the coefficient estimates for race and region are statistically significant in a few logit analyses but mostly are small and not statistically significant.

### **Multivariate Analysis--Severity of Hardship**

The results using the severity of hardship indices are reported in tables 11 and 12. The logit estimation results for death before age 66 are presented in table 11. The incremental effect of the middle-age hardship index on the likelihood of early death (death before age 66) for men and women is displayed in the table. Formally, let  $D$  and  $M$  denote the early death binary variable and the middle-age hardship index, respectively. The entries in table 11 show

$\Pr(D=1|M=n)-\Pr(D=1|M=n-1)$  where  $n$  is the number of middle-age hardships and varies between 1 and 4.<sup>7</sup>

The incremental effect of increasing the middle-age hardship from 0 to 1 is zero for men suggesting that experiencing one middle-age hardship has no effect on early mortality. Experiencing two middle-age hardships increases the likelihood of early death by 15 percentage points while experiencing four middle-age hardships further increases the likelihood by almost 60 percentage points. This suggests that for men the severity of hardship affects mortality.

For women, however, experiencing one middle-age hardship increases the likelihood of early mortality by 12 percentage

points and then there is no statistically significant effect after that. This implies experiencing two or more middle-age hardships has no more effect on the probability of early death than experiencing one middle-age hardship. What matters for women is whether or not an individual experiences hardship in middle-age not the severity of hardship.

The ordered logit results for the old-age hardship index are presented in table 12. Each row of the table shows the incremental effect on the probability the old-age hardship equals the particular value as the middle-age hardship index increases from 0 to 1, 1 to 2, etc. The estimated incremental impacts for the increases in the middle-age hardship index for the old-age hardship index equaling 5 (the last row in each panel) are not statistically significant. The main reason is so few cases have an old-age hardship index of 5 (4 cases altogether).

There is a general positive relation between the middle-age and old-age hardship indices, though there are obvious gender differences. For men, the largest (in absolute terms) and statistically significant effects are mainly concentrated in the upper left of the top panel. This suggests that the severity of hardship is not important but the presence of hardship is. For women on the other hand, as the middle-age hardship index increases the likelihood of small values of the old-age hardship index decreases and increases for the likelihood of large values (the incremental effects in the upper left part of the panel are negative and are positive in the lower right part of the panel). For example, increasing the middle-age hardship index from 0 to 1 decreases the probability that the old-age hardship index equals 0 by 33 percentage points (a 50 percent decline). Likewise, increasing the middle-age hardship from 2 to 3 increases the likelihood that the old-age hardship index equals 4 by almost 15 percentage points. Many of the estimated impacts are statistically significant at conventional confidence levels. These results suggest that not only does hardship persist through the life course but the severity of hardship also persists, especially for women.

## V. SUMMARY AND CONCLUSIONS

Three hypotheses have been offered by various researchers to explain the evolution of heterogeneity over the life course. Each differs in the predictions regarding life course trends in heterogeneity (i.e., increasing, decreasing, or constant). Each, however, predicts limited mobility in economic status over the life course. This paper looks beyond economic status and examines the persistence of hardship (more generally defined) from middle-age to the onset of old-age (age 66).

The main result of the paper is hardship tends to persist from middle-age to old-age as does the severity of hardship. Individuals who suffer chronic hardship in their 40s are more likely to die before age 66, to suffer economic hardship in old-age, to be unmarried in old-age, to be renters in old-age, and to be in poor or fair health in old-age. These results hold true after controlling for sex, race, educational status, birth cohort and other factors. However, the results have a good news/bad news quality to them--while hardship tends to persist from middle- to old-age, middle-age hardship does not guarantee old-age hardship. Status maintenance should perhaps be thought of in probabilistic terms rather than in absolute terms--there is only a tendency for hardship to persist over the life course.

Several studies have examined poverty in old-age. Most find that falling into poverty in old-age is often linked to a specific event such as retirement or widowhood (e.g., Holden, Burkhauser and Myers 1986, Holden, Burkhauser and Feaster 1988, Burkhauser and Duncan 1988, 1991). However, many poor elderly widows were poor immediately before the death of their husbands (Bound, Duncan, Laren and Oleinick 1991, Choudhury and Leonesio 1997, and Hungerford 2001) so for some poverty begins before these retirement or widowhood transitions. Many poor elderly do escape poverty but many times the escape is only temporary (Holden, Burkhauser and Myers 1986, and Coe 1988). This paper has shown that initial experiences with hardship (such as poverty) for many elderly occurred much earlier in life.

Recent work (Rank and Hirschal 2001a, 2001b) suggests that poverty and welfare receipt is more pervasive among Americans than is generally thought. For example, two-thirds of Americans will have received welfare (SSI, AFDC, food stamps or Medicaid) at some by the time they reach 65 and one-in-four Americans will be poor for at least one year between the ages of 60 and 80. Over the life course, poverty and programs to alleviate poverty will touch many if not most lives. The results from this paper suggest that interventions to alleviate old-age hardship should begin well before the onset of old-age and that interventions that do alleviate hardship in middle-age could also contribute to alleviating old-age hardship.

That said, it should be remembered that no structural model was developed and no causal link between middle-age hardship and old-age hardship is found, just that middle-age hardship and old-age hardship are related. The exact nature of this relation is unknown; it may be that unobserved factors which persist through time are the explanation for this

relation and the persistence of hardship. To the extent that this is the case, policies alleviating middle-age hardships which do not affect the unobserved factors will have little or no impact on old-age hardships. But policies affecting the unobserved factors will affect both middle-age and old-age hardship.

Furthermore, it is important to keep in mind that old-age hardship is defined for one year only (age 66). Two other definitions of old-age hardship could be examined. The first is chronic old-age hardship defined in a similar way as chronic middle-age hardship. Using this definition would certainly lower the incidence of old-age hardship and most likely reduce the relationship between middle-age and old-age hardship. A second definition of old-age hardship is ever experiencing hardship in old-age. Previous research suggests that this measure would increase the incidence of old-age hardship and most likely increase the relationship between middle-age and old-age hardship. Both of these alternative definitions, however, requires observing individuals for several years in old-age in addition to the years observed in middle-age. To obtain meaningful sample sizes requires more years of longitudinal data than currently available. In a few years enough waves of the PSID will be available to examine these alternative hardship measures.

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	Total sample	Sample surviving to age 66
Male	43.1	41.8
Female	56.9	58.2
White/Other	68.1	71.3
Black	31.9	28.7
Less than 12 years of schooling	50.0	46.2
12 or more years of schooling	50.0	53.8
Percent dead before age 66	18.5	
Number of observations	1031	837
Data are not weighted.		

		Middle-age Hardships				Old-age Hardships				
		Poor	Unmard	Renter	Overcrwd	Poor	Unmard	Renter	Overcrwd	Pr Health
Middle-age Hardships	Poor	1.00								
	Unmard	0.19	1.00							
	Renter	0.17	0.33	1.00						
	Overcrwd	0.32	0.08	0.11	1.00					
Old-age Hardships	Poor	0.30	0.22	0.20	0.05	1.00				
	Unmard	0.20	0.46	0.24	0.08	0.20	1.00			
	Renter	0.20	0.35	0.41	0.08	0.28	0.33	1.00		
	Overcrwd	0.06	0.03	0.08	0.07	0.09	0.14	0.14	1.00	
	Pr health	0.25	0.09	0.08	0.11	0.23	0.12	0.11	0.03	1.00

**Table 3: Percent experiencing chronic hardships between ages 40-49 and adverse quality of life outcome at age 66**

	All	Sex		Race		Education	
		Male	Female	White	Black	<12 yrs	≥ 12 yrs
<b>A. Experiencing Chronic Hardship between Ages 40-49 (N=1031)</b>							
Poor or Near-poor	11.8	10.6	12.9	9.1	39.4	26.6	3.7
Unmarried	12.2	5.6	18.1	10.4	31.2	15.9	10.2
Renter	16.4	15.4	17.2	14.0	40.3	24.1	12.1
Overcrowded housing	5.4	5.4	5.4	4.2	17.5	11.6	2.0
Middle-age hardship index	0.46	0.37	0.54	0.38	1.28	0.78	0.28
<b>B. Experiencing Adverse Quality of Life Outcomes at age 66 (N=837)</b>							
Poor or Near-poor	9.7	7.6	11.5	8.0	29.4	19.2	5.2
Unmarried	24.6	13.3	33.9	23.0	42.9	29.2	22.4
Renter	11.0	7.4	14.0	9.9	23.5	18.4	7.4
Overcrowded housing	1.0	0.9	1.1	0.9	1.9	1.6	0.7
Dead before age 66 (N=1031)	13.6	16.2	11.3	12.8	22.0	21.5	9.3
Poor or fair health	27.1	25.7	28.2	25.0	51.1	38.3	21.7
Old-age hardship index	0.73	0.55	0.89	0.67	1.49	1.07	0.57
Sample weights used. Mean values of the middle-age hardship and old-age hardship indices are shown.							

**Table 4: Chronic/Non-chronic Differences in Proportions Experiencing Old-age Hardship: Poor or Near-Poor (absolute levels in parentheses)**

Old-age hardship: Poor or Near-poor	Type of Chronic Middle-age Hardship (ages 40 to 49)			
	Poor or Near-Poor	Unmarried	Renter	Overcrowded Housing
Total Sample	0.306*** (0.375-0.069)	0.196*** (0.269-0.073)	0.169*** (0.240-0.071)	0.080*** (0.173-0.093)
Men	0.209*** (0.269-0.060)	0.098*** (0.169-0.070)	0.127*** (0.184-0.057)	0.003 (0.078-0.075)
Women	0.360*** (0.435-0.076)	0.218*** (0.294-0.076)	0.201*** (0.284-0.083)	0.145*** (0.252-0.107)
White	0.241*** (0.304-0.062)	0.159*** (0.219-0.063)	0.146*** (0.207-0.060)	-0.061*** (0.020-0.081)
Black	0.390*** (0.559-0.169)	0.259*** (0.477-0.219)	0.121*** (0.368-0.247)	0.298*** (0.544-0.246)
Less than 12 years education	0.269*** (0.401-0.132)	0.266*** (0.416-0.150)	0.164*** (0.319-0.154)	0.049*** (0.235-0.186)
12 or more years education	0.239*** (0.283-0.044)	0.122*** (0.161-0.039)	0.129*** (0.166-0.037)	-0.011 (0.041-0.051)

\*\*\* chronic/non-chronic difference significant at 1 percent level.



**Table 5: Chronic/Non-chronic Differences in Proportions Experiencing Old-age Hardship: Unmarried (absolute levels in parentheses)**

Old-age hardship: Unmarried	Type of Chronic Middle-age Hardship (ages 40 to 49)			
	Poor or Near-Poor	Unmarried	Renter	Overcrowded Housing
Total Sample	0.301 <sup>***</sup> (0.518-0.217)	0.620 <sup>***</sup> (0.791-0.171)	0.294 <sup>***</sup> (0.494-0.200)	0.166 <sup>***</sup> (0.403-0.237)
Men	0.027 <sup>*</sup> (0.158-0.130)	0.609 <sup>***</sup> (0.711-0.102)	0.222 <sup>***</sup> (0.322-0.100)	-0.020 (0.114-0.133)
Women	0.434 <sup>***</sup> (0.735-0.291)	0.573 <sup>***</sup> (0.810-0.237)	0.346 <sup>***</sup> (0.630-0.284)	0.321 <sup>***</sup> (0.644-0.323)
White	0.274 <sup>***</sup> (0.483-0.209)	0.614 <sup>***</sup> (0.778-0.165)	0.234 <sup>***</sup> (0.432-0.198)	0.132 <sup>***</sup> (0.356-0.224)
Black	0.263 <sup>***</sup> (0.609-0.346)	0.579 <sup>***</sup> (0.842-0.263)	0.499 <sup>***</sup> (0.737-0.238)	0.103 <sup>**</sup> (0.517-0.413)
Less than 12 years education	0.301 <sup>***</sup> (0.527-0.226)	0.670 <sup>***</sup> (0.857-0.188)	0.298 <sup>***</sup> (0.523-0.225)	0.129 <sup>***</sup> (0.408-0.280)
12 or more years education	0.275 <sup>***</sup> (0.488-0.213)	0.578 <sup>***</sup> (0.742-0.164)	0.277 <sup>***</sup> (0.468-0.190)	0.173 <sup>***</sup> (0.391-0.218)

\*\*\* chronic/non-chronic difference significant at 1 percent level.

\*\* chronic/non-chronic difference significant at 5 percent level.

\* chronic/non-chronic difference significant at 10 percent level.

**Table 6: Chronic/Non-chronic Differences in Proportions Experiencing Old-age Hardship: Renter (absolute levels in parentheses)**

Old-age hardship: Renter	Type of Chronic Middle-age Hardship (ages 40 to 49)			
	Poor or Near-Poor	Unmarried	Renter	Overcrowded Housing
Total Sample	0.213*** (0.302-0.089)	0.341*** (0.409-0.068)	0.356*** (0.412-0.056)	0.122*** (0.225-0.103)
Men	0.048*** (0.188-0.070)	0.209*** (0.271-0.062)	0.311*** (0.339-0.028)	-0.006 (0.068-0.073)
Women	0.301*** (0.408-0.106)	0.369*** (0.443-0.074)	0.391*** (0.470-0.079)	0.228*** (0.356-0.128)
White	0.169*** (0.255-0.086)	0.320*** (0.385-0.065)	0.353*** (0.405-0.053)	0.057*** (0.153-0.096)
Black	0.281*** (0.424-0.144)	0.390*** (0.511-0.120)	0.333*** (0.438-0.105)	0.198*** (0.400-0.201)
Less than 12 years education	0.140*** (0.293-0.153)	0.477*** (0.587-0.110)	0.319*** (0.432-0.112)	0.098*** (0.273-0.175)
12 or more years education	0.267*** (0.331-0.065)	0.228*** (0.279-0.050)	0.362*** (0.394-0.032)	0.050*** (0.122-0.072)

\*\*\* chronic/non-chronic difference significant at 1 percent level.

**Table 7: Chronic/Non-chronic Differences in Proportions Experiencing Old-age Hardship: Overcrowded Housing (absolute levels in parentheses)**

Old-age hardship: Overcrowded Housing	Type of Chronic Middle-age Hardship (ages 40 to 49)			
	Poor or Near-Poor	Unmarried	Renter	Overcrowded Housing
Total Sample	0.020 <sup>***</sup> (0.028-0.008)	0.008 <sup>***</sup> (0.017-0.009)	0.023 <sup>***</sup> (0.029-0.006)	0.036 <sup>***</sup> (0.044-0.008)
Men	0.043 <sup>***</sup> (0.048-0.006)	-0.009 <sup>*a</sup> (0.000-0.009)	0.030 <sup>***</sup> (0.035-0.004)	0.050 <sup>***</sup> (0.057-0.007)
Women	0.006 (0.016-0.010)	0.013 <sup>***</sup> (0.021-0.008)	0.016 <sup>***</sup> (0.024-0.008)	0.023 <sup>***</sup> (0.033-0.010)
White	0.009 <sup>***</sup> (0.017-0.008)	0.011 <sup>***</sup> (0.019-0.008)	0.026 <sup>***</sup> (0.032-0.006)	0.031 <sup>***</sup> (0.039-0.008)
Black	0.052 <sup>***</sup> (0.055-0.002)	-0.014 (0.009-0.023)	-0.002 (0.018-0.020)	0.043 <sup>***</sup> (0.056-0.012)
Less than 12 years education	0.022 <sup>***</sup> (0.033-0.010)	-0.013 <sup>***</sup> (0.004-0.017)	0.003 (0.017-0.015)	0.051 <sup>***</sup> (0.062-0.011)
12 or more years education	0.003 (0.010-0.070)	0.022 <sup>***</sup> (0.027-0.005)	0.037 <sup>***</sup> (0.040-0.003)	-0.002 (0.005-0.007)

\*\*\* chronic/non-chronic difference significant at 1 percent level.

<sup>a</sup> no cases experiencing chronic middle-age hardship and old-age hardship.

**Table 8: Chronic/Non-chronic Differences in Proportions Experiencing Old-age Hardship: Dead before age 66 (absolute levels in parentheses)**

Old-age hardship: Dead before age 66	Type of Chronic Middle-age Hardship (ages 40 to 49)			
	Poor or Near-Poor	Unmarried	Renter	Overcrowded Housing
Total Sample	0.222 <sup>***</sup> (0.331-0.110)	0.033 <sup>***</sup> (0.164-0.032)	0.088 <sup>***</sup> (0.209-0.121)	0.184 <sup>***</sup> (0.310-0.126)
Men	0.289 <sup>***</sup> (0.421-0.132)	0.083 <sup>***</sup> (0.240-0.158)	0.057 <sup>***</sup> (0.210-0.154)	0.178 <sup>***</sup> (0.331-0.153)
Women	0.176 <sup>***</sup> (0.266-0.090)	0.038 <sup>***</sup> (0.144-0.106)	0.116 <sup>***</sup> (0.208-0.093)	0.190 <sup>***</sup> (0.292-0.102)
White	0.212 <sup>***</sup> (0.321-0.108)	0.008 (0.135-0.127)	0.080 <sup>***</sup> (0.197-0.117)	0.198 <sup>***</sup> (0.318-0.120)
Black	0.229 <sup>***</sup> (0.358-0.128)	0.072 <sup>***</sup> (0.267-0.195)	0.061 <sup>***</sup> (0.254-0.192)	0.090 <sup>***</sup> (0.291-0.201)
Less than 12 years education	0.184 <sup>***</sup> (0.350-0.166)	0.016 (0.228-0.212)	0.072 <sup>***</sup> (0.270-0.197)	0.186 <sup>***</sup> (0.379-0.193)
12 or more years education	0.172 <sup>***</sup> (0.258-0.086)	0.020 <sup>*</sup> (0.110-0.090)	0.058 <sup>***</sup> (0.143-0.086)	0.004 (0.096-0.092)
<sup>***</sup> chronic/non-chronic difference significant at 1 percent level. <sup>*</sup> chronic/non-chronic difference significant at 10 percent level.				

**Table 9: Chronic/Non-chronic Differences in Proportions Experiencing Old-age Hardship: Poor or Fair Health (absolute levels in parentheses)**

Old-age hardship: Poor or Fair Health	Type of Chronic Middle-age Hardship (ages 40 to 49)			
	Poor or Near-Poor	Unmarried	Renter	Overcrowded Housing
Total Sample	0.379 <sup>***</sup> (0.614-0.235)	0.121 <sup>***</sup> (0.375-0.255)	0.097 <sup>***</sup> (0.352-0.254)	0.252 <sup>***</sup> (0.510-0.258)
Men	0.343 <sup>***</sup> (0.574-0.231)	0.172 <sup>***</sup> (0.419-0.247)	0.105 <sup>***</sup> (0.345-0.240)	0.198 <sup>***</sup> (0.445-0.247)
Women	0.399 <sup>***</sup> (0.637-0.238)	0.103 <sup>***</sup> (0.365-0.262)	0.091 <sup>***</sup> (0.357-0.266)	0.296 <sup>***</sup> (0.564-0.267)
White	0.386 <sup>***</sup> (0.607-0.221)	0.094 <sup>***</sup> (0.333-0.239)	0.133 <sup>***</sup> (0.347-0.234)	0.218 <sup>***</sup> (0.459-0.241)
Black	0.180 <sup>***</sup> (0.631-0.451)	0.063 <sup>*</sup> (0.553-0.490)	-0.221 <sup>***</sup> (0.372-0.593)	0.148 <sup>***</sup> (0.633-0.485)
Less than 12 years education	0.428 <sup>***</sup> (0.716-0.288)	0.100 <sup>***</sup> (0.466-0.366)	0.090 <sup>***</sup> (0.451-0.362)	0.270 <sup>***</sup> (0.627-0.357)
12 or more years education	0.045 <sup>*</sup> (0.259-0.214)	0.103 <sup>***</sup> (0.308-0.205)	0.049 <sup>***</sup> (0.259-0.210)	0.044 (0.259-0.214)
<sup>***</sup> chronic/non-chronic difference significant at 1 percent level. <sup>*</sup> chronic/non-chronic difference significant at 10 percent level.				

**Table 10: Marginal Effects from Logit Estimation (independent variables evaluated at means)**

		Middle-age hardship independent variable			
		Poor/near poor	Unmarried	Renter	Overcrowded
<b>A. Men</b>					
Old-age hardship dependent variable	Poor or Near-poor	0.079*	0.019	0.055*	-0.011
	Unmarried	0.021	0.746***	0.218***	-0.018
	Renter	0.037	0.215*	0.308***	-0.009
	Overcrowded Housing	0.026	0.007	0.021	0.020
	Death before age 66	0.191**	0.046	0.010	0.089
	Fair or poor health	0.238**	0.209	0.028	0.180
<b>B. Women</b>					
Old-age hardship dependent variable	Poor or Near-poor	0.172**	0.170***	0.167***	-0.008
	Unmarried	0.451***	0.568***	0.324***	0.303**
	Renter	0.238***	0.337***	0.360***	0.155
	Overcrowded Housing	0.003	0.002	0.003	0.002
	Death before age 66	0.143**	0.018	0.092**	0.123*
	Fair or poor health	0.320***	0.080	0.077	0.180
*** significant at 1 percent level; ** significant at 5 percent level; * significant at 10 percent level.					

**Table 11: Incremental Effects of Middle-age Hardship Index on Likelihood of Death Before Age 66**

Middle-age Hardship Index	Incremental Effect	
	Men	Women
0-1	0.000	0.121**
1-2	0.152*	-0.020
2-3	0.044	0.005
3-4	0.579***	0.187
*** significant at 1 percent level; ** significant at 5 percent level; * significant at 10 percent level.		

**Table 12: Incremental Effects of Middle-age Hardship Index on Probability of Old-age Hardship Index Value from ordered logit estimation**

		Middle-age hardship: increase in the number of hardships			
		0-1	1-2	2-3	3-4
<b>A. Men</b>					
Old-age hardship index: number of hardships	0	-0.322***	-0.255***	0.134	-0.221***
	1	0.202***	-0.061	0.084	-0.330***
	2	0.093**	0.203**	-0.133	0.158
	3	0.018	0.070	-0.053	0.197*
	4	0.008	0.036	-0.028	0.160
	5	0.001	0.006	-0.005	0.035
<b>B. Women</b>					
Old-age hardship index: number of hardships	0	-0.323***	-0.150**	-0.073**	0.040
	1	0.105***	-0.122**	-0.200***	0.130
	2	0.132***	0.099***	-0.085*	0.086*
	3	0.069***	0.131***	0.185***	-0.117
	4	0.015**	0.038*	0.148**	-0.119
	5	0.002	0.005	0.024	-0.020
*** significant at 1 percent level; ** significant at 5 percent level; * significant at 10 percent level.					

## NOTES

1. Author's tabulations of the March 2001 Current Population Survey (CPS). Means-tested benefits include TANF, general assistance, SSI, food stamps and Medicaid.
2. Deaton and Paxson (1994) show that a simple model of the permanent income hypothesis implies that inequality in consumption and income should grow as a cohort ages.
3. A 50 percent threshold was also tried. While the cell sizes differ, the qualitative and, to a great extent, quantitative results are the same as those reported in this paper.
4. Individuals can rate their health as excellent, very good, good, fair or poor.
5. The full estimation results are available from the author on request.
6. Let  $O$  and  $M$  denoted the old-age and middle-age hardship binary variables, respectively. The marginal impacts reported in table 10 show  $\Pr(O=1|M=1)-\Pr(O=1|M=0)$  holding the other variables constant at their mean values.
7. The other variables are held constant at their mean values.