NBER WORKING PAPER SERIES

RICH, POOR, SINGLES, AND COUPLES. WHO RECEIVES MEDICAID IN OLD AGE AND WHY?

Margherita Borella
Mariacristina De Nardi
Eric French

Working Paper 21873
http://www.nber.org/papers/w21873

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
January 2016

We thank Marco Bassetto, Amy Finkelstein, Helen Koshy, and Lee Lockwood for helpful comments and suggestions. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research, any agency of the federal government, the Federal Reserve Bank of Chicago, or the IFS.

Rich, Poor, Singles, and Couples. Who Receives Medicaid in Old Age and Why?
Margherita Borella, Mariacristina De Nardi, and Eric French
NBER Working Paper No. 21873
January 2016
JEL No. D1,D31,E21,H2,H31,H4,H51

ABSTRACT

We use the Health and Retirement Survey (HRS) data set to study who receives Medicaid in old age and why. First, we conduct a descriptive analysis of Medicaid recipiency along a number of important observables. This analysis shows that, while fewer people with high permanent income receive Medicaid, a significant fraction of high permanent income people receive Medicaid at very old ages. It also shows that more single people receive Medicaid than people in couples, that people who just lost their spouse rapidly become very similar in their Medicaid recipiency and other important observable characteristics to people who have been single for much longer, and that bad health commoves with Medicaid recipiency. Finally, this analysis shows even people having long-term care insurance end up on Medicaid, but that the fraction of people in this group that is on Medicaid is one-third that of the entire population of the elderly. Second, multivariate regression analysis allows us to disentangle the effects of many observables on Medicaid recipiency while conditioning for others and reveals several interesting patterns. First, permanent income and other variables capturing economic background have a major role in determining individuals' Medicaid coverage and explain much of the observed differences in Medicaid recipiency among singles, couples, and people who recently lost their spouse. Second, impairments in the activities of daily living and residency in a nursing home have a large effect on the probability of being on Medicaid, with the effect of nursing home residency being relatively large for those in the middle and upper income groups. Lastly, having long-term care insurance has no independent effect on the probability of ending up on Medicaid.

Margherita Borella
Università di Torino
Dipartimento di Scienze Economico-Sociali
e Matematico-Statistiche
Torino, Italy
margherita.borella@unito.it

Mariacristina De Nardi
Federal Reserve Bank of Chicago
230 South LaSalle St.
Chicago, IL 60604
and University College London
and Institute For Fiscal Studies - IFS
and also NBER
denardim@nber.org

Eric French
University College London, CEPR, and IFS
30 Gordon Street
London, WC1H 0AX
United Kingdom
Eric.French.econ@gmail.com

Introduction

Medicaid is a means-tested program that, among several mandates, helps cover the cost of medical goods and services for the U.S. elderly who have either low income and assets or low assets and catastrophic medical spending; it thus provides insurance against medical risk during retirement. In 2010, 6.3 million individuals aged 65 and older received an average benefit amount of $11,620.

There are several interesting aspects to this program. First, even though Medicaid is intended for "poor" households, middle- and higher-income households with high medical expenses might also qualify for assistance. In fact, given the ongoing growth in medical expenditures, Medicaid coverage in old age is extending from the poor to the middle and upper class (Brown and Finkelstein, 2008) and thus becoming more expensive to administer. Second, because Medicaid takes assets and income into account, it may affect households' saving decisions, not only by reducing the level and risk of their medical expenses but also by encouraging them to consume their wealth and income more quickly to qualify for aid. Third, there is the question of whether people who are not Medicaid eligible, strictly speaking, are able to adopt strategies to avail of the program. Fourth, while some people might spend down their savings to qualify for Medicaid, others who are eligible do not apply for it, due to "Medicaid aversion" or stigma and thus forgo valuable medical insurance.

The goal of this paper is to document new facts about retirees to provide a better understanding of the economic forces and behaviors that might tend to increase or decrease Medicaid recipiency and determine its heterogeneity across people. Given the ever-present pressure on government budgets and the increasing costs of providing medical goods and services, we need to understand how old-age Medicaid insurance works and why people do or do not end up on Medicaid at some point during retirement.

Important differences in wealth, income, and health have been documented between couples and singles. Moreover, the death of one's spouse has been associated with spikes in medical expenditures and large drops in assets for the surviving spouse (French et al., 2006; Poterba et al., 2011). Hence, we perform our analysis for "singles," that is, those who are single during all of our sample period; for "couples," that is, those who start out in our sample as couples, as long as they stay in a couple; and for "singled," that is, those who become single during our sample period. This enables us to better understand how family structure and its changes over time affect important economic variables, including Medicaid eligibility. An important feature of Medicaid is that it provides insurance against catastrophic medical

expenses by providing a minimum floor of consumption for households. It is also possible that this insurance mechanism might work differently for couples, singles, and people just becoming single.

In addition, important differences in savings by permanent income have been documented (De Nardi et al., 2011). For this reason and because Medicaid is means-tested, we further divide our demographic groups by permanent income to perform our descriptive analysis.

We use the Health and Retirement Survey (HRS) data set to study the evolution and possible determinants of Medicaid recipiency for U.S. households during retirement. We start our analysis by documenting the path of Medicaid recipiency, assets, health, nursing home stays, and private long-term-care insurance holdings for couples, singles, and people who become single during our sample period, conditional on permanent income.

Our descriptive analysis uncovers several interesting findings. First, even at higher percentiles of permanent income, the Medicaid recipiency rate is high for old age survivors. For instance, among the singles aged 95 and older in the top permanent income tercile the Medicaid recipiency rate is between 5% and 10%. Second, in the raw data couples are less likely to end up on Medicaid than singles, especially at higher permanent income levels. Third, people who just lost their spouse rapidly become very similar in their Medicaid recipiency and other important observable characteristics to people who have been single for much longer. Fourth, the evolution of health by age for permanent income is similar for singles, singled, and couples. Fifth, impairments related to having difficulties in at least two basic activities of daily living (ADLs) grow fast with age after age 75 and display much less variation in permanent income than self-perceived bad health. Sixth, people living in a couple are much less likely to experience long nursing home stays than singles or to have two or more impairments in ADLs at old ages. Seventh, while the probability of being on Medicaid in our sample is 16%, the probability of being on Medicaid conditional on holding long-term care insurance is still 5.8%, which indicates that people holding long-term care insurance can still end up on Medicaid.

Then, we study how the probability of being covered by Medicaid is influenced by demographic, economic, and health factors, using a logit probability model to quantify the various effects. Permanent income and other variables capturing economic background have a major role in determining individuals' Medicaid coverage and in explaining the observed differences in Medicaid recipiency between singles, singled, and couples. In fact, among the possible family structures, being a single (or singled) woman is the only one to have a positive effect on the probability of being on Medicaid, though only at low permanent income percentiles. Impairments in the activities of daily living and residency in a nursing home have

a large effect on the probability of being on Medicaid, and the nursing home effect is relatively large for middle and upper permanent income people. Both of these findings are consistent with Medicaid eligibility rules: In most states, people with low income are automatically enrolled in Medicaid, while people with higher income can only become Medicaid eligible if they experience high medical expenses related to a severe health condition, which we control for in our regressions.

Finally, long-term care insurance has no effect on Medicaid recipiency once the other observables are controlled for. A possible explanation for this finding is that two forces counterbalance each other. On the one hand, people needing LTC for longer periods might be more likely to purchase LTC insurance plans. On the other hands, the caps on number of nights and other restrictions imposed by the LTC insurance contracts might imply that the people purchasing such plans run out of insurance coverage and are just as likely to end up on Medicaid as those not purchasing them.

Related Literature

The papers most closely related to ours study the observable factors associated with Medicaid enrollment. Pezzin and Casper (2002) use the 1996 Medicare Current Beneficiary (MCBS) data to study the factors associated with Medicaid enrollment among low-income, community-dwelling elderly persons and to evaluate the effects of Medicaid enrollment on the use of health care services by elderly persons, taking into account selection into program participation. They find that less than half of all community-dwelling elderly persons with incomes at or below 100% of the federal poverty line were enrolled in Medicaid in 1996.[1] They also find no effects of state-level Medicaid generosity on the probability of living in the community as opposed to in a nursing home, that Medicaid eligibility does not appear to have strong effects on service usage, and that state-level Medicaid generosity increases the likelihood of Medicaid enrollment. Their main conclusion is that Medicaid participation can be influenced by state policy. Compared with Pezzin and Casper, not only do we study a much longer panel, but we also study Medicaid enrollment across the whole population and permanent income, because Medicaid insurance is becoming more appealing to the middle- and upper-income elderly (Brown and Finkelstein (2008) and De Nardi et al. (2015)).

[1] It should be noted that Medicaid eligibility is based on both assets and income tests and that these authors do not use asset data to determine Medicaid eligibility. In addition, Meyer and Mittag (2015) find that survey data respondents underreport support from public assistance and that these data sets thus sharply understate the income of poor households.

Gardner and Gilleskie (2012) use data from the 1993-2000 waves of the HRS to estimate a dynamic empirical model of health insurance coverage, long-term care arrangements, asset and gift behavior, and health transitions over time. Their main result is that most Medicaid eligibility and generosity policy variables associated with nursing home services have no effects on Medicaid recipiency and savings. Instead, they find that policies related to home- and community-based services have a small but significant influence, especially on the non-married elderly with low assets. Because they found that state-level variation in program rules did little to explain Medicaid recipiency, we focus on other variables. We add many more variables that could be relevant for predicting Medicaid recipiency, including for instance the number of children, and we consider the role of permanent income and cohabitation in a much richer way. See also De Nardi et al. (2012) for more on state-level variation in Medicaid rules.

Compared with the previous two papers, we use HRS panel data from 1996 to 2012, resulting in nine waves of data every two years over a long period. This long time span allows us to follow the evolution of Medicaid enrollments over the retirement period conditional on a person's characteristics and to document important differences by permanent income (rather than just current income) and for singles and couples. Instead of focusing on the differences across states in the implementation of the Medicaid program, we focus on the commonalities of the Medicaid program in the United States. In addition, our descriptive analysis highlights the most important aspects of assets, income, health, and Medicaid eligibility that couples and singles in different income categories experience. Finally, our regression analysis describes Medicaid recipiency as a function of (mostly predetermined) variables, once people's optimizing behavior takes place.

Our paper is also related to the work that studies the incentives to be on Medicaid. At one extreme, some papers find large Medicaid stigma, or public care aversion. At the other extreme, other works discuss Medicaid moral hazard or strategic spend-down of assets by people who want to become Medicaid eligible. In the first camp, for instance, Ameriks et al. (2011) use a data set from Vanguard that samples middle- to high-income people and also asks hypothetical questions to study the determinants of lack of asset run-down and under-annuitization. They conclude that Medicaid aversion is an important determinant of the observed savings patterns. In addition, Norton (2005) argues that the elderly do not spend down to qualify for Medicaid but that, on the contrary, some of them might actually save and/or receive transfers to avoid Medicaid eligibility. Finally, Taylor et al. (1999) find that four out of ten community dwellers could qualify for Medicaid by establishing a trust, but that less than 10% actually had a trust. In addition, for those with trusts, avoidance of probate and controlling assets were stronger

motivations for trust creation than achieving Medicaid spend-down; thus, there was little evidence of strategic trust-setting to become Medicaid eligible. Other works, in contrast, stress that Medicaid imposes strong incentives for households to spend down their savings (Hubbard, Skinner and Zeldes, 1995) and not to purchase long-term-care insurance (Brown and Finkelstein, 2008), and thus has large effects on both savings and portfolio choice. Basset (2007) and Baird, Hurd, and Rohwedder (2014) find that the self-assessed probability of entering a nursing home is a significant determinant of the likelihood of making an asset transfer and interpret this as evidence supporting strategic behavior to achieve Medicaid eligibility. We do not attempt to address these questions and separately try to identify Medicaid aversion or strategic spend-down, but rather, we study Medicaid recipiency in old age and its predictors.

Important differences in wealth, income, and health have been documented between couples and singles and point to the importance of thinking about those characteristics when studying Medicaid recipiency. For instance, Guner at al. (2014) find that married agents are healthier than unmarried ones, this gap widens by age, and there is a health protective role of marriage at older ages. In addition, the death of one's spouse has been associated with spikes in medical expenditures and with large drops in assets for the surviving spouse. See for instance, Poterba Venti and Wise (2011), French et al. (2006), and De Nardi et al (2013). We adopt the insights from these contributions in looking at Medicaid recipiency and its determinants.

There are also several papers that study the Medicaid program. For instance, Gruber (2000) examines the history, rules, and economic implications of the Medicaid program. De Nardi et al. (2012) focus on the two main pathways to Medicaid eligibility after age 65: being categorically needy (having low income and assets) and being categorically needy (having high medical bills). Bitler and Zavodny (2014) and Buchmuller et al. (2015) update Gruber's paper after over 14 years of Medicaid history, changes, and research on Medicaid.

Some Institutional Background

In the United States, there are two major public health insurance programs for the elderly. The first one is Medicare, a federal program that provides health insurance to most people over the age of 65. The second one is Medicaid, a means-tested program that is run jointly by the federal and state governments. Although Medicaid also covers some specific categories of people of all ages (and these categories expanded under the Affordable Care Act), this paper

focuses on Medicaid recipiency by the elderly. An important feature of Medicaid is that not only it is asset[2] and income tested, but it is also is the payer of "last resort": Medicaid contributes only after Medicare and private insurance pay their shares and the individual spends down his assets to a "disregard" amount. In contrast, almost all seniors qualify for Medicare.

Medicare is the main provider of medical care for the elderly and disabled, but does not cover all medical costs. In particular, Medicare reimburses only a limited amount of long-term care costs, and most elderly people do not have private long-term care insurance. As a result, Medicaid covers almost all nursing home costs of poor elderly recipients. More generally, Medicaid now assists 70% of nursing home residents,[3] who face nursing home costs of the order of $77,000 to $88,000 a year (in 2014). Medicaid helps the elderly poor pay for other medical services as well. In 2009, Medicaid spent $74 billion on 6.3 million elderly beneficiaries.[4]

Although Medicaid program requirements are established by each state, the federal government defines some general guidelines for eligibility. Eligibility groups include the categorically needy and the medically needy. In the *categorically needy* group, individuals' or families' income and assets fall below certain thresholds. Supplemental Social Insurance (SSI) recipients typically qualify under the categorically needy provision, although some states have more restrictive rules. The second group comprises the *medically needy*, who are individuals whose income or savings are above the categorically needy threshold, but who face such high medical expenditures that their financial resources are insufficient.

The categorically needy provision thus affects the saving of people who have been poor throughout most of their lives, but has no impact on the saving of middle- and upper-income people. The medically needy provision, instead, provides insurance to people with higher income and assets who are still at risk of being impoverished by expensive medical conditions.

The Data

To study U.S retirees, including the very old, we select individuals (and their partner if present) born before 1924. This group of people comes from a subset of the Health and Retirement Survey (HRS) data known as the Assets and Health Dynamics of the Oldest Old (AHEAD).

[2] See De Nardi et al. (2012) for more on income and asset eligibility criteria of the Medicaid program.
[3] Figure taken from Kaiser Family Foundation (2010).
[4] Figures taken from the Medicaid Statistical Information System. We thank Jeff Silverman and Joshua Volosov for helping with these extracts.

Data for the AHEAD cohorts were collected starting in late 1993/early1994, with wave 2 of the HRS. However, since Rohwedder et al. (2006) found that income and wealth variables are underreported in that wave, we discard it and use data from 1996 (wave 3) onwards. We thus have a total of nine waves, which are collected every two years, spanning the 1996 to 2012 period. Since we select people born before 1924, we have a distribution of people that in 1996 were at least 72 year old and we follow these people over time, until 2012. Our initial sample consists of 3,045 singles and 2,049 initially married individuals, for a total of 5,994 individuals (see Appendix A for details on the selection of the initial sample).

We divide our observations into three groups, according to their marital status. More specifically, the first group, the "singles" includes individuals who were single at the beginning of our sample (wave 3) and who remain single thereafter. The second group, "the couples," includes married individuals and people who are in a couple as of wave 3, as long as they stay married or in a couple. The third group, "the singled" includes those who were initially married in wave 3 but became single later. We thus include them in the third group after they become single and as long as they are alive. Thus, some observations will start in group 2 and transition to group 3 when their partner dies or the couple splits up. Hence, we show graphs for three groups: singles, married, and singled. Our data are thus an unbalanced panel, whose size becomes smaller over time as people die or become single (in the case of couples).

We also group our data according to the year of birth to form three cohorts: the youngest cohort includes individuals born between 1917 and 1923, the middle cohort includes individuals born between 1910 and 1916, and the oldest cohort includes individuals born between 1900 and 1909.[5]

In our graphical analysis, we also group our data according to permanent income terciles. The key idea behind our permanent income measure is that it does not change with age or with demographic status (coupled, single, or singled) during our sample period. See Appendix A for a detailed discussion of how we measure permanent income. Appendix B repeats our descriptive analysis by education level, and the comparison of the two sets of results shows that our conclusions are very similar regardless of whether we use our measure of permanent income or education as a measure of lifetime income.

In the following graphs, the numbers refer to the permanent income tercile (1 = lowest; 2 = middle; 3 = richest). The youngest cohort was born on average in 1920 and is represented by a thick, continuous line; the middle cohort was born on average in 1913 and is represented

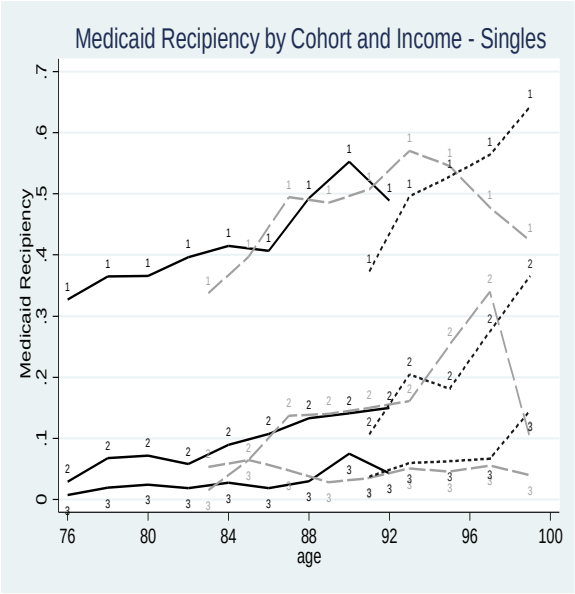
[5] The oldest cohort spans a larger interval as mortality implies a smaller number of individuals at advanced ages.

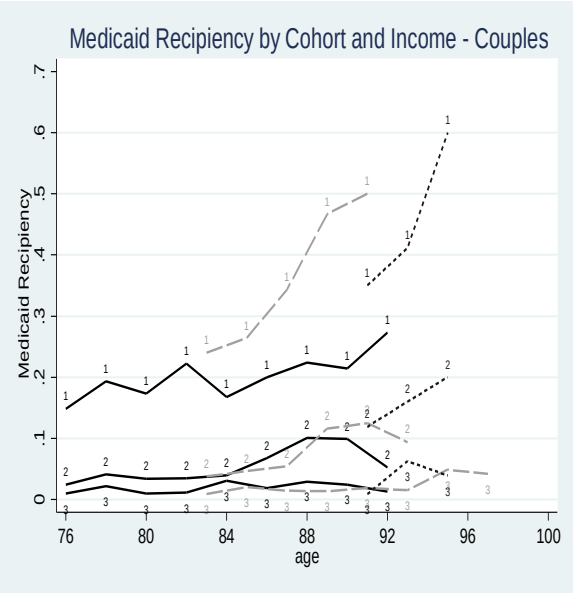
by a dotted line; the oldest cohort was born on average in 1905 and is represented by a thin, continuous line. Tables A1-A6 in Appendix A report some important characteristics of the observations underlying our graphs, such as average income and cell size conditional on age, cohort, permanent income, and marital status.

One consideration to keep in mind when looking at our graphs is that people who are institutionalized are not included in the initial sample of the HRS/AHEAD data set. However, once people are in the data set, they stay in the data set as long as they are alive, including when institutionalized. Due to this sample design, two things are important to mention. First, the set of people that we initially observe at each age tends to be healthier than the representative population of the same age, and this selection is especially pronounced at older ages when the probability of being sick and in a nursing home or hospital is higher. Second, as people in the same cohort age, their health tends to revert to the mean to some extent, thus lessening this initial selection problem. French and Jones (2004) and Hurd et al., 2015, show that the HRS/AHEAD data are representative of the fraction of people in a nursing home by the third wave. As a result of these features of the survey design, our cohort outcomes are different not only because of cohort effects, but also because of the differential selection by age and over time.

Medicaid Recipiency

We start by establishing some facts about Medicaid recipiency in our sample and for our subpopulations of interest by looking at the fraction of people on Medicaid by age, cohort, and permanent income. In Appendix B, we show that the results for Medicaid recipiency by education are very similar to those by permanent income.





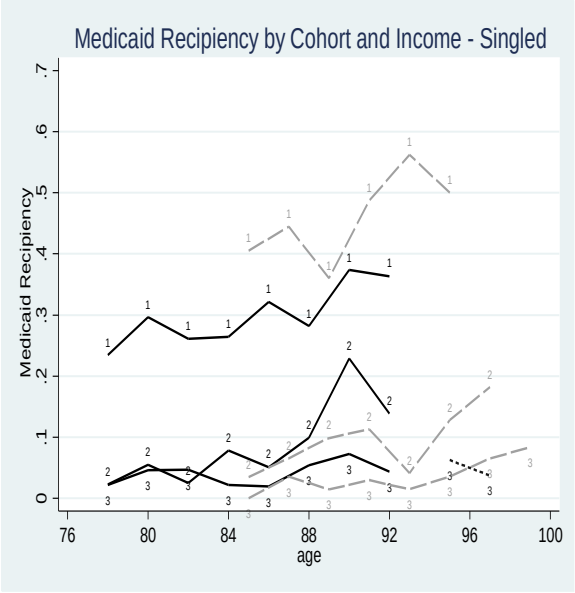


Figure 1: Fraction of people on Medicaid among those who are single (top left), in couples (top right), and singled (bottom) after age 75, by age, cohort, and permanent income.

The top left graph in Figure 1 reports the fraction of single people on Medicaid after age 75, by age, cohort, and permanent income, and displays several interesting patterns. First, there is a big gap in Medicaid recipiency between the people in the bottom permanent income tercile and the people in the two higher permanent income terciles. The fraction of people on Medicaid in the lower permanent income tercile starts higher at age 76, at over 30%, compared with under 3% for the singles in the second and third permanent income terciles and grows fast with age, reaching about 60% for those who survive to age 99. Second, the fraction of survivors on Medicaid for those in the second and third permanent income terciles also rises significantly, going from about 3% at age 76 to about 25% at age 99 for those in the second permanent

income tercile, and from about 0% at age 76 to about 10% at age 99 for those in the third permanent income tercile. These findings confirm those by De Nardi et al. (2013), even though that paper used different permanent income bins and different cohorts. Thus, although Medicaid, as intended, is a program that mainly helps the elderly poor, even elderly in the top two permanent income groups often receive benefits if they live long enough.

The top right graph in Figure 1 reports the fraction of people in couples who are on Medicaid after age 75, by age, cohort, and permanent income. The fraction of people in couples in the lowest permanent income tercile who are on Medicaid at age 76 is about 15%, which is less than half of the corresponding fraction for singles in the lowest permanent income tercile, but then climbs fast as the survivors age, reaching 60%, as for singles. Finally, the fraction of individuals in couples in the two highest permanent income terciles that are on Medicaid is lower than the corresponding terciles for singles and well below the fraction for singles at all ages.

The bottom graph in figure 1 reports the fraction of people who become single during the sample who are on Medicaid after age 75, by age, cohort, and permanent income. The first thing to notice is that, by construction of our groups, there are no singled people right after age 75, as the people in our samples are either initially singles or in couples. The second thing to notice is that the singled Medicaid recipiency rates lie remarkably well between those of the people who were originally singles at the start of our sample and the couples. For instance, about 35% of the 80-year-old singles in the lower permanent income tercile are on Medicaid, compared with 17% of the couples and about 30% of the singled. Analogously, among the 90 year olds in the lowest permanent income tercile, about 50% of the singles are on Medicaid, about 35% of the couples are on Medicaid, and about 43% of the singled are on Medicaid. Thus, it appears that the median person transitioning from a couple to singled becomes quite similar to a single person that has been on Medicaid for longer, in terms of life cycle profiles of the likelihood to be on Medicaid, conditional on age, cohort, and permanent income.

Net Worth

We now turn to displaying median assets by age, cohort, permanent income tercile, and marital status, because Medicaid is a means-tested program that takes into account both assets (or net worth) and income. We use the terms assets and net worth interchangeably because most people at this age have very little debt.

It is important to mention that after someone dies, the HRS/AHEAD follows up with either the spouse, or children, or the executor of the estate to figure out what was left of the decedents' assets. This is done through the exit and post-exit interviews. Previous literature has pointed out two important observations in this regard. First, people can incur large medical expenses in the period before death (see for instance, Marshall et al. (2001) and French et al. (2006)). Second, it appears that assets drop before death for reasons that go beyond medical expenses and that are not yet completely understood (see for example, French et al. (2006) and Poterba et al. (2011)). For these reasons, to have a complete picture of someone's net worth, it is important to take into account what happens immediately before death, which would be overlooked if one were not to use the exit and post-exit interviews. We include all of these additional data. This is described in more detail in Appendix A.

The first thing to notice compared with the Medicaid graphs that we have just discussed is that people in the lowest income tercile have the highest Medicaid recipiency and the lowest assets. Similarly, median assets tend to be higher for people with higher permanent income for each cohort and age. More specifically, the singles (top left graph in Figure 2) in the lowest permanent income tercile enter our sample at age 76 with under $30,000 in median assets; and if they survive into their 90s, they consume all of their assets and live off Social Security, Medicaid, and other government transfers. Those in the second permanent income tercile start out age at 76 with median assets just above $120,000, which also gradually decline for the survivors to about $15,000 once they reach their late nineties. Finally, the singles in the highest income tercile, start out at age 76 with about $320,000 in median assets and also spend down their savings, but still hold almost $200,000 in their late nineties. These findings also confirm those by De Nardi et al. (2010), who also pointed to the importance of out-of-pocket medical expenses in generating these savings patterns. We thus turn to discussing the top right panel of Figure 2, which reports median household assets for males in couples after age 75, by male's age, cohort, and permanent income. As net worth is only measured at the household level, we only plot males, to avoid duplication of the same family unit. There are several things worth noticing. First, couples tend to start out in our sample with more household assets than their single counterparts. For instance, couples with the lowest permanent income level start out in our sample at age 76 with about $75,000 in median net worth, which they largely exhaust if they survive into their mid-nineties. Singles in the same group start out at $30,000 and also decline to zero by the same age. Second, with the exception of those in the lowest permanent income tercile, couples also tend to hold more assets as they age. For instance, couples in the

highest income tercile start out at over $470,000, compared with $320,000 for the singles, and the survivors still hold about $420,000 at age 95, compared with just above $230,000 for the singles. Thus, although couples do not start out with twice as much in assets as single males, those in the two highest income terciles that survive with their spouse at very old ages have almost twice the assets of the single surviving males. In contrast, males in couples with low permanent income seem to rely on government transfers as much as singles once they reach a very advanced age.

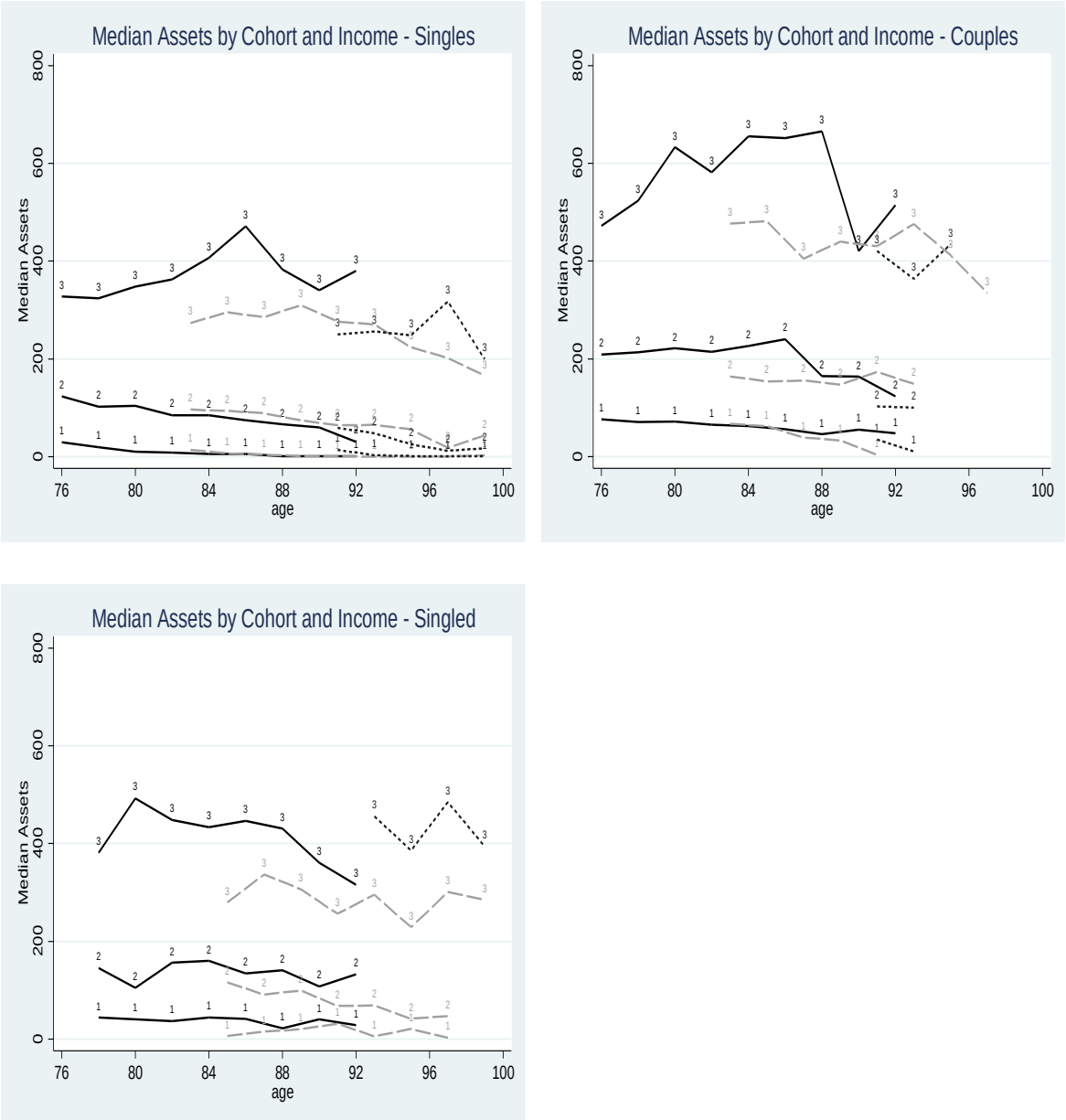


Figure 2: Median assets for those who are single (top left), in couples (top right), and singled (bottom) after age 75, by age, cohort, and permanent income.

The bottom panel in Figure 2 reports median and mean assets for singled males and females after age 75, by age, cohort, and permanent income. The main feature of these graphs for assets is that singled people start out with similar assets to married people but end up having very similar assets to single people if they live long enough.

Appendix C reports the graphs for median wealth when the main residence is excluded from net worth, allowing us to look at liquid assets that can be consumed more easily and without large transaction costs. Figures C1 to C3 in Appendix C show that the liquid assets of those in the lowest permanent income tercile are zero at age 76 and stay at zero across the three demographic groups that we consider. In contrast, the liquid assets of those in the highest permanent income tercile start out high at age 76, remain substantial at very advanced ages, and exhibit less decumulation by couples than by singles and singled.

Health

Because we focus on the role of Medicaid to help finance the consumption of medical goods and services to older people, we also describe the evolution of health after age 75 for our subgroups. To do so, we look at three different measures of health.

First, we use self-reported health, which is a subjective indicator that takes values from 1 to 5 (excellent, very good, good, fair, poor). For this measure, we construct an indicator variable that is equal to 1 if health is fair or poor, and we report the fraction of people in this category (which we label “bad” health) by the same observables that we have used in the previous graphs. For the period after the previous interview, before death, we set health to be bad. Second, because an important determinant of the need for expensive health care services is given by being old and not capable of taking care of oneself, we also measure health as needing help with activities of daily living (ADL). The variable we use is based on indicators of difficulties performing five basic tasks, namely bathing, eating, dressing, walking across a room, and getting in and out of bed. We construct an indicator variable which is equal to 1 if the person has difficulties in performing two or more ADLs, and we include data for the exit and post-exit interviews to complete the period before death. Third, we report information on nursing home residency, including incidence of nursing home stays and duration.

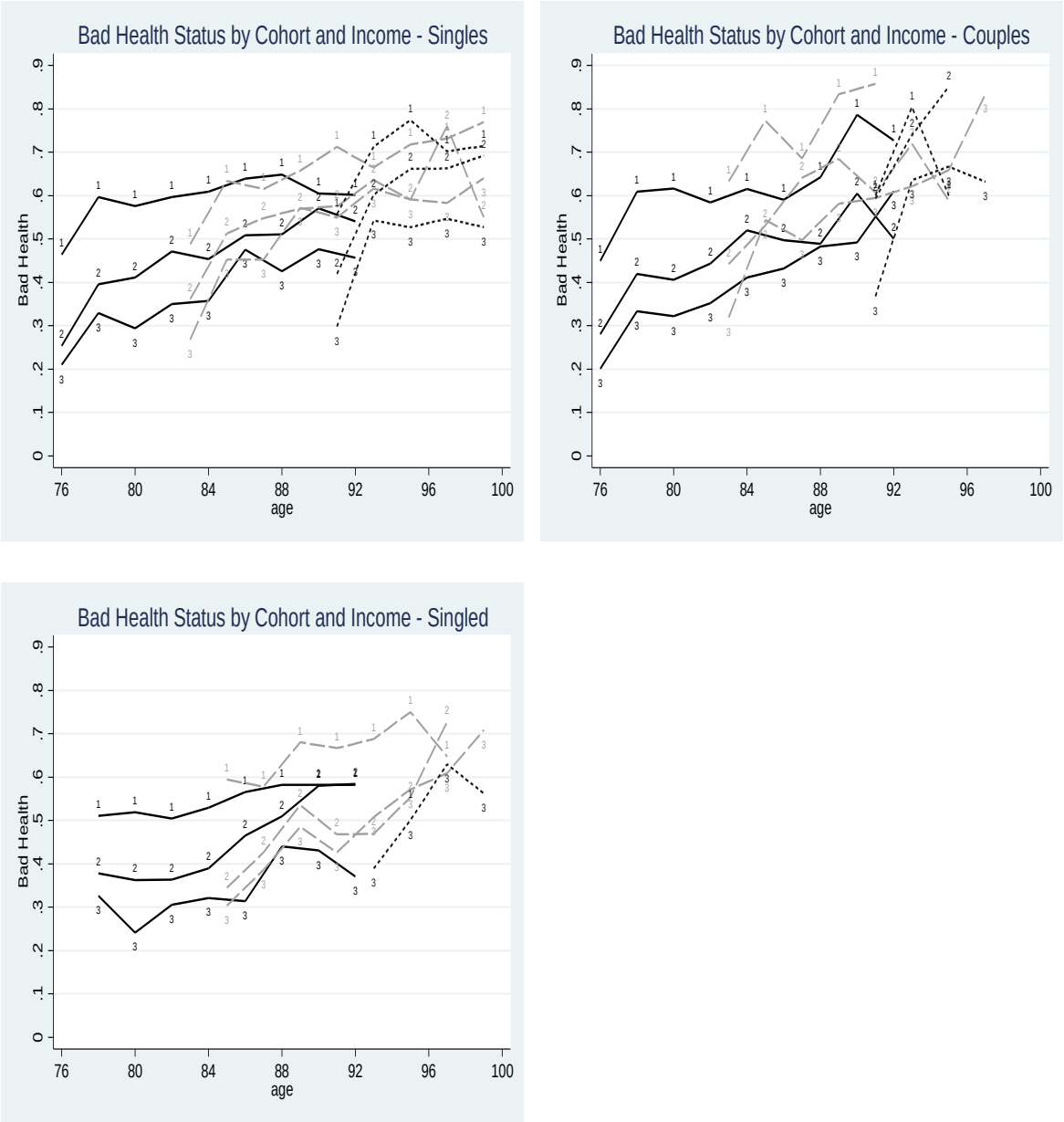


Figure 3: Fraction of people in bad health who are single (top left), in couples (top right), and singled (bottom) after age 75, by age, cohort, and permanent income.

The top left graph in Figure 3 reports the fraction of single people in bad health after age 75, by age, cohort, and permanent income. This graph confirms the previous findings by Waldron (2007), Gan et al. (2003), Attanasio and Emerson (2003), Hurd et al. (2001), and De Nardi et al. (2016), among others, according to which higher income people tend to be healthier (and live longer). In fact, at age 76, 46%, 25%, and 21% of the lowest, middle, and highest permanent income terciles, respectively, report being in bad health. The health/permanent income gradient for the survivors that make it into their late nineties is only a bit narrower (the fraction of people in bad health at that time is 75% for the lowest permanent income level, 65%

for the middle, and 60% for the highest; and outside of cohort effects and possibly linked to the initial sample selection that we have discussed earlier, these profiles seem to increase in parallel fashion over time for people with different permanent income levels.

The top right graph in Figure 3 reports the fraction of people in couples in bad health after age 75, by age, cohort, and permanent income. Interestingly, over all ages, the fraction of people reporting bad health by permanent income is remarkably similar for singles and couples.

The bottom graph in Figure 3 reports the fraction of singled in bad health after age 75, by age, cohort, and permanent income. Consistently with the previous two graphs, both the levels and the evolution of self-reported bad health over time by permanent income do not seem to be very different for singles, people in couples, and singled.

The top left graph in Figure 4 displays the fraction of singles with at least two ADL impairments after age 75, by age, cohort, and permanent income. Individuals with at least two ADLs are often considered sufficiently disabled to be eligible for Medicaid nursing home care assistance (although the specific rules are complex and vary from state to state). Comparing Figure 4 with Figure 3, which reports the fraction of single people in bad health, we can see that at age 76 many fewer people have two or more ADL impairments (3-9%, depending on permanent income) than those who report being in bad health (20-45%). However, the fraction of people with ADL impairments increases fast over time, reaching levels that are close to the fraction of people reporting bad health later in retirement. Interestingly, also, the permanent income/ADLs gradient is much lower than the permanent income/self-reported health gradient, with the fraction of people reporting two or more ADL impairments being much closer across permanent income terciles than the fraction of people self-reporting bad health.

The right panel of Figure 4 reports the fraction of couples and the bottom panel the fraction of singled with at least two ADL impairments after age 75, by age, cohort, and permanent income. The graphs in Figure 4, taken together, suggest that the ADL patterns for these subpopulations by age, cohort, and permanent income are remarkably similar to those for singles.

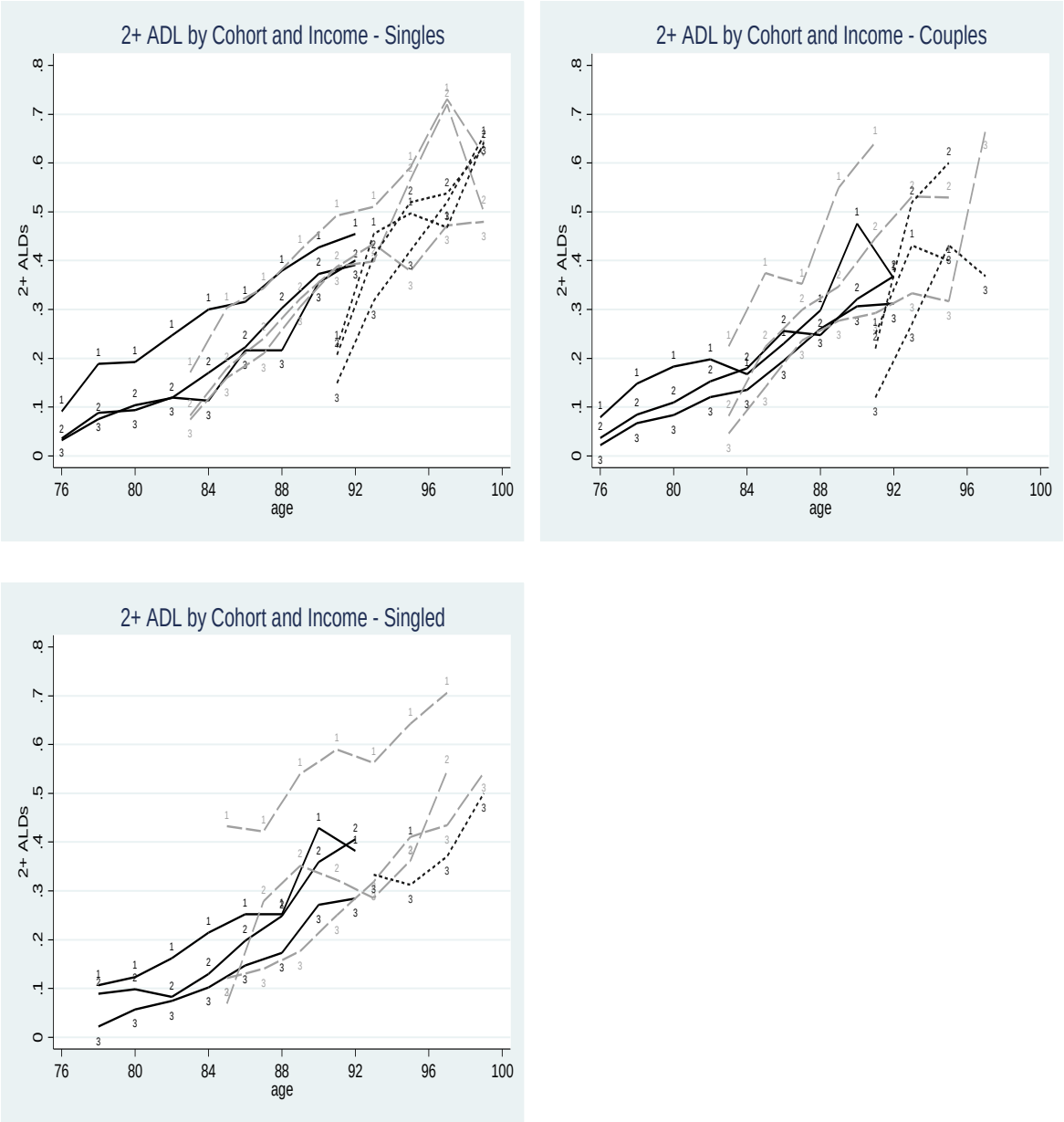


Figure 4: Fraction of people with at least two ADL impairments who are single (top left), in couples (top right), and singled (bottom) after age 75, by age, cohort, and permanent income.

As another measure of health impairments, we analyze the pattern of nursing home stays in our sample. Approximately 62% of Medicaid transfers for the elderly in 2009 were for nursing home payments (Kaiser Foundation, 2013). Nursing homes are expensive, and nursing home stays often lead people to be sufficiently impoverished to become eligible for Medicaid. We report the fraction of individuals living in nursing homes at the time of interview, the fraction of individuals who had at least one nursing home stay between interviews, a variable able to capture short stays, and the (unconditional) average number of days spent in a nursing home between two interviews.

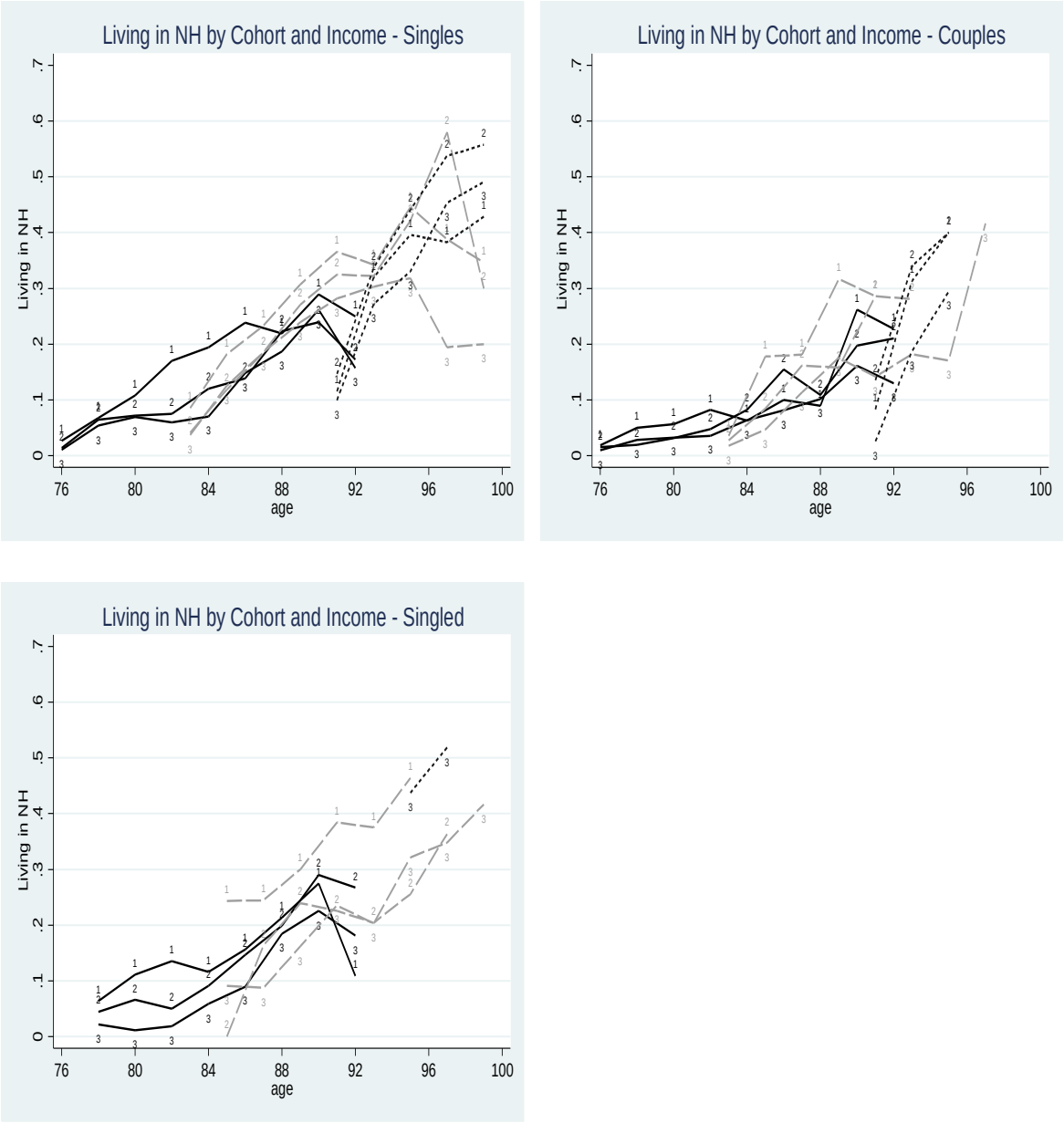


Figure 5: Fraction of people living in a nursing home at the time of the interview who are single (top left), in couples (top right), and singled (bottom) after age 75, by age, cohort, and permanent income.

Figure 5 displays the fraction of people living in a nursing home at the time of the interview and shows that the incidence is remarkably similar by permanent income. It should be noted that the original HRS/AHEAD sample interviewed in 1993-94 consists of non-institutionalized individuals, and that our graphs use information from wave 1996 onwards. While at the beginning of each segment there is a great increase in the fraction of individuals living in a nursing home due to this sample design, in later waves the age effect is still quite steep and similar to that documented by Hurd et al. (2015). From the figure, it appears that people living in a couple are less likely to be resident in a nursing home than singles or singled.

For example, at age 90, on average 26% of singles or singled are residents of a nursing home at the time of the interview, while for people in couples the average is 21%. At age 95, the percentage raises to 39% for singles, 32% for couples, and 37% for singled.

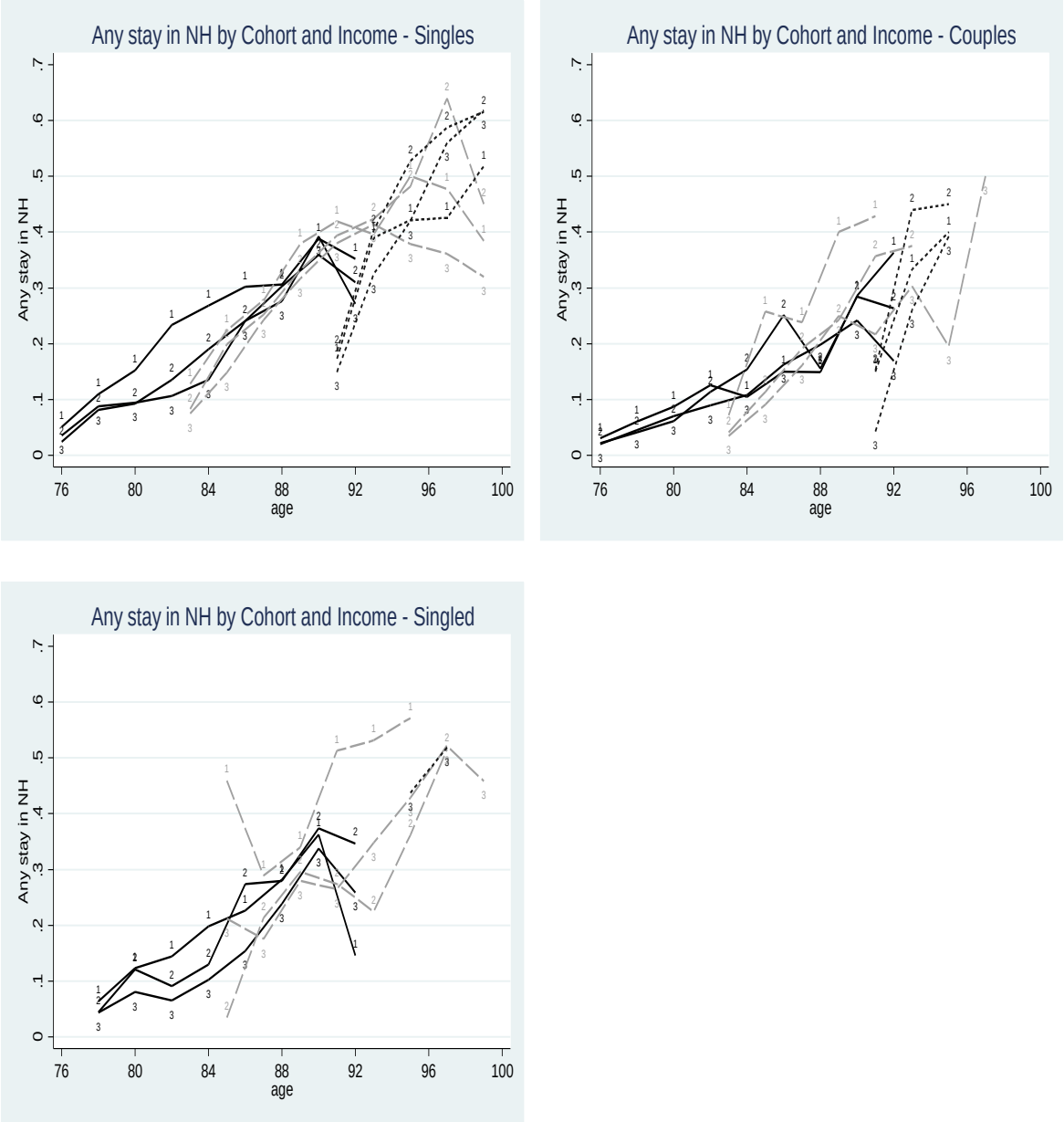


Figure 6: Fraction of people having had any stay in a nursing home between interviews who are single (top left), in couples (top right), and singled (bottom) after age 75, by age, cohort, and permanent income.

Figure 6 shows the fraction of people having had any stay in a nursing home between interviews and, like figure 5, displays remarkable similarities in incidence of nursing home stays by permanent income, conditional on age. As this measure is more general than the one presented in figure 5, the fraction of people reporting a stay in nursing home is higher,

especially at relatively younger ages. At age 90, on average the percentage of individuals reporting to have had any stay in a nursing home is 38% for singles, 27% for people in a couple, and 36% for singled, while at age 95 it rises to 45% for singles and singled and 36% for people in couples.

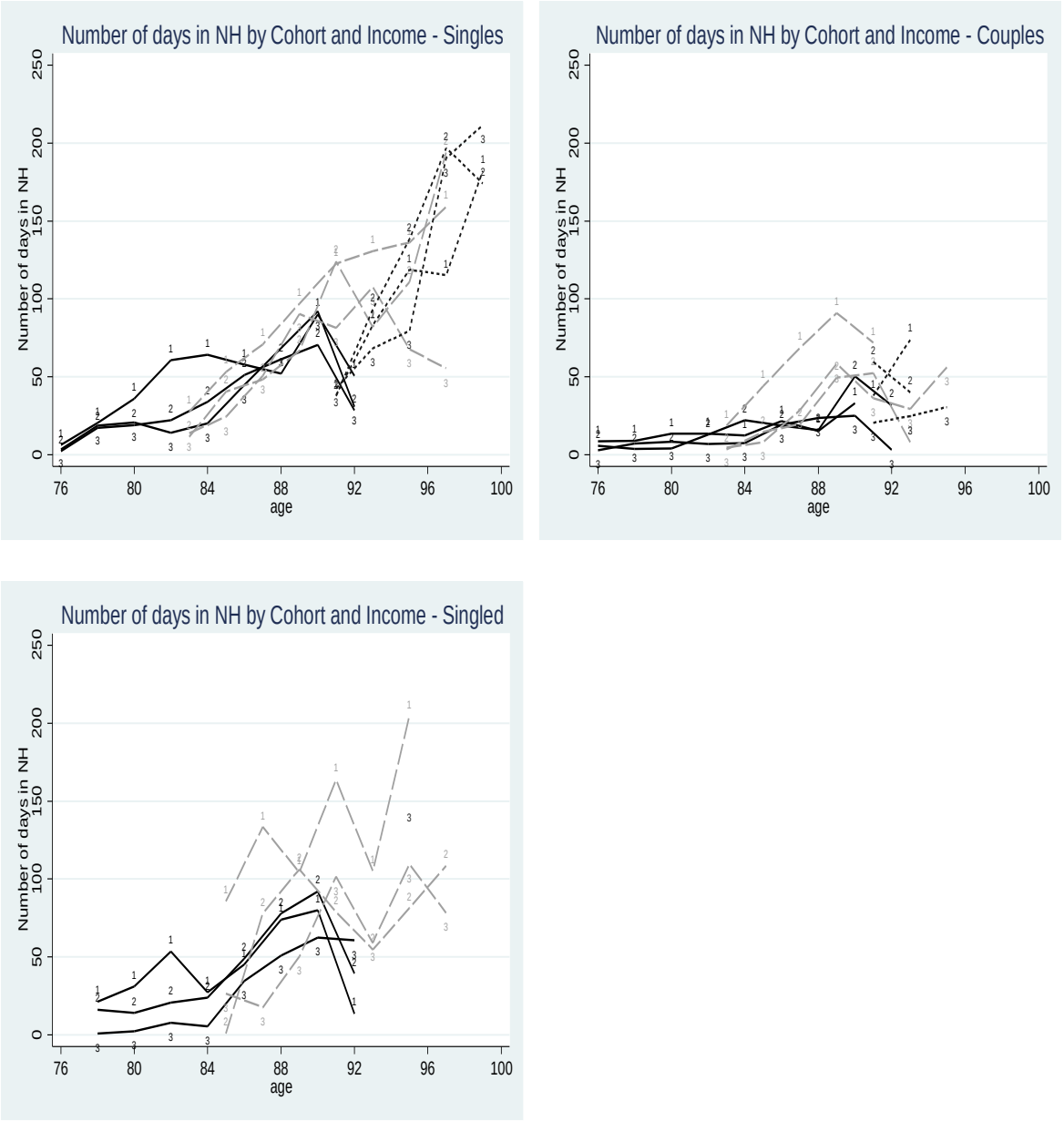


Figure 7: Average number of days spent in a nursing home between interviews by people who are single (top left), in couples (top right), and singled (bottom) after age 75, by age, cohort, and permanent income.

Figure 7 reports the average number of days spent in a nursing home between interviews, and it highlights how people in couples spend much shorter periods in nursing homes. At age 90, the average number of days spent in a nursing home is 84 for singles, 78 for singled, and only 36 for people in a couple. If we compute the conditional average stay, to take

into account that people in couples are less likely to have a stay in a nursing home, we find that the average length is about 300 days for singles and singled and about 200 days for people in couples.

Private Long-Term Care Insurance Holdings

Because Medicaid is a payer of last resort, it may not be worth buying private long-term care (LTC) insurance if one expects to rely on Medicaid for an extended period and/or one does not expect large medical needs (such as nursing home stays). Conversely, Medicaid reimburses nursing homes at a low rate, and thus the quality of a nursing home an individual can enter when on Medicaid may be low. Furthermore, free or reduced-price long-term care insurance may be offered by one's employer as part of a compensation package. The latter two factors may thus create demand for LTC insurance, even among those who are likely to become eligible for Medicaid. Furthermore, LTC insurance usually caps the number of nights and the payments it will cover. Thus, people with long nursing home stays may exhaust their LTC insurance coverage, then be forced to rely on Medicaid. For this reason, a significant fraction of people receive Medicaid benefits despite having long-term care insurance.

Percentage of people on:	**Singles**	**Couples**	**Singled**	**Total**
Medicaid	23.2	7.5	14.0	16.0
LTC	7.3	11.2	10.5	9.2
Joint Medicaid and LTC	0.6	0.3	0.7	0.6
Medicaid conditional on LTC=1	8.8	3.1	6.3	5.8
LTC conditional on Medicaid=1	2.8	74.6	4.7	5.3

Table 1. Percentage of singles, couples, and singled who, after age 75 of the household head, are on Medicaid, own LTC insurance, or both.

Table 1 reports the percentage of couples, singles, and singled who are Medicaid, own LTC insurance, or both. The first line of this table shows that only 7.5% of people in couples are on Medicaid, compared with 14% of the singled and 23% of the singles. The second line of this table reports the fraction of people holding private long-term care insurance. Only 11%

of couples hold LTC insurance, compared with 10% of the singled and 7% of the singles. Many in the literature have pointed out this number is somewhat low considering the lifespan and medical expenses risk that people face and, thus, constitutes an LTC insurance "puzzle." Brown and Finkelstein (2008) show that Medicaid eliminates LTC insurance demand for a large fraction of the U.S. population, excluding the richest, while Lockwood (2014) shows that bequest motives greatly reduce the demand for LTC insurance and especially so for the rich, who have a strongest bequest motive. In addition, recent research by Friedberg et al. (2015) shows that properly modeling health care needs in old age further reduces the demand for LTC insurance implied by the modeling used in several of the previous contributions.

The third line shows that the joint occurrence of holding LTC insurance and being on Medicaid is only between 0.3% (couples) and 0.6-0.7% (singles and singled). Interestingly, the fourth line of this table shows that the probability of being on Medicaid, conditional on holding LTC insurance, is about one third as large as the unconditional probability of being on Medicaid in each subpopulation. Having LTC insurance thus reduces, but does not eliminate the probability of being on Medicaid. Finally, the last line of the table shows that the probability of holding LTC insurance conditional on being on Medicaid is from one half to one third of the unconditional case for the relevant subpopulation.

Figure 8 shows several interesting patterns. First, as one might expect, private LTC insurance holdings are increasing with permanent income. Second, the fraction of private LTC insurance holdings at age 76 is quite similar for couples, singles, and singled—about 5% for the lowest income tercile, about 10% for the middle income tercile, and about 20% for the upper income tercile. Third, as people in a given age and permanent income tercile age, the fraction of people holding LTC insurance is quite flat until very advanced ages, when the cell size starts being rather small. This can result from two opposite forces. Adverse selection in LTC insurance purchases and mortality bias might tend to generate increasing patterns of LTC insurance holdings among the survivors, as the richest and those who tend to live longest are more likely to have LTC insurance and to stay in the sample. On the other hand, LTC insurance policies lapsing among those whose health outcomes mean they are unlikely to need long-term care tends to generate a decreasing profile in LTC insurance holdings among the survivors. Fourth, for both singles, couples, and singled, the oldest cohort in the highest permanent income quintile (orange line with the number 3 label) starts out at a much lower rate of LTC insurance holdings at age 91 than the younger singles of the same permanent income in our

sample and the fraction of the single survivors in this category holding LTC insurance is decreasing with age.

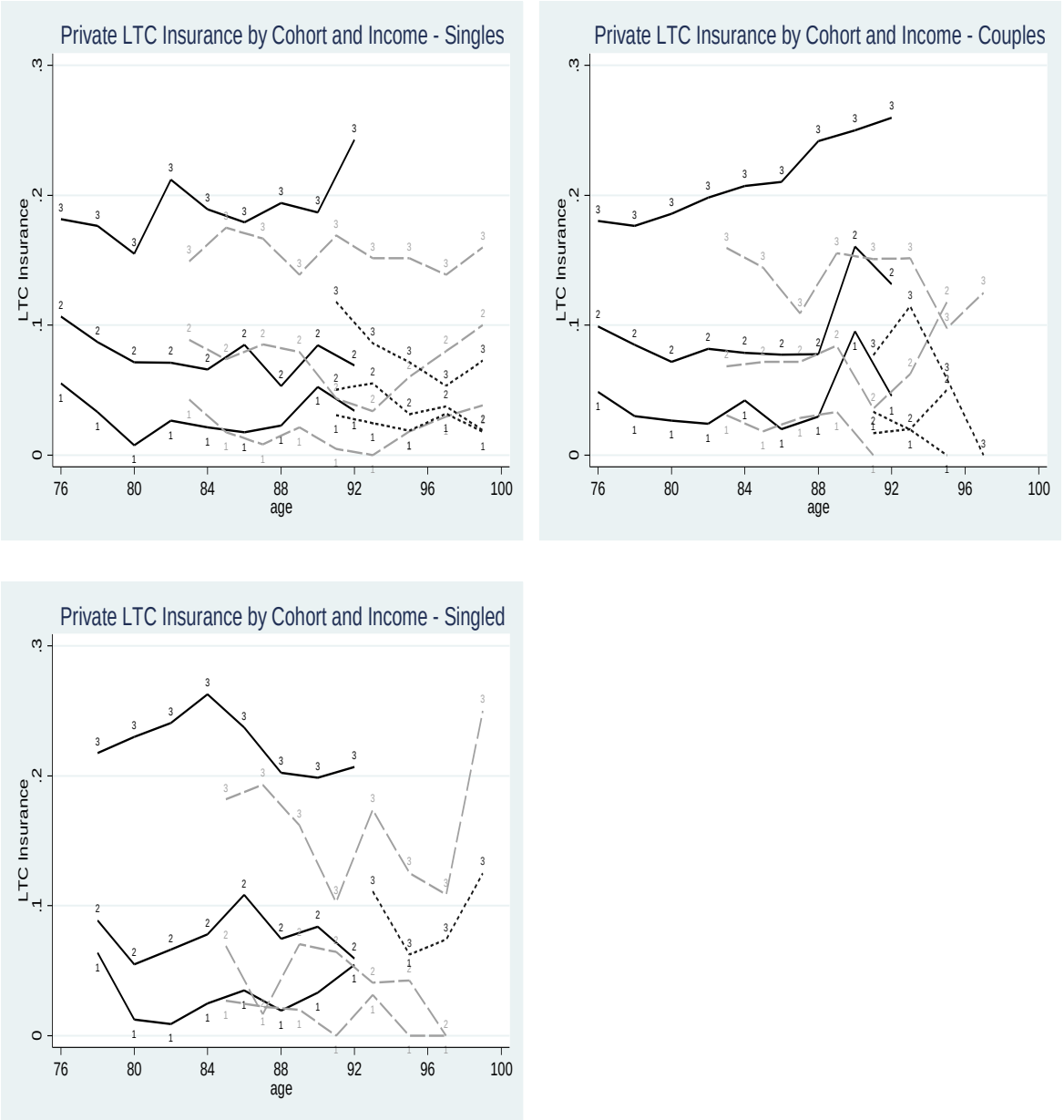


Figure 8: Fraction of people with LTC insurance who are single (top left), in couples (top right), and singled (bottom) after age 75, by age, cohort, and permanent income.

Comparing Table 1 and Figure 8, it might appear surprising that singles are much less likely to hold LTC insurance than couples but have similar LTC behavior by permanent income and cohort. The two facts are reconciled by the observation that singles are much more likely to be at lower PI percentiles than couples.

Multivariate Analysis

We now turn to the analysis of the probability of being on Medicaid and its determinants in the context of a descriptive multivariate analysis. To do so, we estimate a logistic probability model, with a binary dependent variable equal to 1 if the individual is covered by Medicaid and zero otherwise.

We include a broad set of explanatory variables to identify the main factors influencing the probability of being on Medicaid: a polynomial in age, dummies for gender/marital status (single/singled male, married female, single/singled female, with married male thus being the excluded category), dummies for self-perceived health status (fair and poor, with the excluded category being good or better than good), a dummy indicating if the individual has 2 or more ADLs, a dummy for having LTC insurance, a dummy for being resident in a nursing home in the current wave, regional dummies (New England, Mid Atlantic, EN Central, WN Central, S Atlantic, ES Central, WS Central, and Mountain, with New England excluded), veteran status, education of the father (in years), dummies for own education (GED, high school graduate, some college, college and above, with the excluded category being lower than high school), a polynomial in permanent income (PI) percentile, which is the percentile of our measure of permanent income, liquid wealth measured in 1996 (in millions), house wealth measured in 1996 (in millions), cohort dummies, and a constant. We also add interactions between PI and other variables, finding statistically significant effects for the interactions of PI with variables capturing health (self-reported health status, difficulties with 2 or more ADLs, being resident in a nursing home) and wealth (initial liquid and housing wealth).

In Table 2, we present results for our estimates, starting in column (i) with a specification that includes all the variables just described. In subsequent columns, we introduce different variables to measure nursing home stays. We report the average marginal effects of the variables included. The results in column (i) show that older age, conditional on the included covariates, increases the probability of being on Medicaid, with an average marginal effect of about 0.2 percentage points for every additional year of life. As for family structure, we find that being a single (or singled) woman increases the probability of being on Medicaid by 2 percentage points on average relative to all other family structures.[6] Health status has an obvious positive impact, as being in fair health increases the probability of being on Medicaid by about 1.6 percentage points (with respect to being in good or better health) on average, while

[6] In the estimates, we merged the single and singled categories as they did not display any significant difference.

being in poor health raises this probability by 1.2 percentage points. Having two or more ADLs increases the probability by 6.6 percentage points on average, while, interestingly, having LTC insurance does not have any effect. The dummy capturing current residency in a nursing home has a large and positive effect on average, increasing the probability by almost 15 percentage points. Region (actually, Census Division) turns out to be a significant predictor, while being a veteran reduces the probability of being on Medicaid by 3.6 percentage points on average.

The next set of indicators captures permanent income and social background and goes in the expected direction: PI percentile (our measure of permanent income) has a large impact on the probability of being on Medicaid and 1 additional percentile reduces this probability, on average, by 0.5 percentage points. Conditional on PI percentile, other significant variables include education level, with a negative effect, and initial liquid and housing wealth, both with a (small) negative effect, conditional on other factors, as they are measured in $100,000s. Liquid wealth has about the same impact on Medicaid recipiency as housing wealth: On average, increasing liquid (housing) wealth by $100,000 reduces the probability of being on Medicaid by about 0.55 (0.50) percentage points. This may be surprising because, in many circumstances, an individual with a home can be eligible for Medicaid, whereas an individual with more than a small amount of liquid assets is not eligible (De Nardi et al., 2012). On the other hand, people run down their housing wealth and rebalance their portfolios as they experience health shocks and death of the spouse (Poterba et al., 2010) and it is thus not surprising that these effects are similar in presence of optimizing behavior about the level and the composition of savings.

As residency in a nursing home proved to be an important factor determining the probability of being on Medicaid, we also re-estimate our model with other indicators of nursing home stays; in particular we evaluate the effect of an indicator variable capturing any stay in a nursing home between two interviews (which better captures short stays) and of the number of days spent in a nursing home between two interviews. Marginal results are shown in columns (ii) and (iii): While the marginal effect of other explanatory variables remains more or less stable, the effect of the variable capturing any stay in a nursing home is smaller (0.11) than the one found in column (i) for current residency. This finding indicates that including short stays in the indicator variable results in a smaller marginal effect or, in other words, longer stays tend to have a bigger impact on the probability of being on Medicaid.

To check whether this is the case, in column (iii) we capture the effect of nursing home stays by including the number of days spent in a nursing home between two interviews. Its marginal effect is precisely estimated and indicates, for example, that an increase in a stay of 100 days increases the probability of being on Medicaid by 2 percentage points on average.

Table 2 – Logistic estimates, average marginal effects

	Currently in NH (i) b/se	Any NH stay (ii) b/se	# of days in NH (iii) b/se
Age	0.0018***	0.0018***	0.0017***
	(0.00060)	(0.00060)	(0.00061)
Family structure:			
- Single/singled male	0.0026	0.0044	0.0061
	(0.00904)	(0.00909)	(0.00918)
- Married woman	-0.0082	-0.0077	-0.0092
	(0.01087)	(0.01095)	(0.01070)
- Single/singled woman	0.0219***	0.0231***	0.0169**
	(0.00853)	(0.00857)	(0.00848)
Self reported health:			
- Fair	0.0160***	0.0144***	0.0147***
	(0.00501)	(0.00505)	(0.00462)
- Poor	0.0123***	0.0137***	0.0175***
	(0.00538)	(0.00539)	(0.00525)
ADL2+	0.0657***	0.0735***	0.0659***
	(0.00618)	(0.00614)	(0.00628)
LTC: yes	-0.0080	-0.0107	0.0017
	(0.01038)	(0.01037)	(0.01016)
NH: yes	0.1473***	0.1081***	0.0002***
	(0.00907)	(0.00678)	(0.00001)
Census divisions:			
2. Mid Atlantic	-0.0048	-0.0035	-0.0075
	(0.01267)	(0.01247)	(0.01300)
3. EN Central	-0.0306**	-0.0280**	-0.0291**
	(0.01247)	(0.01227)	(0.01286)
4. WN Central	-0.0327**	-0.0305**	-0.0287*
	(0.01440)	(0.01422)	(0.01505)
5. South Atlantic	-0.0215**	-0.0192	-0.0223*
	(0.01206)	(0.01180)	(0.01251)
6. ES Central	-0.0332**	-0.0317**	-0.0322*
	(0.01704)	(0.01698)	(0.01778)
7. WE Central	0.0217***	0.0248**	0.0206

	(0.01320)	(0.01302)	(0.01352)
8. Mountain	-0.0099	-0.0083	-0.0070
	(0.01629)	(0.01632)	(0.01674)
9. Pacific	0.0354**	0.0376***	0.0348**
	(0.01409)	(0.01383)	(0.01451)
Veteran (yes=1)	-0.0365***	-0.0367***	-0.0374***
	(0.00837)	(0.00846)	(0.00810)
PI percentile	-0.0046***	-0.0046***	-0.0045***
	(0.00018)	(0.00018)	(0.00017)
Education			
2. GED	-0.0038	-0.0019	-0.0047
	(0.01545)	(0.01593)	(0.01523)
3. High-school	-0.0322***	-0.0324***	-0.0295***
	(0.00648)	(0.00650)	(0.00642)
4. Some college	-0.0268***	-0.0256***	-0.0260***
	(0.00889)	(0.00894)	(0.00902)
5. College	-0.0520***	-0.0519***	-0.0430***
	(0.01112)	(0.01124)	(0.01070)
Initial liquid Wealth/100,000	-0.0550***	-0.0555***	-0.0544***
	(0.00848)	(0.00846)	(0.00874)
Initial housing Wealth/100,000	-0.0500***	-0.0512***	-0.0505***
	(0.00604)	(0.00619)	(0.00589)
N	29,722	29,722	27,680
Pseudo R2	0.389	0.381	0.390

Note: ***1% significance level; **5% significance level; *10% significance level. Clustered standard errors. Standard errors in parentheses. Wave and cohort dummies included.

As the marginal effects of the explanatory variables are not constant over the range observed in the sample, in the left graph of Figure 9 we plot the average predicted probabilities of being in Medicaid as a function of permanent income percentile. For clarity, the figure reports the average predicted probabilities at 5 percentile intervals, while the vertical bars refer to the 95% confidence interval. The first point in the figure, for example, represents the average predicted probability for those observations being in the first 5 PI percentiles, while all the other variables are at their observed values. Subsequent points are computed in a similar way. The figure shows that PI percentile greatly affects the probability of being on Medicaid, conditional on other covariates, which drops from 65% at the lowest PI percentile to 1% at the highest PI percentile.

Next, we plot the marginal effect of some indicator variables that proved to be significant in Table 2. We start with the effect of family structure on the probability of being on Medicaid. In the right graph of Figure 9, we plot average probabilities as a function of PI percentile, as before, computed as if everyone had a family structure equal to "married male," our reference category in the logit estimates, and then as if everyone had a family structure equal to "single female," the only category found to have a statistically significant effect. The marginal effect of being a single female relative to the reference category of being a married male is the difference between the two functions. As it is apparent from the figure, which also plots 95% confidence intervals as vertical bars, being a single female significantly raises the probability of being on Medicaid, with respect to the reference category, only in the lowest PI tercile, with the effect vanishing as permanent income increases. Conditional on the other covariates included in the analysis, gender and family structure influence the probability of being on Medicaid only at low permanent income percentiles, while the effect vanishes at higher percentiles.

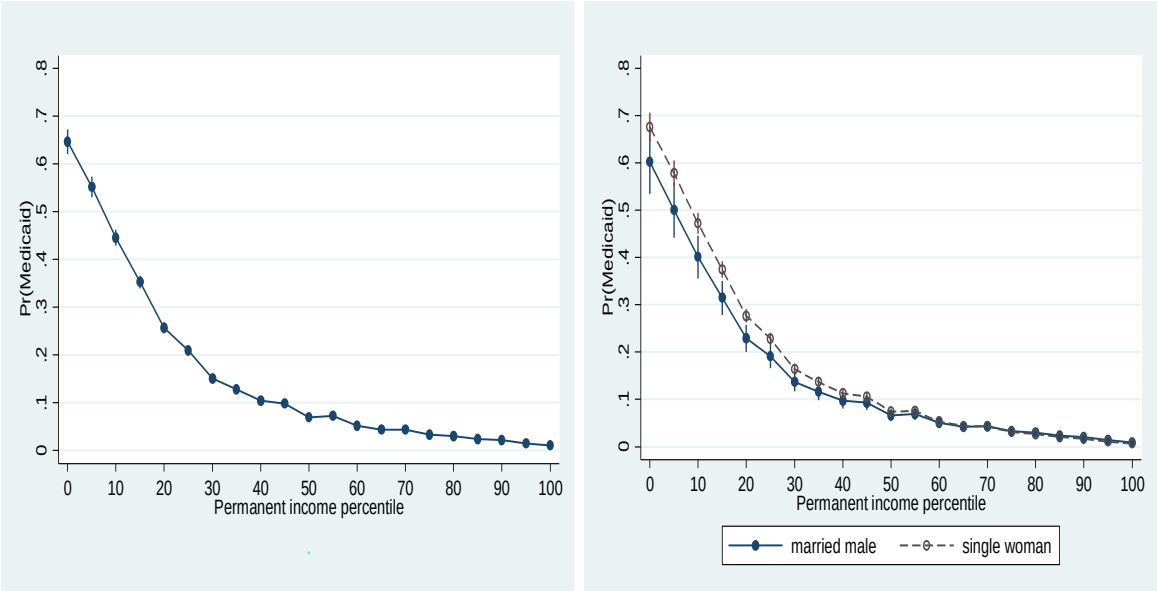


Figure 9 – Effect of PI percentile on Probability of being on Medicaid, everyone (left graph) and by family structure (right graph).

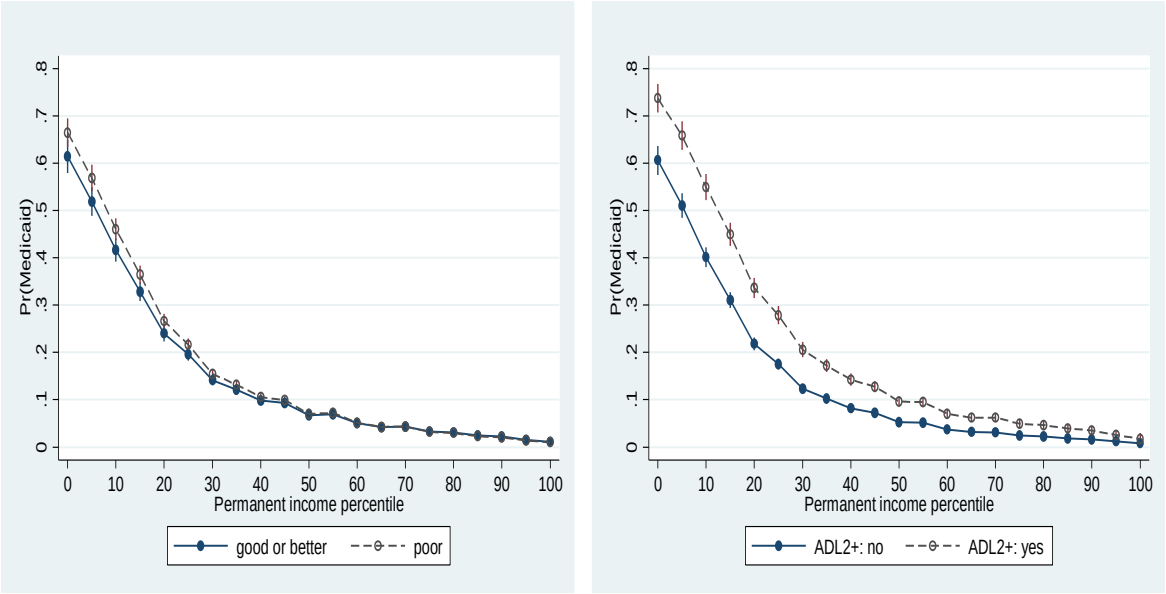


Figure 10 – Effect of PI percentile on Probability of being on Medicaid, by self-reported health (left graph) and by ADLs (right graph).

In the left graph of Figure 10, we plot the average predicted probabilities of being in a poor health status versus being in a good or better than good health status (our reference category in the logit estimates), conditional on other characteristics. The difference between the two plotted functions, that is, the marginal effect, is in this case relatively small—about 5 percentage points at very low percentiles, and vanishing at higher ones.

The effect of having two or more ADL impairments is plotted in Figure 10. Especially at low income percentiles, the effect of this variable is sizable, increasing the predicted probability of being on Medicaid from 0.60 to 0.74 in the lowest 5 percentiles. Although at the upper end of the permanent income distribution its effect is much smaller, for example 2.5 percentage points at the 80th percentile, it is still precisely estimated.

In the left graph of Figure 11, we consider the effect of living in a nursing home at the time of the interview on the predicted probabilities. Conditional on other explanatory variables, being in a nursing home increases the probability of being on Medicaid in a sizable way along the permanent income distribution, vanishing only above the 90th percentile. At the lowest percentile, the average predicted probability is equal to 64% if individuals are not living in a nursing home at the time of the interview, and 70% if they are. The difference in the average predicted probability increases in the first part of the distribution of permanent income, being greatest around the 20th percentile where it reaches 24 percentage points. At the higher end of

the distribution, where the average probability of being covered by Medicaid is about 1%, the effect is still sizeable, raising the probability of being on Medicaid by 5.5 percentage points (around the 80th percentile) or by 2 percentage points (around the 90th percentile).

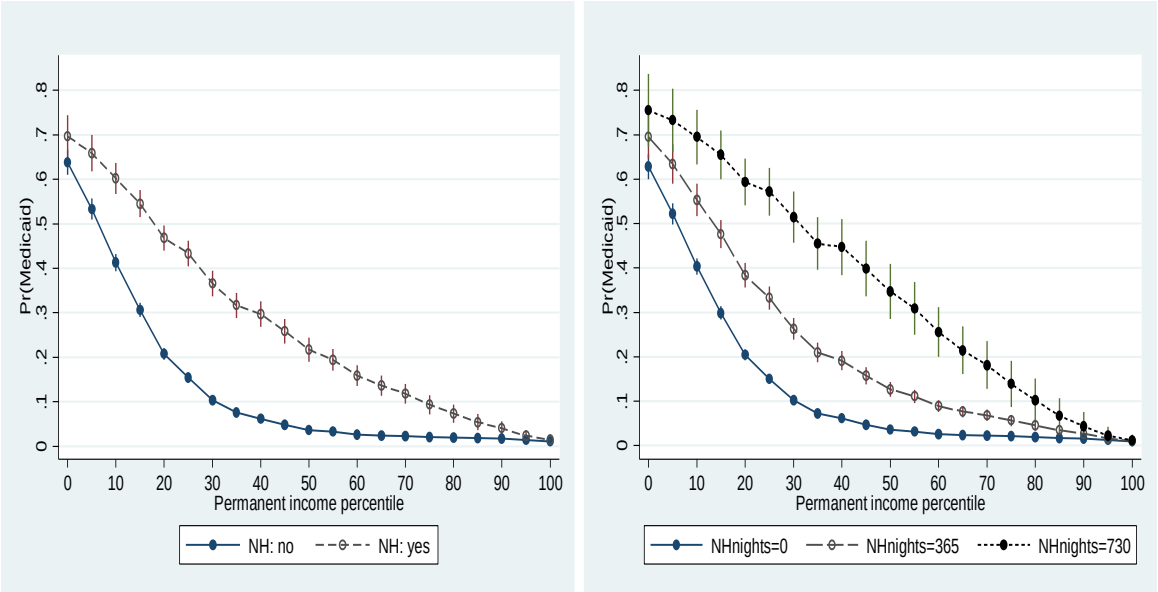


Figure 11 – Effect of Living in Nursing Home on Predicted Probabilities. Currently in a Nursing home (left graph) any stay in a Nursing Home (right graph).

In the right graph of Figure 11, we plot the effect of the number of nights spent in a nursing home during the last two years on the probability of being on Medicaid, plotted for three values: 1) zero nights; 2) 365 nights; 3) 730 nights, or two years. The average predicted probability when the number of nights in a nursing home is zero goes from 63% at the lowest PI percentile to 1% at the highest PI percentile, a result comparable to that obtained in the left graph in the same Figure under the hypothesis of no nursing home stay. When the number of nights in a nursing home is 365, the average predicted probability of being on Medicaid increases to 70% at the lowest PI percentiles and to 40% at the 20th PI percentile. For stays as long as two years, the average predicted probability increases dramatically, reaching 76% at the lowest PI percentile, 60% at the 20th percentile, and 10% at the 80th percentile. Hence, longer nursing home stays substantially increase the probability of being on Medicaid. This effect is especially large between the 20th and the 80th percentile.

Conclusions

We use the Health and Retirement Survey (HRS) data to study the evolution and possible determinants of Medicaid recipiency of the U.S. households during retirement.

Our descriptive analysis uncovers several interesting findings. First, even at higher percentiles of permanent income, the Medicaid recipiency rate is high for old age survivors. For instance, among the singles aged 95 and older in the top permanent income tercile the Medicaid recipiency rate is between 5% and 10%. Second, in the raw data couples are less likely to end up on Medicaid than singles, especially at higher permanent income levels. Third, people who just lost their spouse rapidly become very similar in their Medicaid recipiency and other important observable characteristics to people who have been single for much longer. Fourth, the evolution of health by age for permanent income is similar for singles, singled, and couples. Fifth, impairments related to having difficulties in at least two basic activities of daily living (ADLs) grow fast with age after age 75 and display much less variation in permanent income than self-perceived bad health. Sixth, people living in a couple are much less likely to experience long nursing home stays than singles or to have two or more impairments in ADLs at old ages. Seventh, while the probability of being on Medicaid in our sample is 16%, the probability of being on Medicaid conditional on holding long-term care insurance is still 5.8%, which indicates that people holding long-term care insurance can still end up on Medicaid.

Then, we study how the probability of being covered by Medicaid is influenced by demographic, economic, and health factors, using a logit probability model to quantify the various effects.

Permanent income (PI) percentile has a large impact on the probability of being on Medicaid: one additional percentile reduces this probability, on average, by 0.4 percentage points. Conditional on PI percentile, other significant variables include education level, with a negative effect, and initial liquid and housing wealth: on average, increasing liquid (housing) wealth by $100,000 reduces the probability of being on Medicaid by about 0.5 percentage points. These findings are consistent with the nature of Medicaid eligibility rules: In most states, people with low income are automatically enrolled in Medicaid, while people with higher income can only become Medicaid eligible if they experience high medical expenses, which are likely to stem from severe health conditions.

Permanent income also explains much of the difference in Medicaid recipiency between singles and couples. In fact, holding other factors constant, single women are only 2 percentage points more likely to receive Medicaid than people in other family structures.

Health status also has a large impact: Compared to being in good or better health, being in fair health increases on average the probability of being on Medicaid by about 1.7 percentage points, while being in poor health raises it by 1.5 percentage points. Having two or more ADL impairments increases the probability of being on Medicaid by 6.6 percentage points on average, while those currently residing in a nursing home are 15 percentage points more likely to receive Medicaid than other groups.

Finally, our regressions suggest that, after controlling for covariates, having LTC insurance does not reduce the incidence of Medicaid recipiency. A possible explanation for this finding is that two forces counterbalance each other. On the one hand, people needing LTC for longer periods might be more likely to purchase LTC insurance plans. On the other hands, the caps on number of nights and other restrictions imposed by the LTC insurance contracts might imply that the people purchasing such plans run out of insurance coverage and are just as likely to end up on Medicaid as those not purchasing them.

Appendix A. Data

A.1 Data selection

While the AHEAD cohort starts in late 1993/early 1994 (which we refer to as 1994) with 8,222 individuals, our initial sample in late 1995/early 1996 (which we refer to as 1996) comprises all those who are still alive in wave 1996 and have a non-missing marital status and labor force status, that is 7,006 individuals (753 individuals are reported to die between 1994 and 1996). We further drop 47 individuals who are single in 1996 and get married at some point in the panel, leaving us with 6,959 individuals. We further select individuals born between 1900 and 1923 (6,125 individuals) and drop those with missing information on variables used in our analysis. Our final sample consists of 3,045 singles and 2,949 initially married individuals, for a total of 5,994 individuals. Because not all of the initially married individuals have a spouse born between 1900 and 1923, not all spouses are included in our sample. We use data available from the exit interviews to recover information of individuals who died during the sample period.

A2. How we construct our key variables

Total household income (respondent + spouse) includes: individual earnings (note: respondent's earnings are zero because (s)he's retired, but spouse may be working); household capital income (business or farm income, self-employment, dividend and interest income); individual income from employer pension or annuity; individual income from Social Security disability or SSI (supplemental security income); individual income from Social Security retirement; individual unemployment or workers compensation; individual income from other government transfers; all other household income (alimony, other income, lump sums from insurance, pensions, and inheritance).

Wealth includes wealth at death, as reported in the exit interviews. Our measure of wealth coincides with total net household wealth, which includes IRAs and primary home but excludes secondary home as it was not available in 1996. Performing all the calculations with total net wealth starting from 1998 produces virtually identical results.

Estates. We compute estate value using information from the surviving spouse (when available) or from the exit interviews. When a member in a couple dies, we impute as net total wealth the corresponding value for the surviving spouse. When a single individual dies, we use

estate information when available from exit/post exit interviews. As some respondents in the exit or post-exit interviews declare that the value of the (primary) house was not included in their response, we add the value of the house from the previous wave to the estate value. While the value of the house may obviously change because of price volatility, we think this procedure is better than excluding it altogether.

ADL. As long-term care insurance policies and Medicaid nursing home eligibility require needing help with two or more activities of daily living to trigger benefits, we define an indicator equal to 1 if a respondent declares difficulties in two or more ADL. The five ADL are: bathing, eating, dressing, walking across a room, and getting in or out of bed. As for measuring ADL, we rely on the RAND sample for individuals alive; and for dead individuals we use the exit interviews to extract information on the decedent's ADL needs before death.

Medicaid recipiency. This indicator variable takes a value equal to 1 if the respondent indicated he/she was covered by Medicaid since the previous interview. The exact wording of the question is: "Have you been covered by health insurance through Medicaid at any time since last interview (or in the last two years)?" For dead individuals, we use information from the exit interviews.

Permanent Income. As customary in the literature, we assume log household income for individual *i* can be written as:

$$\ln y_{it} = X_{it}\beta + \alpha_i + w_{it},$$

where $X_{it}\beta$ captures the common life cycle component, α_i is a household-specific effect that is fixed over time, and w_{it} is an idiosyncratic error term. We follow Altonji and Doraszelski (2005) and De Nardi, French, and Jones (2015) in assuming that the serial correlation in w_{it} is sufficiently weak to be ignored in computing permanent income on the basis of α_i. Since permanent income is a summary measure of lifetime income at retirement, it should not change during retirement and is thus a fixed effect over our sample period. Although permanent income will not change, current income could change as a household ages and potentially loses a family member.

We model the life cycle component as depending on age, cohort, gender, and family status. As income is measured at the individual level for singles and singled but is the sum of income of

the two spouses in couples, we explicitly include marital status in our regression, distinguishing in particular between one- or two-person households.

We define permanent income as the individual effect α_i, estimated as the average residual of our regression computed for each individual over time. We then classify individuals in terciles based on their estimated α_i, and take the percentile rank of it to compute the permanent income percentiles used in the logistic regressions.

Table A1 – Average and median income by permanent income percentile, singles

cohort	Income group	Average Income	Median Income	Avg Cell size
1920	1	11750	10793	374
1920	2	22189	20013	251
1920	3	56768	39209	185
1913	1	10143	9776	238
1913	2	19147	17672	174
1913	3	44463	33005	143
1905	1	9209	8990	97
1905	2	16526	15057	75
1905	3	42967	30468	68

Table A2 – Average and median income by permanent income percentile, couples

cohort	Income group	Average Income	Median Income	Avg Cell size
1920	1	21392	20767	197
1920	2	36297	33695	312
1920	3	82405	63235	377
1913	1	18044	17190	64
1913	2	32898	30621	100
1913	3	80749	53144	139
1905	1	14755	14664	25
1905	2	27497	25805	24
1905	3	77190	50794	43

Table A3 – Average and median income by permanent income percentile, singled

cohort	Income group	Average Income	Median Income	Avg Cell size
1920	1	12562	12110	90
1920	2	21413	18910	120
1920	3	53544	38788	121
1913	1	11300	11017	32
1913	2	20052	16918	46
1913	3	57438	34514	53
1905	1	10028	9236	8
1905	2	17391	15654	6
1905	3	59788	43609	16

Table A4 – Cell size by cohort and PI tercile – Singles.

	First PI tercile			Second PI tercile			Third PI tercile		
Age	Born in 1920	Born in 1913	Born in 1905	Born in 1920	Born in 1913	Born in 1905	Born in 1920	Born in 1913	Born in 1905
76	672			375			281		
78	603			356			261		
80	519			336			245		
82	454			295			217		
83		492			338			268	
84	376			258			185		
85		451			312			263	
86	285			224			162		
87		364			270			210	
88	219			188			134		
89		280			214			180	
90	152			142			107		
91		205	260		160	198		142	161
92	88			87			70		
93		149	244		118	181		99	151
95		110	159		83	127		66	112
97		67	94		50	80		36	75
99		26	56		20	52		25	55

Note: cells with N<15 were not used in the graphs in the text.

Table A5 – Cell size by cohort and PI tercile – Couples

	First PI tercile			Second PI tercile			Third PI tercile		
Age	Born in 1920	Born in 1913	Born in 1905	Born in 1920	Born in 1913	Born in 1905	Born in 1920	Born in 1913	Born in 1905
76	492			656			732		
78	399			565			641		
80	300			473			528		
82	207			379			449		
83		196			292			345	
84	143			279			362		
85		163			237			298	
86	100			207			271		
87		105			167			211	
88	67			129			207		
89		60			95			148	
90	42			81			124		
91		28	60		56	59		106	117
92	22			38			77		
93		13	51		32	50		66	96
95		6	20		17	20		41	51
97		2	12		6	8		24	19
99		1	6		2	3		9	10

Note: cells with N<15 were not used in the graphs in the text.

Table A6 – Cell size by cohort and PI tercile – Singled.

	First PI tercile			Second PI tercile			Third PI tercile		
Age	Born in 1920	Born in 1913	Born in 1905	Born in 1920	Born in 1913	Born in 1905	Born in 1920	Born in 1913	Born in 1905
78	47			45			46		
80	81			91			87		
82	111			121			108		
84	121			154			137		
85		37			29			33	
86	115			157			156		
87		45			61			57	
88	103			161			168		
89		50			71			68	
90	91			131			151		
91		39			62			68	
92	55			101			116		
93		32	9		49	7		69	18
95		28	15		47	13		56	32
97		17	14		33	11		46	27
99		11	10		13	5		24	16

Note: cells with N<15 were not used in the graphs in the text.

Appendix B. Medicaid recipiency, net worth, and cell counts by education grouping

We now report some key graphs, namely Medicaid recipiency and median assets, and cell counts by stratifying the households by education rather than by our measure of permanent income. The three education groups that we distinguish are: 1) Less than high school + GED (General Education Diploma); 2) High school graduates; and 3) College dropouts and college graduates.

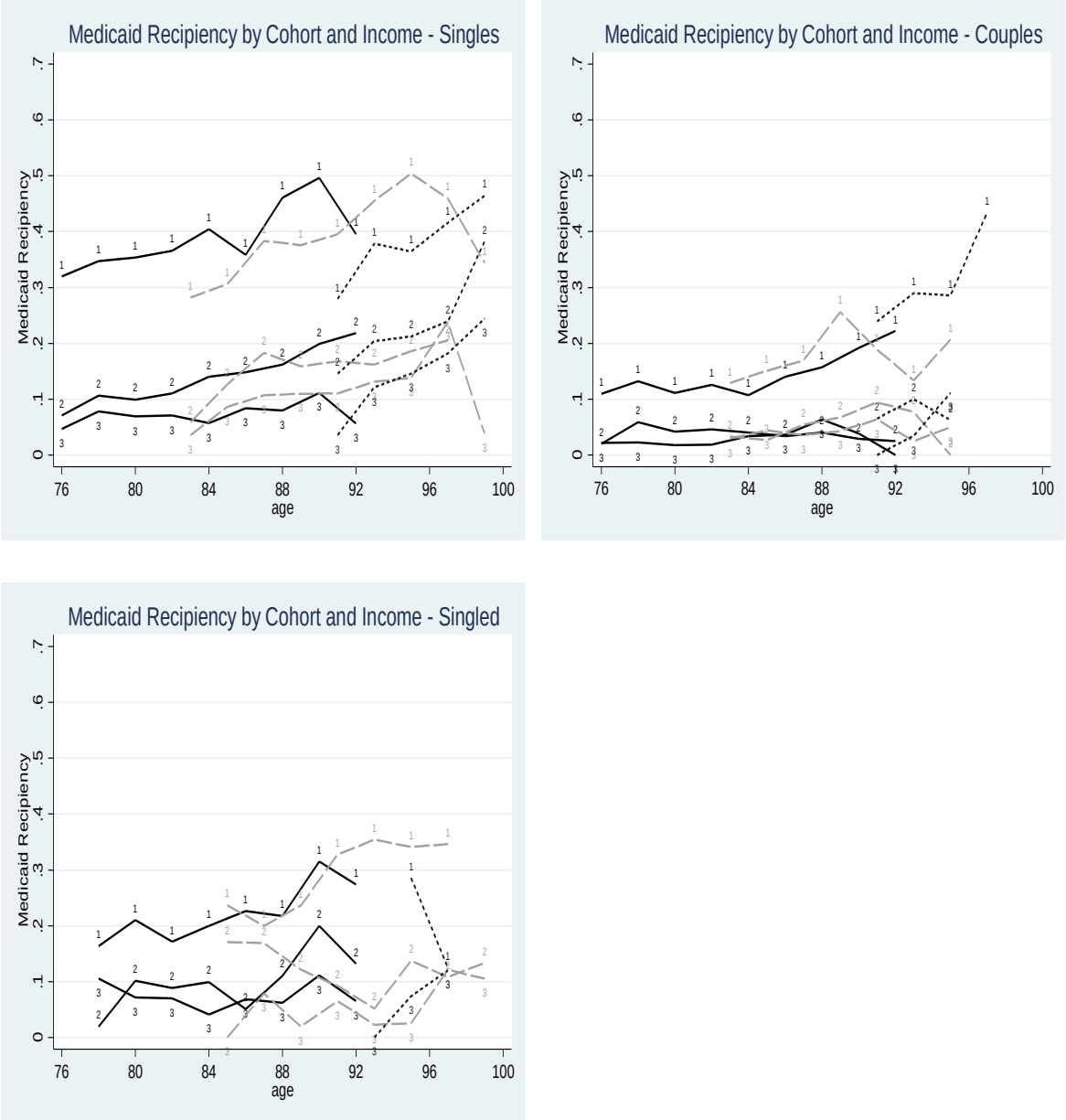


Figure B1. Fraction of people on Medicaid among those who are single (top left), in couples (top right), and singled (bottom) after age 75, by age, cohort, and education.

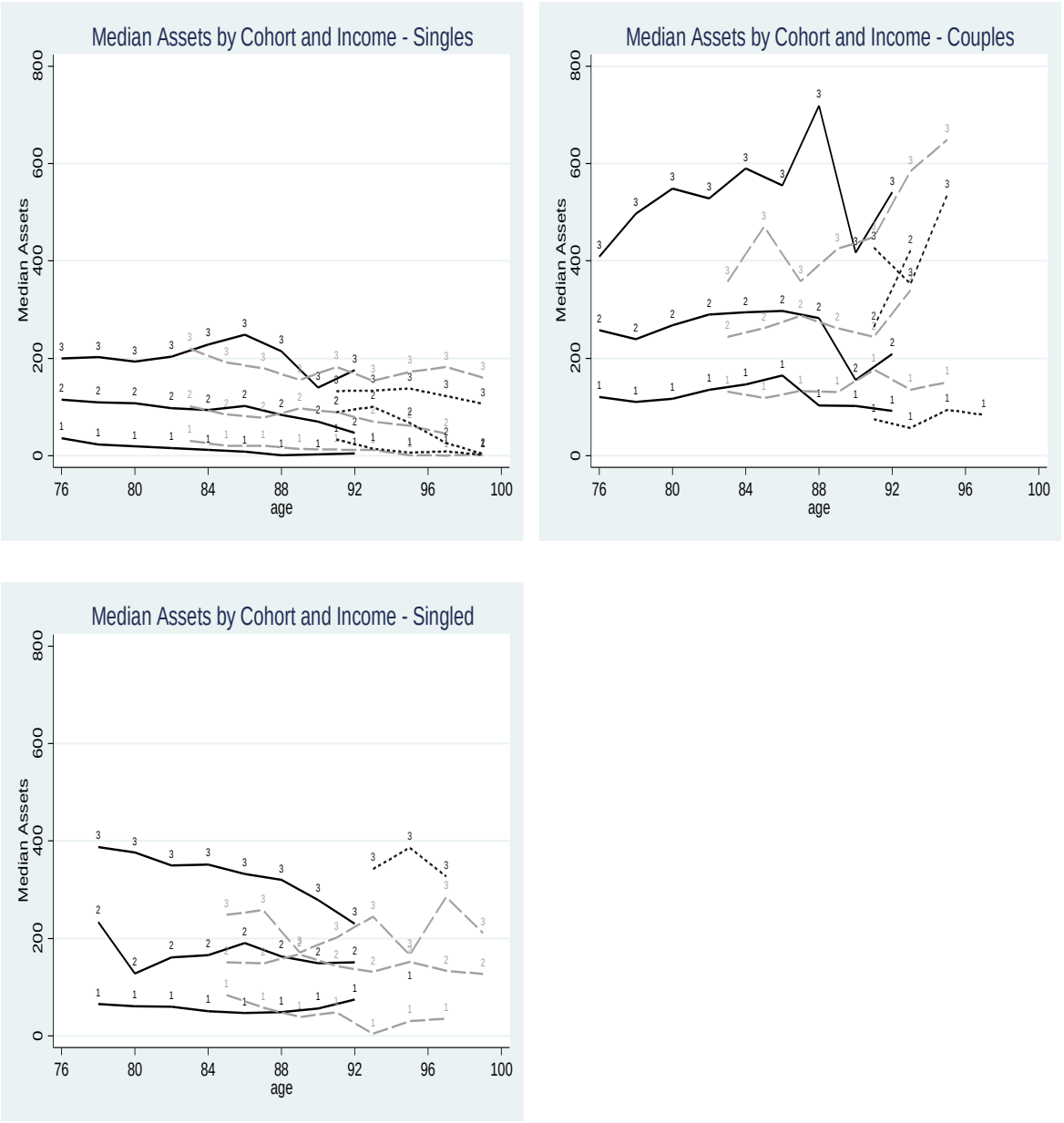


Figure B2. Median assets for people after age 75, who are single (top left), in couples (top right), and singled (bottom), by age, cohort, and education.

Table B1 – Average and median permanent income by education group, singles

cohort	Education group	Average PI	Median PI	Avg Cell size
1920	1	15203	12032	336
1920	2	26648	18611	267
1920	3	40180	26850	206
1913	1	14693	11685	282
1913	2	22792	17161	151
1913	3	36456	25403	124
1905	1	15346	11639	139
1905	2	21636	16117	43
1905	3	34621	22982	58

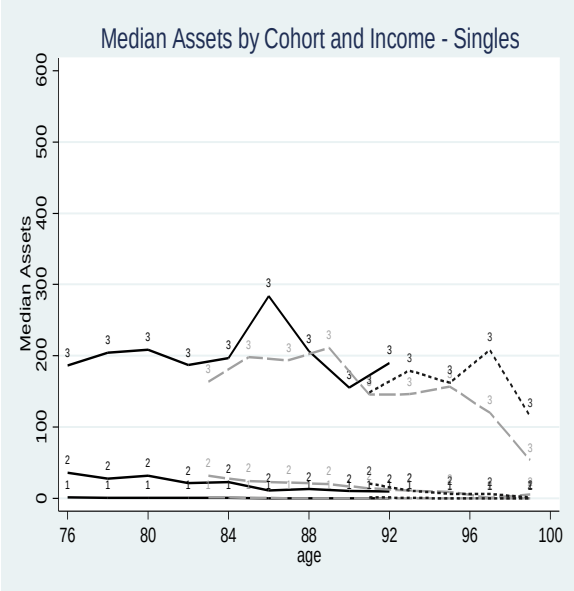
Table B2 – Average and median permanent income by education group, couples

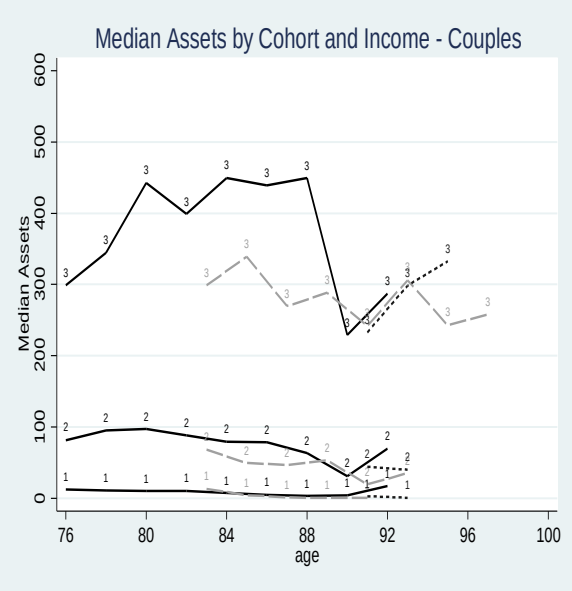
cohort	Education group	Average PI	Median PI	Avg Cell size
1920	1	34476	28363	287
1920	2	49603	37969	285
1920	3	72399	53944	313
1913	1	33456	27070	129
1913	2	46604	36333	83
1913	3	83292	51108	91
1905	1	28390	22606	50
1905	2	77301	46766	17
1905	3	65367	47491	27

Table B3– Average and median permanent income by education group, singled

cohort	Education group	Average PI	Median PI	Avg Cell size
1920	1	18699	14953	101
1920	2	29089	20441	125
1920	3	44661	29974	106
1913	1	16209	13032	45
1913	2	30776	20615	50
1913	3	56180	31978	36
1905	1	14343	11366	9
1905	2	56639	20654	7
1905	3	43532	32476	13

Appendix C – Net worth without main residence





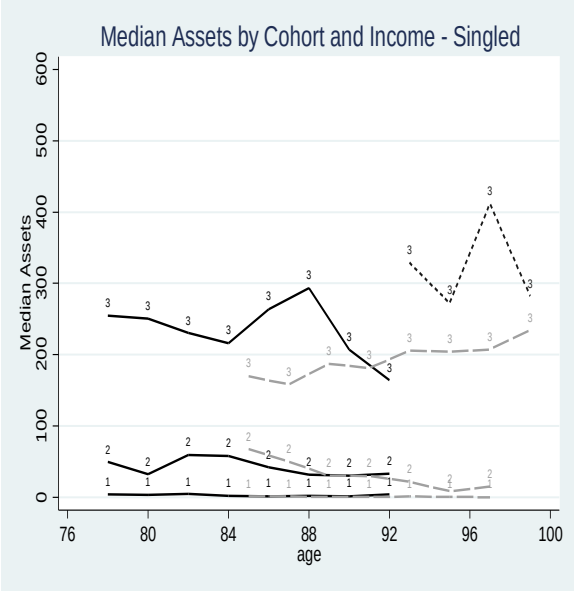


Figure C1: Median assets (excluding main residence) for singles, males in couples, and singled, after age 75, by age, cohort, and permanent income.

Appendix D –Logistic Estimates

In Table D1, we report the coefficients of table 2 in the main text.

Table D1 – Coefficients of estimates presented in Table 2

	col1 b/se	col2 b/se	col3 b/se
Medicaid			
age	-0.0719	-0.1133	-0.1072
	(0.0965)	(0.0935)	(0.1089)
age # age	0.0006	0.0008	0.0008
	(0.0006)	(0.0005)	(0.0006)
married male	0.0000	0.0000	0.0000
	(.)	(.)	(.)
single male	0.1036	0.0698	0.0419
	(0.2519)	(0.2507)	(0.2665)
married woman	-0.0191	-0.0506	-0.0627
	(0.3108)	(0.3100)	(0.3202)
single woman	0.4014*	0.3858*	0.3931*
	(0.2166)	(0.2157)	(0.2285)
married male # PI	0.0000	0.0000	0.0000
	(.)	(.)	(.)
single male # PI	-0.0168	-0.0131	-0.0109
	(0.0140)	(0.0139)	(0.0153)
married woman # PI	-0.0066	-0.0039	-0.0065
	(0.0159)	(0.0159)	(0.0166)
single woman # PI	-0.0021	-0.0011	-0.0040
	(0.0114)	(0.0114)	(0.0124)
married male # PI # PI	0.0000	0.0000	0.0000
	(.)	(.)	(.)
single male # PI # PI	0.0003*	0.0002	0.0002
	(0.0001)	(0.0001)	(0.0002)
married woman # PI # PI	0.0001	0.0000	0.0001
	(0.0002)	(0.0002)	(0.0002)
single woman # PI # PI	-0.0000	-0.0001	-0.0000
	(0.0001)	(0.0001)	(0.0001)
good or better	0.0000	0.0000	0.0000
	(.)	(.)	(.)
fair	0.2532***	0.2496***	0.2560***
	(0.0940)	(0.0942)	(0.0956)
poor	0.2668***	0.2542**	0.3253***
	(0.1029)	(0.1019)	(0.1074)
good or better # PI	0.0000	0.0000	0.0000
	(.)	(.)	(.)
fair # PI	-0.0020	-0.0026	-0.0021
	(0.0025)	(0.0025)	(0.0026)

poor # PI	-0.0039	-0.0030	-0.0033
	(0.0025)	(0.0025)	(0.0028)
ADL2+: no	0.0000	0.0000	0.0000
	(.)	(.)	(.)
ADL2+: yes	0.7183***	0.7188***	0.7495***
	(0.1011)	(0.0992)	(0.1037)
ADL2+: no # PI	0.0000	0.0000	0.0000
	(.)	(.)	(.)
ADL2+: yes # PI	0.0008	0.0030	0.0015
	(0.0026)	(0.0025)	(0.0027)
LTC: 0.no	0.0000	0.0000	0.0000
	(.)	(.)	(.)
LTC: 1.yes	-0.0952	-0.1307	-0.0337
	(0.2116)	(0.2108)	(0.2105)
LTC: 0.no # PI	0.0000	0.0000	0.0000
	(.)	(.)	(.)
LTC: 1.yes # PI	-0.0002	-0.0000	0.0020
	(0.0038)	(0.0038)	(0.0039)
NH: no	0.0000	0.0000	0.0007
	(.)	(.)	(0.0004)
NH: yes	0.1255	0.0655	0.0001***
	(0.1642)	(0.1433)	(0.0000)
NH: no # PI	0.0000	0.0000	-0.0000***
	(.)	(.)	(0.0000)
NH: yes # PI	0.0762***	0.0659***	0.0007
	(0.0087)	(0.0079)	(0.0004)
NH: no # PI # PI	0.0000	0.0000	0.0001***
	(.)	(.)	(0.0000)
NH: yes # PI # PI	-0.0007***	-0.0007***	-0.0000***
	(0.0001)	(0.0001)	(0.0000)
1. new england	0.0000	0.0000	0.0000
	(.)	(.)	(.)
2. mid atlantic	-0.0574	-0.0412	-0.0968
	(0.1497)	(0.1458)	(0.1673)
3. en central	-0.3816**	-0.3440**	-0.3970**
	(0.1510)	(0.1472)	(0.1695)
4. wn central	-0.4093**	-0.3766**	-0.3912*
	(0.1796)	(0.1753)	(0.2045)
5. s atlantic	-0.2632*	-0.2324*	-0.2997*
	(0.1440)	(0.1395)	(0.1627)
6. es central	-0.4152*	-0.3929*	-0.4443*
	(0.2177)	(0.2148)	(0.2506)
7. ws central	0.2462	0.2774*	0.2526
	(0.1519)	(0.1478)	(0.1689)
8. mountain	-0.1189	-0.0981	-0.0912
	(0.1954)	(0.1935)	(0.2174)

9. pacific	0.3939**	0.4132***	0.4152**
	(0.1593)	(0.1543)	(0.1773)
Veteran: 0.no	0.0000	0.0000	0.0000
	(.)	(.)	(.)
Veteran: 1.yes	-0.4650***	-0.4595***	-0.5279***
	(0.1114)	(0.1108)	(0.1207)
Education: 1. lt high-school	0.0000	0.0000	0.0000
	(.)	(.)	(.)
2. ged	-0.0436	-0.0215	-0.0581
	(0.1765)	(0.1781)	(0.1908)
3. high-school graduate	-0.3856***	-0.3821***	-0.3886***
	(0.0783)	(0.0774)	(0.0856)
4. some college	-0.3177***	-0.2979***	-0.3398***
	(0.1077)	(0.1062)	(0.1212)
5. college and above	-0.6509***	-0.6391***	-0.5872***
	(0.1502)	(0.1497)	(0.1572)
PI percentile	-0.1041***	-0.1076***	-0.1000***
	(0.0111)	(0.0112)	(0.0116)
PI percentile#PI percentile	0.0006***	0.0006***	0.0005***
	(0.0001)	(0.0001)	(0.0001)
Initial liquid Wealth (/100,000)	-1.3569***	-1.3593***	-1.4178***
	(0.2080)	(0.2057)	(0.2279)
Initial liquid Wealth # PI	0.0318***	0.0320***	0.0341***
	(0.0050)	(0.0050)	(0.0055)
Initial liquid Wealth # PI # PI	-0.0002***	-0.0002***	-0.0002***
	(0.0000)	(0.0000)	(0.0000)
Initial housing wealth (/100,000)	-1.3993***	-1.3829***	-1.4378***
	(0.1642)	(0.1659)	(0.1748)
Initial housing wealth # PI	0.0403***	0.0388***	0.0403***
	(0.0065)	(0.0067)	(0.0065)
Initial housing wealth # PI # PI	-0.0003***	-0.0003***	-0.0003***
	(0.0001)	(0.0001)	(0.0001)
born in 1920	0.0000	0.0000	0.0000
	(.)	(.)	(.)
born in 1913	-0.1287	-0.1068	-0.0950
	(0.0811)	(0.0801)	(0.0903)
born in 1905	-0.0615	-0.0333	-0.0206
	(0.1267)	(0.1242)	(0.1439)
Wave: 3	0.0293	0.0405	0.0301
	(0.0367)	(0.0363)	(0.0400)
Wave: 4	-0.0185	-0.0157	-0.0328
	(0.0414)	(0.0410)	(0.0453)
Wave: 5	0.0067	0.0003	0.0442
	(0.0510)	(0.0502)	(0.0564)
Wave: 6	-0.0119	-0.0263	-0.0399
	(0.0587)	(0.0573)	(0.0673)

Wave: 7	0.1082	0.1204*	0.0369
	(0.0664)	(0.0655)	(0.0780)
Wave: 8	0.1777**	0.1699**	0.2059**
	(0.0728)	(0.0706)	(0.0907)
Wave: 9	-0.2230***	-0.2164***	-0.1955**
	(0.0796)	(0.0774)	(0.0973)
Constant	-0.0719	-0.1133	-0.1072
	(0.0965)	(0.0935)	(0.1089)
N	29,722	29,722	27,680
R2	0.389	0.381	0.390

Note: ***1% significance level; **5% significance level; *10% significance level. Clustered standard errors. Standard errors in parentheses.

Bibliography

Joseph G. Altonji and Ulrich Doraszelski. "The Role of Permanent Income and Demographics in Black/White Differences in Wealth." *The Journal of Human Resources*, vol. 40, no. 1, pages 1-30, 2005.

John Ameriks, Andrew Caplin, Steven Laufer and Stijn Van Nieuwerburgh. "The Joy of Giving or Assisted Living? Using Strategic Surveys to Separate Public Care Aversion from Bequest Motives." *The Journal of Finance*, vol. 66, no. 2, pages 519-561, 2011.

Orazio P. Attanasio and Carl Emmerson. "Mortality, Health Status, and Wealth." *Journal of the European Economic Association* vol. 4, March, pages 821–50, 2003.

Matthew Baird, Michael Hurd, and Susann Rohwedder. "Medicaid Spend-down: The Importance of Strategic Asset Transfers to Reach Medicaid Eligibility", Mimeo, 2014.

William F. Bassett. "Medicaid's Nursing Home Coverage and Asset Transers". *Public Finance Review*, vol. 35, no. 3, pages 414-439, 2007.

Marianne P. Bitler and Madeline Zavodny. "Medicaid: A review of the Literature." NBER working paper no. 21425, 2014.

Jeff Brown and Amy Finkelstein. "The interaction of public and private insurance: Medicaid and the long term care insurance market." *The American Economic Review*, vol. 98, no. 5, pages 837–880, 2008.

Thomas Buchmueller, John C. Ham, and Lara D. Shore-Sheppard. "The Medicaid Program." NBER working paper no. 20169, 2015.

Mariacristina De Nardi, Eric French, and John Bailey Jones. "Savings After Retirement: A Survey," NBER working paper no. 21268, 2015 and forthcoming in the *Annual Review of Economics*, 2016.

Mariacristina De Nardi, Eric French, and John Bailey Jones. "Couples and Singles' Savings After Retirement," Mimeo, 2015.

Mariacristina De Nardi, Eric French, John Bailey Jones, and Angshuman Gooptu. "Medicaid and The Elderly," *Federal Reserve Bank of Chicago Economic Perspectives*, January 2012.

Mariacristina De Nardi, Eric French, and John Bailey Jones. "Medicaid Insurance in Old Age," NBER working paper no. 19151, 2013.

Mariacristina De Nardi, Eric French, and John Bailey Jones. "Why Do the Elderly Save? The Role of Medical Expenses," *Journal of Political Economy*, February 2010, vol. 118, pages 39-75.

Mariacristina De Nardi, Eric French, and John Bailey Jones. "Life Expectancy and Old Age Savings," *American Economic Review, Papers and Proceedings*, May 2009, pages 110-115.

Eric French, Mariacristina De Nardi, John B. Jones, Olyesa Baker, and Phil Doctor. “Right Before the end: Asset decumulation at the end of life,” *Economic Perspectives*, vol. 30, no. 3, pages 2-13, 2006.

Eric French and John Bailey Jones. On the distribution and dynamics of health care costs. Journal of Applied Econometrics, 19(4):705–721, 2004.

Leora Friedberg Wenliang Hou, Wei Sun, Anthony Webb, and Zhenyu Li. “New Evidence on the Risk of Requiring Long Term Care,” Center for Retirement Research at Boston College working paper no 2014-12, 2014, revised in 2015.

Li Gan, Michael Hurd, and Daniel McFadden. “Individual subjective survival curves.” Working Paper 9480, National Bureau of Economic Research, 2003.

Lara Gardner and Donna Gilleskie. “The Effects of State Medicaid Policies on Dynamic Savings Patterns and Medicaid Enrollment of the Elderly,” The Journal of Human Resources, vol. 47, no. 4, pages 1082-1127.

Jonathan Gruber. “Medicaid.” Working Paper 7829, National Bureau of Economic Research, 2000.

Nezih Guner, Yulia Kulikova, and Joan Lluss. “Does Marriage Make you Healthier?” Mimeo, October 2014.

R. Glenn Hubbard, Jonathan Skinner, and Stephen P. Zeldes. “Precautionary Saving and Social Insurance,” *Journal of Political Economy*, vol. 103 no. 2, pages 360–399, 1995.

Michael D. Hurd, Daniel McFadden, and Angela Merrill. “Predictors of Mortality among the Elderly.” In Themes in the Economics of Aging, edited by David A. Wise, pages 171–97. Chicago: University of Chicago Press, 2001.

Michael D. Hurd, Pierre-Carl Michaud, and Susann Rohwedder. “The Lifetime Risk of Nursing Home Use,” in D. Wise (ed.) Discoveries in the Economics of Aging, forthcoming 2015.

Lee Lockwood. “Incidental Bequests: Bequest Motives and the Choice to Self-Insure Late-Life Risks,” NBER working paper no. 20745, December 2014.

Samuel Marshall, Kathleen McGarry, and Jonathan S. Skinner. “The risk of out-of-pocket health care expenditure at the end of life.” In Explorations in the Economics of Aging, pages 101-128. University of Chicago Press, 2011.

Bruce D. Meyer and Nikolas Mittag. “Using Linked Surveys and Administrative Data to Better Measure Income: Implications for Poverty, Program Effectiveness and Holes in the Safety Net," NBER working paper no. 21676, 2015.

Edward C. Norton. “Elderly Assets, Medicaid Policy, and Spend-Down in Nursing Homes,” *The Review of Income and Wealth*, Vol. 41, no 3, pages 309-329, 2005.

Liliana E. Pezzin and Judith D. Casper. “Medicaid Enrollment among Elderly Medicaid Beneficiaries: Individual Determinants, Effects of State Policy, and Impact on Service Use,” *Public Policy Impact*, August 2002, vol. 34, no. 4, pages 827-847.

James M. Poterba, Steven F. Venti, and David Wise. “The Asset Cost of Poor Health,” NBER working paper no. 16389, 2010.

James M. Poterba, Steven F. Venti, and David A. Wise. The composition and drawdown of wealth in retirement. *Journal of Economic Perspectives*, 25:95–117, 2011.

Susann Rohwedder, Steven J. Haider, and Michael Hurd. “Increases in wealth among the elderly in the early 1990s: How much is due to survey design?” *Review of Income and Wealth*, vol. 52 no. 4, pages 509–524, 2006.

Donald H. Taylor Jr., Frank A. Sloan, and Edward C. Norton. “Formation of Trusts and Spend Down to Medicaid,” *Journal of Gerontology: Social Sciences*, vol. 54B, no. 4, pages 194-201, 1999.

Hilary Waldron. “Trends in mortality differentials and life expectancy for male social security-covered workers, by socioeconomic status,” *Social Security Bulletin*, vol. 67 no. 3, pages 1–28, 2007.