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Faculty Research Working Paper Series

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January 2011
RWP11-005

NBER WORKING PAPER SERIES

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Working Paper 16389
http://www.nber.org/papers/w16389

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
September 2010

This research was supported by the U.S. Social Security Administration through grants #10-P-98363-1-05 and #10-M-98363-1-01 to the National Bureau of Economic Research as part of the SSA Retirement Research Consortium. Funding was also provided through grant number P01 AG005842 from the National Institute on Aging. Poterba is a trustee of the College Retirement Equity Fund (CREF), a provider of retirement income services. The findings and conclusions expressed are solely those of the authors and do not represent the views of SSA, any agency of the Federal Government, TIAA-CREF, or the NBER. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 16389
September 2010
JEL No. E21,H10,J14

ABSTRACT

This paper examines the correlation between poor health and asset accumulation for households in the first nine waves of the Health and Retirement Survey. Rather than enumerating the specific costs of poor health, such as out of pocket medical expenses or lost earnings, we estimate how the evolution of household assets is related to poor health. We construct a simple measure of health status based on the first principal component of HRS survey responses on self-reported health status, diagnoses, ADLs, IADL, and other indicators of underlying health. Our estimates suggest large and substantively important correlations between poor health and asset accumulation. We compare persons in each 1992 asset quintile who were in the top third of the 1992 distribution of latent health with those in the same 1992 asset quintile who were in the bottom third of the latent health distribution. By 2008, those in the top third of the health distribution had accumulated, on average, more than 50 percent more assets than those in the bottom third of the health distribution. This "asset cost of poor health" appears to be larger for persons with substantial 1992 asset balances than for those with lower balances.

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Health care costs are a major concern of the elderly. In assessing the financial risks of poor late-life health, however, focusing on out-of-pocket expenditures for health care may substantially understate the actual risks that households face. Poor health may also trigger a number of other costs, such as home renovation or relocation, loss of earnings, and the costs of hiring various service providers. Further, poor health is an ongoing condition that may deplete resources over a long period of time. To provide evidence on the full cost of poor health, we examine the effect of poor health on the evolution of near- and post-retirement assets. We label this the "asset cost of poor health," and view it as more inclusive than many other measures of the financial cost of poor health since it captures both out-of-pocket medical expenses as well as other health-related costs.

Several approaches have been used to estimate components of the cost of poor health, mostly focusing on out-of-pocket expenditures for health care. Marshall, McGarry and Skinner (2010), one of the most recent studies of this issue, obtain a comprehensive measure of these costs, based on core (living) and exit (deceased) interviews in the Health and Retirement Study (HRS). They give careful consideration to the imputation of missing values and to the treatment of unusually large reported expenditures. They estimate that spending in the last year of life is $11,618 on average, with the 90th percentile equal to $29,335, the 95th percentile $49,907, and the 99th equal to $94,310. These estimates are substantially larger than those in some earlier studies, for example Palumbo (1999) and French and Jones (2004). Hurd and Rohwedder (2009), DeNardi, French, and Jones (2010), and Webb and Zhivan (2010) also estimate of the distribution of out-of-pocket health care costs; these studies consider costs over a broader time period than the last year of life. All of these studies, however, may underestimate the total cost of poor health by omitting indirect costs.

An alternative approach is to infer the financial consequences of poor health from the change in assets following specific health shocks. Smith (1999, 2004) investigates how wealth responds to major health events using the early waves of the HRS. Coile and Milligan (2009) consider how asset holdings respond to specific acute health events and new diagnoses, also using the HRS. These studies show that specific major health events can have substantial financial repercussions. They neglect, however, the costs of poor health that are not directly associated with specific health events.

Rather than compiling a comprehensive accounting of out-of-pocket costs associated with poor health or health events, we estimate the asset cost of poor health by estimating how the evolution of household assets varies as a function of household health status. Our goal is to capture not only the relationship between assets and the out-of-pocket cost of health care per se, but also other costs that are associated with poor health. We hope to capture the cumulative effect on assets of all of the adverse consequences of poor health over a long period of time. We do not attempt to specifically identify the types of expenditures associated with poor health that cause households to draw down assets.

Our analysis is based on data from the first nine waves, from 1992 to 2008, of the HRS. We study the original HRS cohort that includes households containing at least one respondent between the ages of 51 and 61 in the base year. We focus on the

asset cost of poor health for persons in two-person households, and briefly summarize results for single-person households.

Our analysis is divided into six sections. In section 1 we describe our procedure for estimating the evolution of assets. In section 2 we describe the measure of "latent" health that we use to categorize respondents by health status. We emphasize the properties of the index that are particularly important for our analysis. In section 3 we describe the evolution of assets by latent health quintile. In section 4, we describe our estimates of the asset cost of poor health for two-person households. We use two methods, both of which compare the asset growth of persons who have similar assets, but different latent health, in 1992. One method is the standard difference-in-difference estimator that compares the increase in assets between 1992 and 2008 for persons who in 1992 had similar assets but different latent health. The other approach is the matching estimator proposed by Abadie, Drukker, Herr and Imbens (2004) and Abadie and Imbens (2006). The two approaches yield broadly similar results, suggesting that the asset cost of poor health is very large. Even among persons with similar assets in 1992, those with good health in 1992 accumulated at least 50 percent more in assets by 2008 than those in poor health in 1992. In section 5 we briefly discuss parallel findings on the asset cost of poor health for one-person households. In section 6 we summarize our findings.

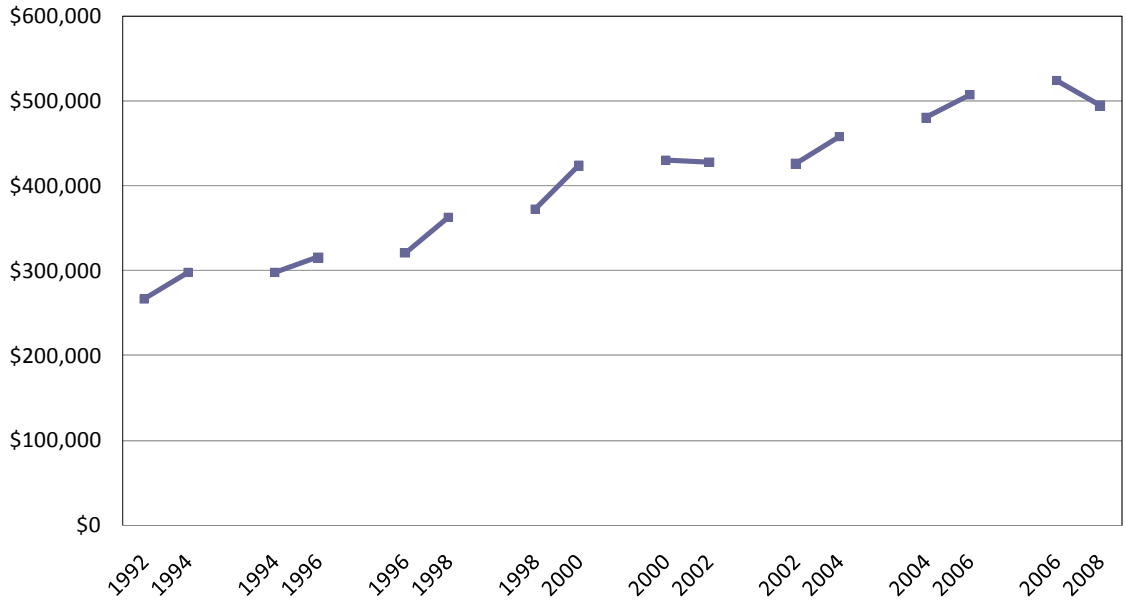
1. The Evolution of Assets

The unit of observation for our analysis is the person. We analyze persons in two-person households and persons in one-person households separately. HRS respondents were first surveyed in 1992 when they were between the ages of 51 and 61 and subsequently resurveyed every other year through 2008 (when they were age 67 to 77). We calculate asset growth for each of the eight two-year intervals between the nine survey waves. Although the unit of observation is the person, the figures below show the total assets in the person's household. Assets are defined broadly to include equity in owner-occupied housing, IRA balances (which include rollovers from 401(k) accounts), Keogh balances, other financial assets, and the value of vehicles, less debt. The value of business assets and other real estate are excluded. Balances in 401(k) plans are not included because 401(k) reporting limitations in the HRS, as explained in Poterba, Venti, and Wise (2010).. We emphasize these assets because their drawdown is controlled directly by the household. We do not include the asset value of annuities received from Social Security or from defined benefit pension plans. The relationship between these and other income sources on the evolution of assets is discussed below.

Figure 1-1 shows the "predicted" value of assets for the beginning and ending year for each of the eight intervals for persons in "continuing two-person households"—those in a two-person household at the beginning and the end of an interval. For example, the asset balances shown for the 1992 to 1994 interval are for persons in two-person households in both 1992 and 1994 and the balances shown for 1994 and 1996 pertain to persons who were in two-person households at both the start and end of this period. Thus some households included in the 1992 to 1994 interval are not included in the 1994 to 1996 interval. This selection effect results from death of a spouse, divorce,

or separation and is reflected in the difference in the mean assets at the end of the 1992 to 1994 interval and the beginning of the 1994 to 1996 interval. In most, but not all, instances, the predicted asset mean at the beginning of one interval is greater than the predicted asset mean at the end of the prior interval. All dollar values here and throughout the paper have been converted to 2008 dollars using the CPI-U. Real mean assets increase by 186 percent over the 16-year period, which translates to a compound annual growth rate of about 3.95 percent per year.

Figure 1-1. Predicted assets by year, all persons in continuing two-person households age 51-61 in 1992



Poterba, Venti, and Wise (2010) report that asset means calculated from the "raw" data are noticeably affected by apparent reporting errors and are unstable from year to year. The "predicted" values in Figure 1-1 are therefore based on trimmed data, and are calculated as follows:

(i) We first estimate separate GLS regressions for assets at the beginning and end of each interval. Each GLS regression allows the residual variance to differ from interval to interval. For each family status transition group (i.e. persons in one-person or two-person households), we estimate a specification of the form:

$$A_{ibj} = \alpha_b + \sum_{j=1}^{J} \delta_{bj} I_j + \varepsilon_{ibj}$$

(1)

$$A_{iej} = \alpha_e + \sum_{j=1}^{J} \delta_{ej} I_j + \varepsilon_{iej}$$

In these equations A is the asset level (in constant year 2008 dollars). The first equation pertains to beginning assets in each interval and the second equation to ending assets; I_j is an indicator variable for the jth interval, *i* indicates person, *b* indicates the beginning of an interval, and *e* indicates the end of an interval. This specification allows the error variance to vary by interval.

(ii) To obtain trimmed means, for each interval and for each family status group we eliminated the observations with residuals in the top and bottom one percent of the residual distribution. In cases where there are fewer that 100 observations in an interval we exclude the observations with the highest and lowest residuals.

(iii) We then re-estimated the equations in (1) using the trimmed data. The resulting estimates of (δ_{bj} , δ_{ej}), and the associated intercepts (α_b , α_e) are shown below in Table 1-1. The values plotted in Figure 1-1 correspond to $\alpha_b + \delta_{bj}$ and $\alpha_e + \delta_{ej}$ for each interval j .

Table 1-1. GLS estimates of beginning and end of interval assets, persons in two-person households age 51 to 61 in 1992, trimmed means

	Beginning of period wealth			End of period wealth		
interval	coefficient	s.e.	z	coefficient	s.e.	z
1994-1996	31,310	5,524	5.7	17,915	6,094	2.9
1996-1998	54,573	6,044	9.0	65,638	7,105	9.2
1998-2000	106,082	7,195	14.7	126,014	8,224	15.3
2000-2002	164,054	8,184	20.1	129,994	8,092	16.1
2002-2004	159,771	8,213	19.5	160,285	9,055	17.7
2004-2006	213,844	9,504	22.5	209,489	10,063	20.8
2006-2008	258,075	10,641	24.3	197,107	10,187	19.4
constant	266,467	3,627	73.5	297,771	4,021	74.1
N	39721			39721		
Wald chi2	1437			1104		
prob>chi	0.0000			0.0000		

2. Latent health index

Our aim is to understand the relationship between health and the evolution of assets. To do this we need to distinguish persons by health status, which we measure by a latent health index. The HRS collects substantial information on health status and on changes in health status. We assume that latent health is revealed by responses to

these questions over the course of the survey waves. The index is used to group persons by latent health status at the beginning of each of the survey's two-year intervals.

Our latent health index is an "evolving" index that uses information up to the beginning of each interval for each person. This means that a person may experience changes in his or her latent health index across the various two-year intervals that we analyze. For example, suppose we are considering the change in assets between the third and fourth waves of the HRS survey (between 1996 and 1998). We group persons by a health index based on health indicators available in the 1992, 1994, and 1996 waves of the HRS. If we consider the change in assets between 1992 and 1994, we construct the index from the 1992 responses. The latent health index for the 2004 to 2006 interval can be constructed from the seven survey waves between 1992 and 2004.

The HRS contains a large number of detailed questions that can be used to construct an index of latent health. To construct the index we use responses to the 27 questions that are shown in Table 2-1, and obtain the first principal component of these indicators of health. The first principal component is the weighted average of the health indicators where the weights are chosen to maximize the proportion of the variance of the individual health indicators that can be explained by the first principal component. For presentation purposes we convert the first principal component into percentile scores and group persons by quintiles of this score. For two-person households the average of the percentile scores of the two members of the household is assigned to each person in the household.

Although this is a very simple index, it has several important properties. First, it is relatively stable over time. That is, the weights given to each health indicator vary little over time. Table 2-1 shows the weights in the beginning year of each of the eight HRS intervals. Notice also that this index gives the highest weights to self-reported health (health limits work and health fair or poor) and ADLs and IADLs. Much less weight is given to questions about whether the respondent ever experienced specific health problems. Second, the index is strongly related to mortality. Table 2-2 shows mean subsequent mortality rates by latent health quintile in 1992 for persons alive at the beginning and end of the 1992 to 1994 interval. Mortality rates are presented for each of the 1992 health quintiles as well as for the top and bottom 5 percent of the distribution of latent health. The relationship is striking. By 2008 males in quintile 5 (poor health) are three times more likely to have died than males in the healthiest quintile. Males with extremely poor health (top 5 percent) are four times more likely to die than males with the best health (bottom 5 percent). Although overall mortality rates are lower for females than for males, the differences are more pronounced than for males. Females in the poorest health quintile are four times more likely to die than females in the best health quintile and females with extremely low health (top 5 percent) are over five times more likely to die than females with very good health (bottom five percent).

Table 2-1, Evolving latent health index weights (component loadings) for persons 51 to 61 in 1992, for beginnirg year of each interval, ordered by weight in 1992

	1992	1994	1996	1998	2000	2002	2004	2006
number of periods: health problems limit work	0.289	0.286	0.278	0.278	0.278	0.277	0.274	0.275
number of periods with difficulty push/pull	0.289	0.284	0.275	0.272	0.269	0.270	0.268	0.265
number of periods: self-reported health fair or poor	0.275	0.270	0.263	0.262	0.259	0.257	0.255	0.254
number of periods with difficulty walking sev blocks	0.274	0.273	0.274	0.275	0.277	0.278	0.278	0.278
number of periods with difficulty lift/carry	0.274	0.276	0.273	0.272	0.271	0.271	0.271	0.269
number of periods with some difficulty with an ADL	0.270	0.256	0.256	0.259	0.260	0.260	0.259	0.258
number of periods with difficulty stoop/kneel/crouch	0.251	0.251	0.250	0.251	0.254	0.253	0.254	0.254
number of periods with difficulty getting up from chair	0.244	0.237	0.242	0.245	0.249	0.251	0.252	0.253
number of periods with difficulty reach/extend arms up	0.237	0.241	0.237	0.235	0.234	0.233	0.230	0.230
number of periods with difficulty climbing stairs	0.235	0.249	0.247	0.247	0.249	0.250	0.250	0.251
number of periods: health worse in previous period	0.201	0.219	0.225	0.225	0.226	0.226	0.229	0.231
ever experience arthritis	0.181	0.164	0.156	0.151	0.148	0.144	0.142	0.135
number of doctor visits	0.179	0.189	0.193	0.188	0.185	0.177	0.169	0.166
number of periods with difficulty pick up a dime	0.170	0.162	0.163	0.166	0.163	0.162	0.159	0.157
number of periods with difficulty sitting two hours	0.167	0.191	0.207	0.217	0.223	0.226	0.227	0.226
number of periods with back problems	0.162	0.172	0.183	0.181	0.193	0.193	0.197	0.196
ever experience psychological problems	0.137	0.136	0.134	0.131	0.134	0.130	0.130	0.130
ever experience heart problems	0.136	0.122	0.112	0.102	0.099	0.103	0.100	0.103
ever experience lung disease	0.118	0.112	0.108	0.103	0.101	0.105	0.103	0.104
ever experience diabetes	0.105	0.099	0.090	0.084	0.083	0.082	0.089	0.084
ever experience high blood pressure	0.104	0.088	0.081	0.076	0.074	0.069	0.067	0.064
BMI at beginning of period	0.102	0.092	0.083	0.088	0.095	0.087	0.097	0.097
number hospital stays	0.102	0.124	0.143	0.154	0.136	0.145	0.149	0.165
number of periods: home care	0.090	0.112	0.126	0.126	0.126	0.131	0.135	0.145
ever experience stroke	0.087	0.077	0.078	0.085	0.080	0.081	0.075	0.069
ever experience cancer	0.036	0.038	0.038	0.034	0.032	0.027	0.025	0.022
number of nursing home stays	0.036	0.016	0.047	0.036	0.040	0.048	0.063	0.062

Third, the index is strongly predictive of future health events such as a stroke or the onset of cancer or diabetes. Figure 2-1 shows the probability that selected health events occur by 2008 by latent health quintile in 1992. The health events shown include significant diagnoses (diabetes, cancer, lung disease, heart disease), a stroke, whether the respondent reported fair or poor health, and whether the respondent had any hospital or nursing home stays by 2008. It is clear that the latent health indicator is strongly related to these subsequent health events. Appendix Table 2-1 reports linear probability models for each of these future health events as a function of the latent health indicator. The estimates show that the latent health variable is a statistically significant predictor for all eight future health events.

Table 2-2. Percentage of HRS respondents age 51 to 61 in 1992 and alive at the beginning and end of the 1992-1994 interval who are deceased by the beginning of each wave, by latent health quintile (and top and bottom 5%) in 1992

	1992 health quintile						
Year	bottom 5%	1	2	3	4	5	top 5%
			Men				
1996	1.4%	1.4%	1.6%	2.2%	2.2%	6.0%	9.5%
1998	2.2%	2.6%	2.8%	3.8%	5.0%	11.7%	14.9%
2000	4.1%	4.0%	5.2%	5.7%	10.7%	18.7%	23.4%
2002	7.0%	7.0%	7.9%	9.0%	15.6%	25.3%	32.6%
2004	9.7%	8.9%	10.3%	12.5%	19.0%	30.5%	38.8%
2006	11.2%	11.3%	12.9%	16.1%	21.2%	37.9%	49.1%
2008	13.6%	14.2%	16.4%	18.7%	26.5%	42.9%	56.9%
			Women				
1996	0.0%	0.6%	0.3%	1.2%	0.6%	2.8%	3.9%
1998	0.0%	1.2%	1.3%	2.8%	2.1%	6.4%	9.2%
2000	0.2%	1.3%	3.1%	3.7%	4.7%	11.3%	15.8%
2002	3.5%	2.7%	5.2%	5.9%	7.0%	16.9%	21.5%
2004	4.5%	3.3%	6.5%	7.0%	9.0%	19.8%	25.1%
2006	6.0%	5.0%	8.6%	9.1%	12.5%	24.2%	31.3%
2008	6.7%	6.1%	10.4%	11.9%	15.7%	28.3%	36.9%

Note: Mortality rates are zero in both 1992 and 1994 because we only constructed the health index for respondents who were present in both 1992 and 1994.

Fourth, the latent health index is strongly related to economic outcomes prior to 1992, as well as to outcomes in 1992 and in 2006. Table 2-3 shows outcomes for persons in two-person households in 1992. Column 1 shows Social Security lifetime earnings (through 1992) by latent health quintile in 1992, which increase consistently from about $1,362,000 for those in the lowest quintile to about $1,664,000 for those in the highest latent health quintile. Because annual Social Security earnings are subject

to a cap, the difference between the actual earnings of those in the highest and lowest health quintiles may be even larger than these statistics suggest. Column 2 shows that for persons in households with at least one working member in 1992, household earnings increase from about $72,000 for those in the lowest health quintile in 1992 to about $153,000 for those in the highest latent health quintile. Column 3 shows household annuity income in 1992 for persons between the ages of 51 and 61 in 1992. Annuity income is primarily Social Security retirement and disability benefits and private pension benefits and is determined primarily by lifetime income. At these ages most persons have not yet begun to receive annuity income, with the exception of persons in poor health receiving disability and early retirement benefits. Thus, in column 4 we also show household annuity income in 2006 when most persons are retired. Finally, column 5 shows household assets in 1992 that range from about $157,000 for persons in the worst health to about $370,000 for persons in the best health.

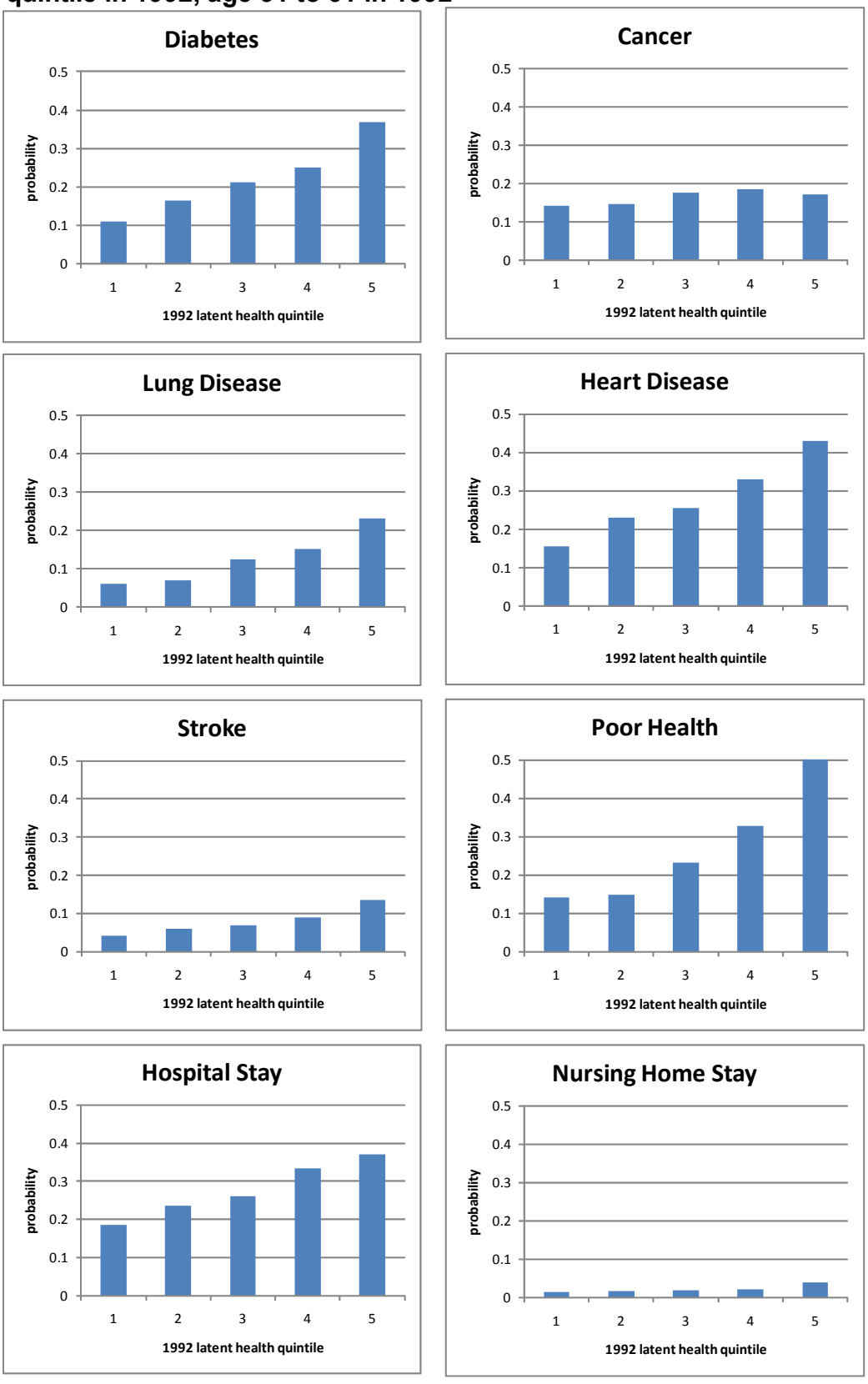
These findings on the relationship between latent health in 1992 and various measures of economic status in before and after 1992 are consistent with the large literature on the health-wealth gradient. Our focus is not, however, on the retrospective links between health status and economic circumstances, but on the prospective association between health status and the evolution of economic status.

Table 2-3. Lifetime earnings through 1992 and assets in 1992 by health quintile in 1992, married persons in 1992 (in 2008 dollars)

1992 health quintile	lifetime SS earnings in 1992	mean earnings in 1992 (if positive)	Annuity income in 1992 (if positive)	Annuity income in 2006 (if positive)	Assets in 1992	percent with earnings in 1992	percent with annuity income in 1992	percent with annuity income in 2006
1st (lowest)	1,362,434	72,489	27,700	41,054	157,070	0.772	0.527	0.994
2nd	1,597,938	103,315	33,150	54,489	225,350	0.900	0.356	0.981
3rd	1,656,465	120,317	39,070	60,706	273,270	0.925	0.255	0.988
4th	1,772,866	142,562	39,416	70,429	374,209	0.949	0.203	0.991
5th (highest)	1,663,647	152,675	43,715	69,113	370,026	0.918	0.165	0.966

We have experimented with alternative methods of constructing an index of latent health. After considerable analysis of the properties of alternative indices we chose the rather simple principal component index because this index had substantial predictive power for the post-retirement evolution of assets. One alternative index that we considered was based on the prediction of mortality. Compared to the principal component index, this mortality “propensity score" index gives much greater weight to the “ever experienced” health elements and less weight to the “number of … “ health elements. But the mortality propensity index does not explain asset evolution nearly as well as the principal component index.

Figure 2-1. Probability of health events by 2008 by latent health quintile in 1992, age 51 to 61 in 1992



3. The Evolution of Assets by Health Status

We now examine the evolution of assets for persons with different levels of latent health. We also explore the effect of earned income and annuity income on the evolution of assets. Our basic specification is:

$$A_{ibj} = \alpha_b + \sum_{j=1}^{J}\left(\delta_{bj} + \beta_{bj}h_i + \gamma_{bj}y_i + \lambda_{bj}a_i\right)I_j + \varepsilon_{ibj}$$

(2)

$$A_{iej} = \alpha_e + \sum_{j=1}^{J}\left(\delta_{ej} + \beta_{ej}h_i + \gamma_{ej}y_i + \lambda_{ej}a_i\right)I_j + \varepsilon_{iej}$$

As in equation (1), A is the asset level (in constant year 2008 dollars). The first equation pertains to assets at the beginning of each interval and the second equation to ending assets; I_j is an indicator variable for the jth interval, *i* indicates person, *b* indicates the beginning of an interval, and *e* indicates the end of an interval. In addition, h represents latent health, y represents earned income, and a represents annuity income. Latent health h is expressed as a percentile where the first percentile is the best health and the 100th percentile is the poorest health. Again the estimates are based on trimmed data, as described with respect to equation (1).

Table 3-1 reports our estimation results. The first two columns show estimates for latent health only, as well as indicator variables for each interval. The effect of latent health is very large and the estimates trend upward with year (age). For example, in the beginning year of an interval, a decline of one percentile in latent health is associated with a reduction of assets by $2,417 in 1992 and by $6,882 in 2006. For the ending year of an interval a one percentile decline in latent health translated to an asset reduction of $3,063 in 1992 and by $6,776 in 2008.

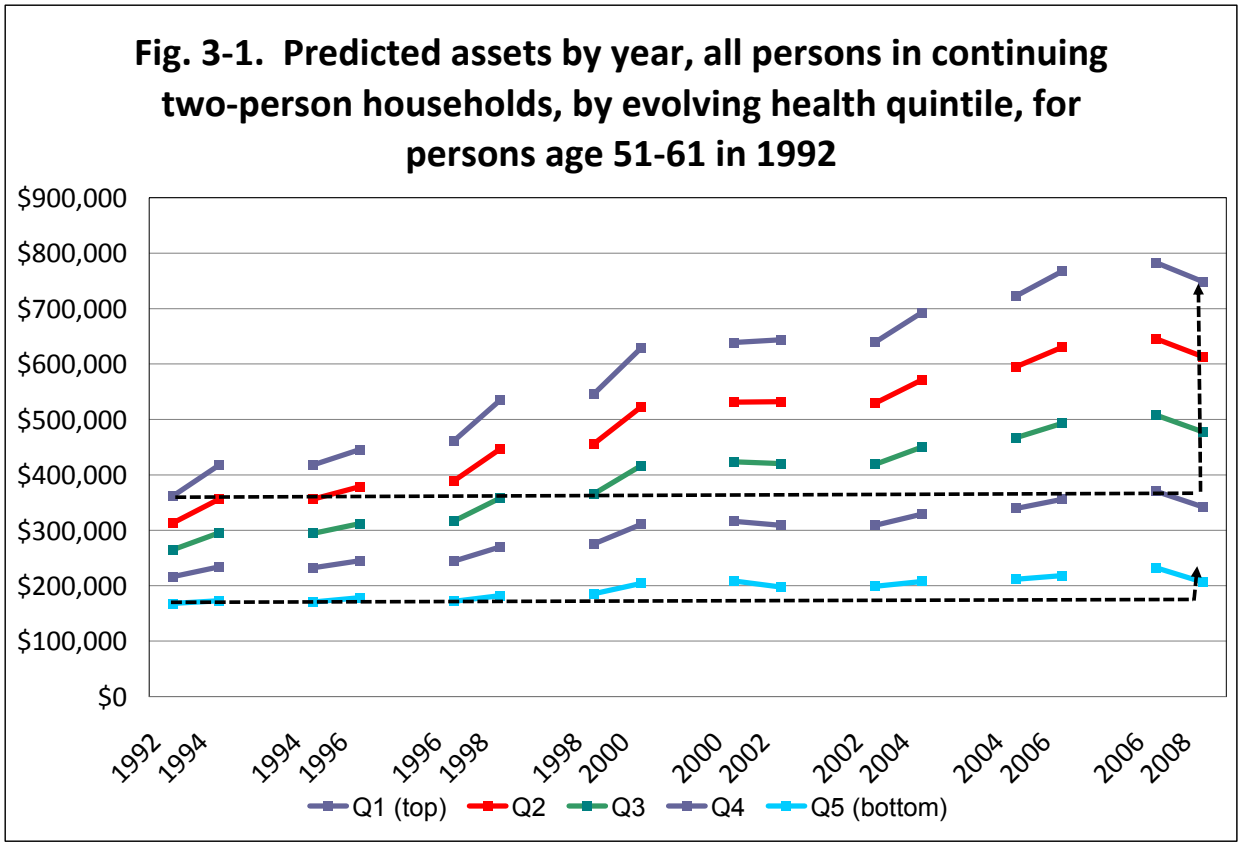
We can use these estimates to show how assets evolve for persons with different levels of latent health. We consider five quintiles of the distribution of latent health. For each health quintile we use the estimates to predict beginning and end of interval wealth separately for each interval. For example, to predict assets for a person in the top quintile (a value of h between 1 and 20 percent) we set h to 10. For the second quintile h is set to 30, etc. Figure 3-1 shows profiles based on the estimates in columns 1 and 2 of Table 3-1 and distinguished by quintiles of latent health. The profiles are upward sloping, but there are "dips" associated with financial market declines in 2000 to 2002 and 2006 to 2008. It is clear that there is a very strong relationship between health and both the level of assets in 1992 and the subsequent growth in assets. In 1992, the assets of households of persons in the poorest health were only 46 percent of the assets of household in the best health quintile. By 2008, the assets of those in the poorest health were only 28 percent of the asset of those in the best health. Two sets of heavy dashed lines show that the assets of households in the top health quintile increased much more than the assets of persons in the lowest health quintile. The assets of those in the poorest health increased only $38,556 compared to $387,250 for

those in the best health. This difference is the key to our estimates of the "asset cost of poor health" in the next section.

Table 3-1. GLS estimates of beginning and end of interval assets, persons age 51 to 61 in 1992 in continuing two-person households, trimmed means

	Beginning of period wealth			End of period wealth			Beginning of period wealth			End of period wealth		
interval	coefficient	s.e.	z	coefficient	s.e.	z	coefficient	s.e.	z	coefficient	s.e.	z
1994-1996	63,726	11,200	5.7	30,417	12,321	2.5	103,973	13,348	7.8	33,093	14,777	2.2
1996-1998	111,925	12,192	9.2	131,022	14,331	9.1	157,969	14,671	10.8	111,646	16,805	6.6
1998-2000	206,396	14,467	14.3	233,247	16,521	14.1	232,105	16,775	13.8	213,743	20,014	10.7
2000-2002	307,006	16,439	18.7	250,891	16,148	15.5	367,116	20,357	18.0	247,147	20,181	12.3
2002-2004	308,660	16,358	18.9	304,540	18,015	16.9	318,208	20,105	15.8	249,202	19,634	12.7
2004-2006	400,806	18,766	21.4	387,816	19,827	19.6	385,182	20,213	19.1	333,798	24,166	13.8
2006-2008	466,516	21,004	22.2	367,654	19,958	18.4	474,574	25,782	18.4	306,759	25,994	11.8
health index												
1992-1994	-2,417	132	-18.3	-3,063	146	-21.1	-1,409	124	-11.4	-2,184	141	-15.5
1994-1996	-3,097	151	-20.5	-3,342	166	-20.2	-2,158	147	-14.7	-2,661	163	-16.3
1996-1998	-3,618	174	-20.8	-4,418	211	-20.9	-2,902	171	-17.0	-3,668	206	-17.8
1998-2000	-4,512	224	-20.1	-5,307	259	-20.5	-3,792	218	-17.4	-4,606	257	-17.9
2000-2002	-5,378	264	-20.3	-5,580	251	-22.2	-4,844	266	-18.2	-4,842	252	-19.2
2002-2004	-5,504	262	-21.0	-6,060	289	-21.0	-4,575	259	-17.7	-4,854	273	-17.8
2004-2006	-6,386	315	-20.3	-6,866	330	-20.8	-5,207	295	-17.6	-5,773	325	-17.8
2006-2008	-6,882	361	-19.1	-6,776	335	-20.2	-5,871	358	-16.4	-5,756	334	-17.2
earned income												
1992-1994							1.33	0.04	37.1	0.98	0.04	27.5
1994-1996							0.96	0.04	25.8	0.98	0.05	21.1
1996-1998							0.99	0.05	20.7	1.11	0.06	20.0
1998-2000							1.08	0.05	20.0	0.93	0.07	13.1
2000-2002							0.69	0.08	9.0	0.72	0.07	10.5
2002-2004							1.02	0.07	14.8	1.33	0.09	15.3
2004-2006							1.38	0.09	14.9	1.48	0.12	12.5
2006-2008							1.44	0.14	10.6	1.22	0.13	9.3
annuity income												
1992-1994							3.57	0.16	22.6	2.58	0.12	21.5
1994-1996							2.65	0.12	21.6	2.91	0.14	20.4
1996-1998							2.86	0.15	19.1	2.85	0.15	18.8
1998-2000							2.86	0.16	18.0	2.78	0.17	16.4
2000-2002							2.42	0.17	14.2	2.19	0.16	14.0
2002-2004							2.34	0.16	14.5	2.00	0.08	25.4
2004-2006							2.03	0.08	25.1	2.04	0.16	13.2
2006-2008							1.85	0.17	11.1	2.36	0.19	12.3
constant	385,460	7,409	52.0	448,644	8,155	55.0	163,560	8,777	18.6	271,409	9,564	28.4
N	39721			39721			39721			39721		
Wald chi2	4778			1104			10691			9356		
prob>chi	0.0000			0.0000			0.0000			0.0000		

Columns 3 and 4 of Table 3-1 control for annuity income and earned income, as well as latent health. Note first that the estimated coefficient of latent health on asset balances is reduced substantially when annuity and earning income are added. The average attenuation is about 20 percent, averaged over all years. The estimates with and without annuity and earned income are shown in Figure 3-2. The earned income and annuity variables are correlated with health status (as shown in Table 2-3) and some of the effect of poor health is accounted for by lower earned income and lower annuity income. This result also presages later estimates that suggest that the asset cost of poor health is accounted for in part by low levels of these income sources.



Higher levels of annuity income and earned income reduce the need to draw down assets to pay for health related costs. The estimated effect of each income source on beginning and ending asset balances is shown in the last two columns of Table 3-1. The estimated effect of an additional dollar of annuity income and an additional dollar of earned income are shown in Figure 3-3. Both effects are large. The estimated effect of annuity income tends to decline with age. For example, an additional dollar of annuity income is associated with an increase in beginning-of-period assets of over $3 in the first interval and about $2 in the last interval. On the other hand, the association between earned income and beginning-of-period assets tends to be roughly constant across different ages. For example, one dollar more in earned income is associated with an increase in beginning of period assets of $1.33 in the first interval and of $1.44 in the last interval. Recall that most respondents are still working during the first interval (1992-1994) and most are retired during the last interval (2006-2008). But even at the beginning of the last interval nearly 40 percent of married respondents report that at least one household member is employed.

Fig. 3-2. Effect of a one percentile decline in health on beginning and end of interval assets, without and with controlling for annuity and earned income

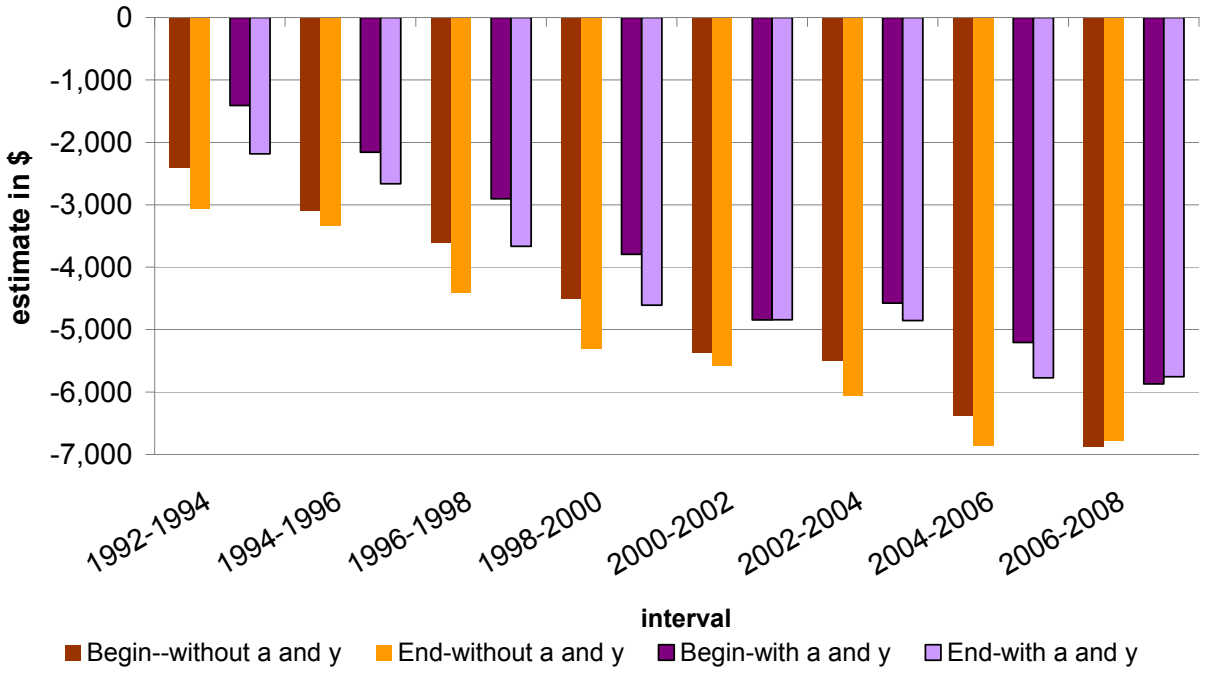
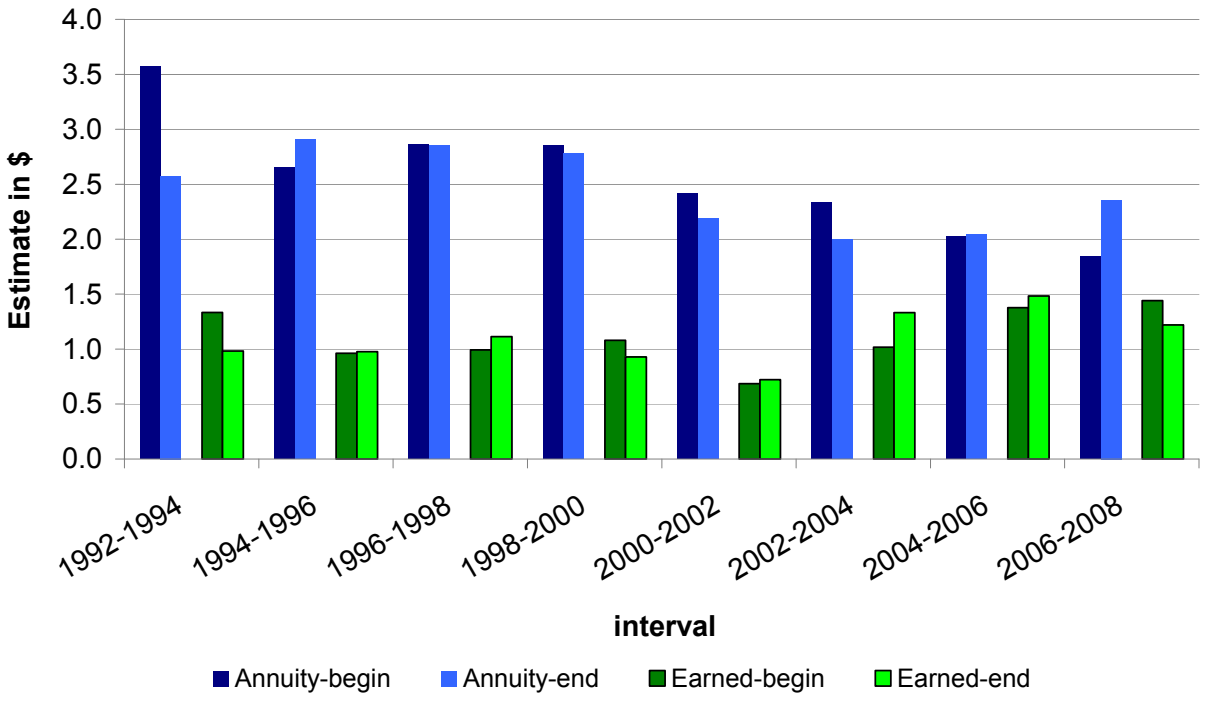


Fig. 3-3. Effect of $1 of annuity income and earned income on beginning and end of interval assets



4. What is the Asset Cost of Poor Health?

Figure 3-1 shows the evolution of assets distinguished by quintiles of the evolving latent health index. The assets at the beginning and the end of each interval are calculated as the predicted values by health quintile based on the evolving latent health index at the beginning of each interval. Thus the figure shows how the change in assets within each interval depends on latent health for that interval. Recall that the selection effect of persons moving from two-person to one-person households, which results primarily from the death of a spouse or devorce, is reflected in the difference between the predicted value of assets at the end of one interval and at the beginning of the next interval. These selection effects are typically positive but small—that is persons who remain in two-person households from the end of one interval to the beginning of the next, and who have not only survived through the interval but also have been married to a spouse who survived, have slightly higher mean assets than persons who leave the sample between intervals. The selection effects, however, are large in some cases—for persons in the top latent health quintile, for example, assets at the end of the 2002 to 2004 interval are $692,579 and at the beginning of the 2004 to 2006 interval are $722,407. Part of this effect may result from the better latent health of those who survive from one interval to the next, even though the calculation is made for persons in the top quintile of the distribution of health in each interval.

The two sets of heavy dashed lines in Figure 3-1 show that the assets of households in the top health quintile in 1992 increased much more between 1992 and 2008 than the assets of persons in the lowest health quintile in 1992. The different rates of asset growth for individuals with different latent health status at the start of our sample are the key to understanding the estimates of the long-run asset cost of poor health.

To formally estimate the asset cost of poor health, we use two methods to compare the asset growth of persons who have similar assets in 1992 but have different latent health. One is the standard difference-in-difference (DD) estimator that compares the increase in assets between 1992 and 2008 for persons who in 1992 had similar assets but different latent health. The other is the matching estimator proposed by Abadie, Drukker, Herr and Imbens (2004) and Abadie and Imbens (2006). This estimator compares the 2008 assets of a person with good health in 1992 to the 2008 assets of a person with poor health in 1992, but imposes the condition that these two persons be matched with respect to assets in 1992.

We typically obtain estimates of the asset cost of poor health separately for each of the five 1992 asset quintiles. Within each asset quintile, persons are grouped into three groups—terciles—based on latent health in 1992. The first tercile—persons with the worst health in 1992—is treated as the “control” group and the 2nd and 3rd terciles are "treatment" groups.

The simple DD estimate of the asset cost of poor health can be calculated as

$$\left[A_{T08} - A_{T92}\right] - \left[A_{C08} - A_{C92}\right]$$

for each of the five 1992 asset quintiles where A denotes predicted mean assets and the subscripts C and D denote the "control" and "treatment" groups respectively. To estimate this difference, the typical regression specification is

$$A_i = \alpha_{92} + \alpha_{T92} T_i + \gamma Y_{08} + t Y_{08} \cdot T_i + \varepsilon_i$$

where t is the "treatment" effect. If the same persons are observed in 1992 and 2008 then we can base estimates on the change for each person and allow for individual-specific effects, u_i. The equations for assets in 1992 (A_{i92}), assets in 2008 (A_{i08}), and the change in assets between 1992 and 2008 are:

$$A_{i92} = \alpha_{92} + \alpha_{92T} T + \quad + u_i + \eta_{i92}$$
$$A_{i08} = \alpha_{92} + \alpha_{92T} T + \gamma_{08} + tT + u_i + \eta_{i08}$$
$$A_{i08} - A_{i92} = \gamma_{08} + tT + \eta_{i08} - \eta_{i92}$$

We obtain estimates of the treatment effect by estimating the last equation directly. In subsequent analysis we add covariates X_i to the specification and the estimation equation becomes:

$$A_{i92} = \alpha_{92} + \alpha_{92T} T + \quad + \beta_{92} X_{i92} + u_i + \eta_{i92}$$
$$A_{i08} = \alpha_{92} + \alpha_{92T} T + \gamma_{08} + tT + \beta_{92} X_{i08} + u_i + \eta_{i08}$$
$$A_{i08} - A_{i92} = \gamma_{08} + tT + \beta_{08} X_{i08} - \beta_{92} X_{i92} + \eta_{i08} - \eta_{i92}$$

One of the limitations of the DD approach is that the initial assets of the "treatment" and "control" groups may differ in 1992, even though we perform the analysis separately by asset quintile in 1992. The matching approach addresses this issue by matching each person in the treatment group to a "close" person in the control group. We obtain matching estimates separately for each 1992 asset quintile and we match by assets in 1992 within quintile. As with the estimation of asset levels discussed in section 1, we also trim these change data to reduce the effect of apparent reporting errors. Within each asset quintile we drop the top one percent and the bottom one precent of the change in assets between 1992 and 2008. In some specifications we also use age, earned income and annuity income as matching variables. We use four matches for each treatment respondent, a number that Abadie et. al. (2004) find works well.

Table 4-1 shows estimates for the five 1992 asset quintiles, with persons within each asset quintile grouped into latent health terciles. To illustrate the approach, consider the 3rd asset quintile. The difference-in-difference estimates show that the assets of households in the 2nd health tercile increased by $58,072 more (between 1992 and 2008) than the assets of the households in the 1st health tercile (the "control" group). Below we sometimes refer to this estimate as the asset cost based on the 2nd tercile. The assets of households in the 3rd health tercile (in the best health) increased by $135,694 more than the assets of the households in the 1st health tercile. The

matching estimates are very similar—$51,142 and $126,793 respectively. This is also the case for other asset quintile groups.

Both estimation methods suggest that asset cost of poor health is substantial. Both methods also suggest that the asset cost is greater for persons with high asset balances in1992. Even among persons with the "same" level of assets in 1992, meaning that they are within the same 1992 asset quintile, those with good health accumulated at least 50 percent more in assets than those in poor health by 2008.

We can use the matching method to obtain estimates of the asset cost of poor health averaged over all asset quintiles. Table 4-2 shows matching estimates for both health terciles and for health quintiles, averaged over all asset levels. The tercile estimates indicate that on average the assets of households in the best health (the 3rd tercile) increased by $253,017 more than the assets of persons in the worst health tercile. This average is similar to the average of the estimates by asset quintile in Table 4-1 that range from $53,218 in the lowest asset quintile to $585,092 in the highest asset quintile, with an average of $233,009. The estimates for latent health quintiles show that assets in household in the top health quintile increased $287,610 more than the increase for households in the bottom health quintile, averaged over all 1992 asset levels. The asset cost based on the third health quintile is $122,684—similar to the asset cost based on the second health tercile, which is $128,899.

Table 4-1. Difference-in-difference and matching estimates of the long-run "asset cost" of poor health, persons age 51 to 61 in continuing two-person households

1992 asset quintile	health tercile	Difference-in-difference estimates mean of total assets 1992	2008	diff-in-diff 1992 vs 2008	t-stat	Matching estimates coef-ficient	t-stat
1st (lowest)	1 (worst)	13,280	101,857				
	2	9,439	122,372	24,356	1.33	12,629	0.75
	3 (best)	23,744	184,616	72,295	3.49	53,218	2.17
2nd	1 (worst)	98,677	171,415				
	2	99,572	221,039	48,729	2.73	44,363	2.37
	3 (best)	100,318	262,116	89,060	4.66	92,710	4.01
3rd	1 (worst)	175,842	263,615				
	2	181,149	326,994	58,072	2.05	51,142	1.79
	3 (best)	181,705	405,172	135,694	4.78	126,793	3.61
4th	1 (worst)	303,396	388,215				
	2	317,124	552,951	151,008	3.73	168,360	3.36
	3 (best)	316,685	652,688	251,184	6.05	307,232	6.22
5th (highest)	1 (worst)	771,176	891,089				
	2	822,193	1,280,380	338,274	1.89	383,639	2.80
	3 (best)	884,725	1,476,755	472,117	2.74	585,092	3.59

Table 4-2. Matching estimates of the long-run "asset cost" of poor health, persons age 51 to 61 in continuing two-person households,all asset quintiles combined, for health terciles and for health quintiles

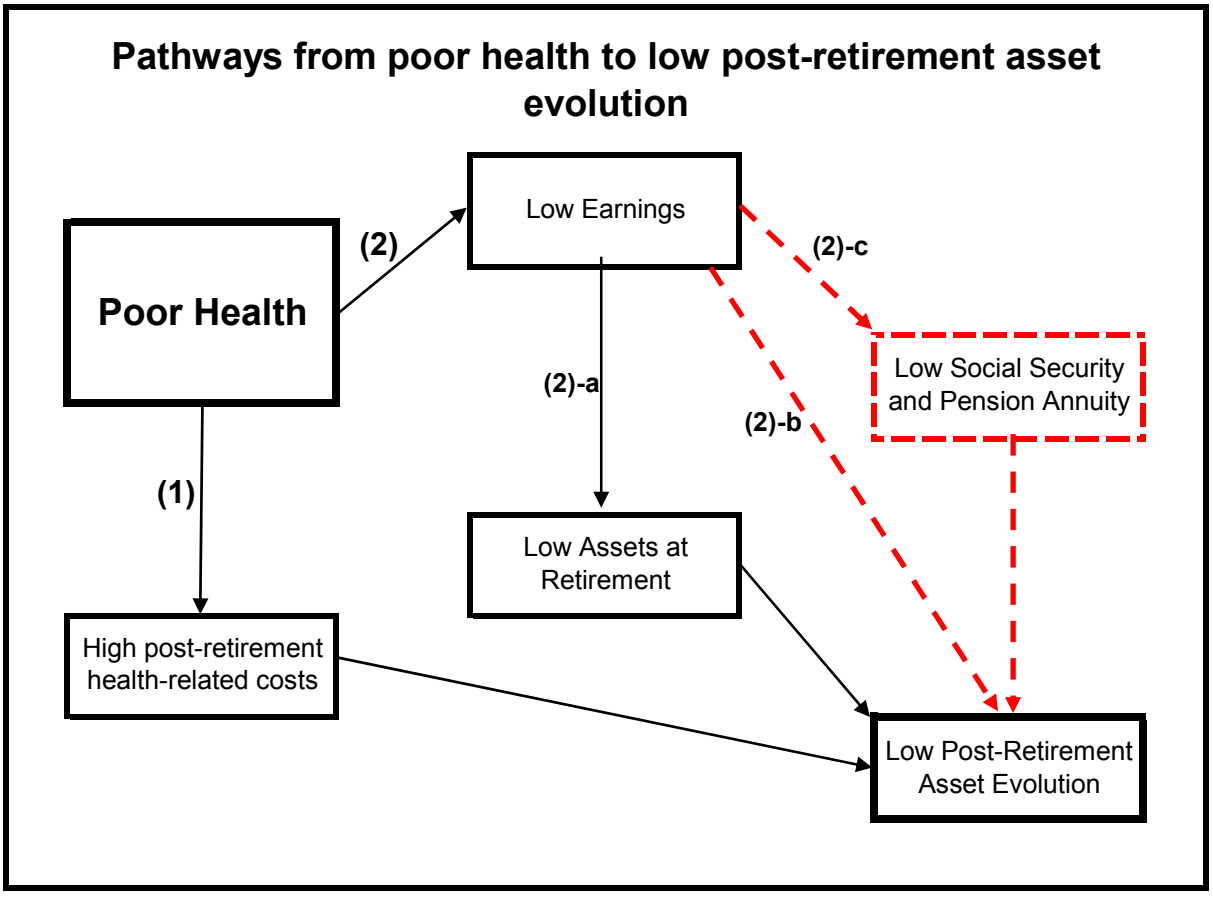
1992 asset quintile	Health tercile	coefficient	t-stat	Health quintile	coefficient	t-stat
	1 (worst)			1 (worst)		
All	2	128,899	4.87	2	65,581	2.84
	3 (best)	253,017	6.91	3	122,684	3.43
				4	274,888	5.53
				5 (best)	287,610	4.60

We now explore more carefully how the asset cost of poor health is attenuated by the receipt of Social Security benefits and DB pension annuities, as well as earned

income. The diagram below is a schematic illustration of the potential ways that poor health may affect the evolution of assets. It illustrates two key pathways. First, poor health may be associated with high post-retirement medical costs which may be financed by drawing down assets and thus reducing the post-retirement accumulation of assets. Second, poor health may contribute to low earnings while working and to a shorter working life.

Low lifetime earnings in turn reduce post-retirement asset balances in three ways. First, low post-retirement earnings affect asset growth directly by restricting the ability of households to meet medical costs without tapping into assets. Second, low pre-retirement earnings reduce the level of Social Security and private pension annuities that are available to pay health-related costs in retirement. Third, low pre-retirement earnings result in low asset balances upon entry into retirement.

The results in Table 2-3 confirm the relevance of the pathway that links poor health to low lifetime earnings. The findings suggest not only that poor health is associated with lower lifetime earnings, but also that it is correlated with low earnings in 1992, low annuity income, and low assets in 1992. The estimates of the asset cost of poor health in Tables 4-1 and 4-2 above represent the combined effect of both of the pathways that link poor health and asset levels.



The estimates presented in the last two columns of Table 3-1 show that assets

are positively related to annuity income, consisting largely of Social Security benefits, earned income, as well as to latent health. We now estimate the proportion of the asset cost of poor health that can be accounted for by the effect of poor health on earnings. This effect includes the indirect effects of low earnings on Social Security and DB pension benefits. The results suggest that the asset cost of poor health is attenuated by earned income and by annuity income, a finding that is consistent with higher-income households being better able to "protect" their assets. Our goal is not to explain the reasons for poor health but rather to highlight the pathways from poor health to low assets.

One way to estimate the share of the asset cost of poor health that is accounted for by low earned income or low annuity income is to compute DD and matching estimates of the asset cost of poor health controlling for earned income and annuity income. Table 4-3 shows matching estimates with and without controlling for these sources of income. A comparison suggests that between 20 and 40 percent of the estimated asset cost is "explained" by lower earned and annuity income—39%, 42%, 21%, 24%, 44% for the first to fifth asset quintiles respectively.

Table 4-4 shows comparable estimates based on the DD method. A comparison of the two sets of estimates in this case suggests that between 25 and 50 percent of the estimated asset cost is "explained" by lower earned and annuity income—53%, 56%, 44%, 26%, 34% for the first to fifth asset quintiles respectively.

Table 4-3. Matching estimates of the long-run "asset cost" of poor health, persons age 51 to 61 in continuing two-person households, with and without matching on earned income, annuity income, and age

1992 asset quintile	Health tercile	Matched on assets in 1992		Matched on assets, annuity income, earned income, and age in 1992 & 2008	
		coefficient	t-stat	coefficient	t-stat
1st (lowest)	1 (worst)				
	2	12,629	0.75	-2,945	-0.18
	3 (best)	53,218	2.17	32,264	1.53
2nd	1 (worst)				
	2	44,363	2.37	51,165	2.44
	3 (best)	92,710	4.01	53,351	2.42
3rd	1 (worst)				
	2	51,142	1.79	54,093	1.91
	3 (best)	126,793	3.61	100,199	3.24
4th	1 (worst)				
	2	168,360	3.36	121,672	2.54
	3 (best)	307,232	6.22	233,775	4.68
5 (highest)	1 (worst)				
	2	383,639	2.80	309,963	2.63
	3 (best)	585,092	3.59	328,705	1.92
All	1 (worst)				
	2	128,899	4.87	109,320	4.65
	3 (best)	253,017	6.91	194,546	5.15

Table 4-4. DD estimates of the long-run "asset cost" of poor health, persons age 51 to 61 in continuing two-person households, with and without controlling for earned income, annuity income, and age

1992 asset quintile	Health tercile	No controls		Controlling for annuity income, earned income, and age in 1992 & 2008	
		coefficient	t-stat	coefficient	t-stat
1st (lowest)	1 (worst)				
	2	24,356	1.42	6,701	0.38
	3 (best)	72,295	3.36	33,867	1.75
2nd	1 (worst)				
	2	48,729	2.88	37,077	2.24
	3 (best)	89,060	4.74	39,140	2.15
3rd	1 (worst)				
	2	58,073	2.45	37,362	1.55
	3 (best)	135,695	4.77	75,513	2.78
4th	1 (worst)				
	2	151,008	3.84	108,912	2.75
	3 (best)	251,184	6.13	184,875	4.60
5 (highest)	1 (worst)				
	2	338,274	2.99	185,147	1.75
	3 (best)	472,117	3.48	311,899	2.27

5. One-Person Households

Our analysis so far has focused on individuals who were part of continuing two-person households in each of the two-year intervals we analyzed. For comparison, we also estimate the asset cost of poor health for continuing one-person households. We report only estimates based on the matching method; as in the case of continuing two-person households, the DD results are very similar. Figure 5-1 shows the average evolution of assets for continuing one-person households and Figure 5-2 shows the evolution by latent health quintiles. These figures are analogous to Figures 1-1 and 3-1 for two-person households. The general pattern of asset evolution is very similar to the pattern for two-person households. The asset levels are much lower however, as comparison of Figures 1-1 and 5-1 shows. Figure 5-2 shows very large differences in assets by latent health for one-person households. In 1992, the average of assets of one-person households in the poorest health was only 37 percent of the average for one-person households in the best health. By 2008, assets of the poorest health quintile were only 30 percent of assets of the healthiest quintile.

Figure 5-1. Predicted assets by year, all persons in continuing one-person households age 51-61 in 1992

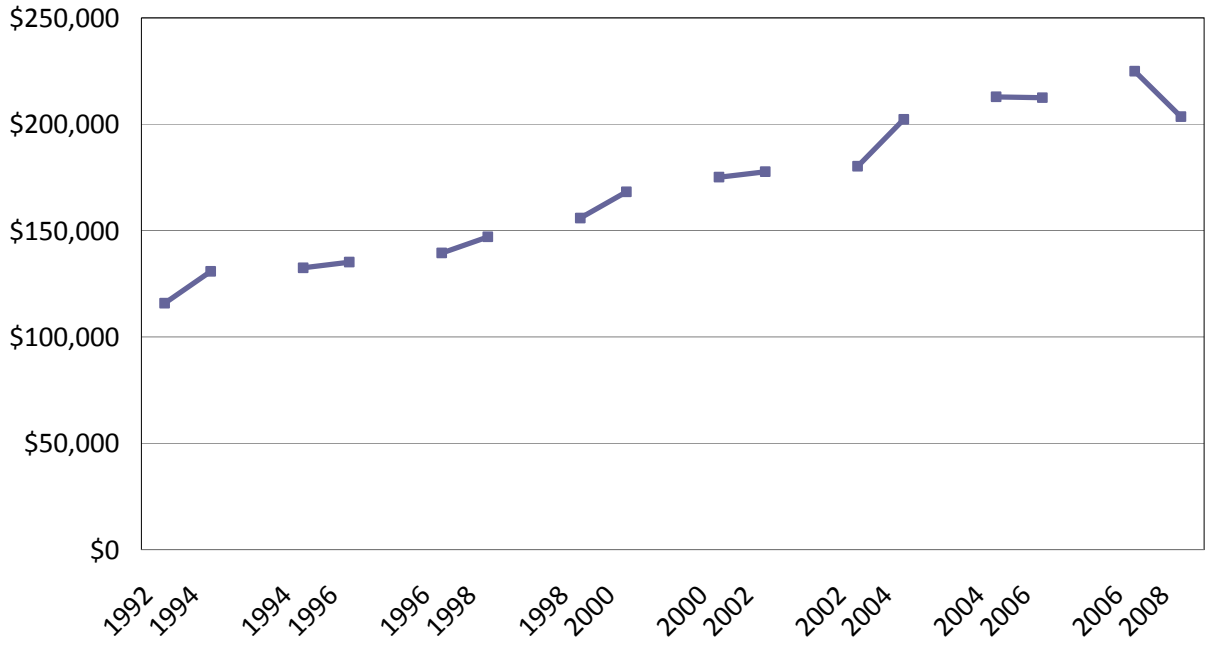


Fig. 5-2. Predicted assets by year, all persons in continuing one-person households, by health quintile, age 51-61 in 1992

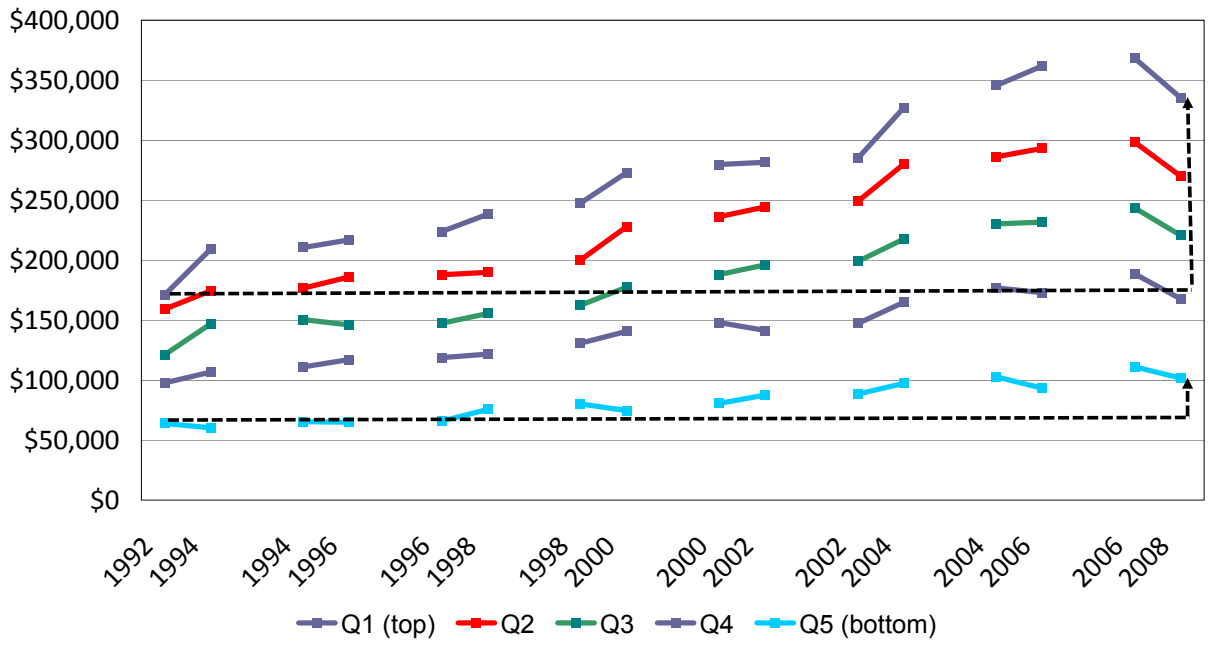


Table 5-1 shows matching estimates of the asset cost of poor health for one-person households. As for two-person households, one-person households are grouped into asset quintiles and then into latent health terciles within each asset quintile. Comparing the top to the bottom latent health terciles, the asset cost ranges from $27,989 in the bottom asset quintile to $198,020 in the top asset quintile. Table 5-2 shows matching estimates for all asset quintiles combined, using both terciles and quintiles for latent health. Based on the top health tercile the estimated asset cost is $83,678. This estimate is close to the average across the five quintiles in Table 5-1 of $81,048. Based on the top latent health quintile the asset cost of poor health is $114,454, when the calculation is made for all 1992 assets levels combined.

Table 5-1. Matching estimates of the long-run "asset cost" of poor health, persons age 51 to 61 in continuing one-person households

1992 asset quintile	Health tercile	Coeffi-cient	t-stat
	1 (worst)		
1st (lowest)	2	-3,773	-0.41
	3 (best)	27,989	1.71
	1 (worst)		
2nd	2	3,794	0.34
	3 (best)	64,600	2.15
	1 (worst)		
3rd	2	78,430	4.27
	3 (best)	68,544	2.51
	1 (worst)		
4th	2	25,258	0.70
	3 (best)	46,087	1.22
	1 (worst)		
5th (highest)	2	112,156	0.79
	3 (best)	198,020	1.91

Table 5-2. Matching estimates of the long-run "asset cost" of poor health, persons age 51 to 61 in continuing one-person households,all asset quintiles combined, for health terciles and for health quintiles

1992 asset quintile	Health tercile	coeffi-cient	t-stat	Health quintile	coeffi-cient	t-stat
	1 (worst)			1 (worst)		
All	2	38,770	1.72	2	62,381	3.12
	3 (best)	83,678	3.87	3	52,474	2.93
				4	73,071	3.01
				5 (best)	114,454	4.37

As with two-person households, we consider how much of the estimated asset cost of poor health can be explained by the lower annuity and earned income of persons in poor health compared to those in better health. There are many fewer persons in one-person than two-person households (975 one-person and 3289 two-person) and the estimates by quintile are very imprecise for one-person households. Table 5-3, however, shows matching estimates of the cost of poor health with and without controlling for annuity income and earned income, for latent health terciles, for all asset groups combined. The estimates suggest that for one-person households a substantial proportion of the asset cost of poor health can be attributed to low income. Comparing the top and bottom health terciles, about 36 percent of the asset cost of poor health is accounted for by low earned and annuity income. Using the second health tercile the estimates suggest that 65 percent of the asset cost is accounted for by low earned and annuity income. Neither estimate is measured with great precision, however.

Table 5-3. Matching estimates of the long-run "asset cost" of poor health, persons age 51 to 61 in continuing one-person households, with and without matching on earned income, annuity income, and age

1992 asset quintile	Health tercile	Matched on assets in 1992		Matched on assets, annuity income, earned income, and age in 1992 & 2008	
		coeffi-cient	t-stat	coeffi-cient	t-stat
	1 (worst)				
All quintiles	2	38,770	1.72	13,708	0.48
	3 (best)	83,678	3.87	53,739	2.08

6. Summary and Discussion

Survey evidence suggests that health care costs are a major financial concern of many elderly households. Moreover, the distribution of costs associated with late-life medical needs is a key input to the design of both private retirement saving programs and public social insurance programs that are designed to ensure living standards in retirement. Previous research has documented substantial skewness in out-of-pocket medical costs, and the most recent research, such as Marshall, McGarry, and Skinner (2010), also suggests that these costs can be substantial.

The cost of poor health includes not only the risk of substantial out-of-pocket health care expenditures, but also a number of indirect costs that could be associated with lifestyle modification or with the use of various service providers. These indirect costs may lead estimates of the distribution of out-of-pocket medical expenses to substantially understate the actual financial risk of late-life poor health. In this paper, we compare the evolution of assets for persons in and near retirement with different levels of latent health. By comparing the asset evolution across health status groups, we attempt to infer the "full cost" of poor health for persons as they approach and enter retirement. Our goal is to capture not only the relationship between assets and the out-of-pocket cost of health care costs per se, but other costs that are associated with poor health, and to capture the cumulative effect on assets of all of the adverse consequences of poor health over a long period of time. Our estimates are based on the first nine waves of the HRS, which track the experience over a sixteen year period of the cohort that was age 51 to 61 in 1992. To obtain these estimates we use a simple measure of latent health that summarizes HRS survey responses on self-reported health status, diagnoses, ADLs, IADL, and other indicators of underlying health.

We use two methods to estimate the asset cost of poor health. One is the standard difference-in-difference approach that compares the increase in assets between 1992 and 2008 for persons who in 1992 had similar assets but different latent health. Using this method, persons with poor health in 1992 are treated as the "control" group and people with better health in 1992 are the "treatment" groups. The other approach is a matching method that considers persons with differ latent health, but similar level of assets, in 1992.

Our estimates suggest that the asset cost of poor health may be quite large, substantially greater than most estimates of out-of-pocket medical spending. For example, we group households into five 1992 asset quintiles and then within each asset quintile into latent health terciles. Our baseline estimates compare persons in the top third of the distribution of latent health in 1992 to persons in the bottom third of the health distribution in 1992 within each 1992 asset quintile. We find that by 2008, persons in the top third of the health distribution on average accumulate at least 50 percent more assets than persons in the bottom third of the health distribution who had the same level of assets in 1992. For example, among persons in 3rd asset quintile we find that between 1992 and 2008 persons in the top third of the health distribution accumulated $135,694 more assets that persons in the bottom third of the health

distribution using the matching method. The difference-in-difference method produces similar results. Both estimation strategies suggest that asset cost of poor health is substantial and is greater for persons with high asset balances in1992.

Poor health can reduce assets through several pathways. One is the direct relationship between poor health and health-related expenditures. Another is by way of low earnings, including the indirect effect of low earnings on Social Security and other annuity income in retirement. Depending on the sample we consider, between 20 to 40 percent of the asset cost of poor health seems to be attributable to the lower earned income and annuity income of persons in poor health. Income is protective of assets, which may explain why assets rise by more for households with greater earned income and annuity income. Consistent with the large literature on the health-wealth gradient, our findings highlight the important relationship between health status in 1992 (age 51 to 61) and prior earnings and asset accumulation, as well as the subsequent evolution of assets.

One issue that we plan to explore in future work is whether there are reasons other than health-related expenditures for the growth in asset balances of those in the healthiest condition. For example, we can investigate whether assets grow as a result of new saving, which could be indicated by continued earning of income for persons in better health. It is even possible that good health is related to the rate of return households earn on their investments, perhaps because healthier individuals have more time to devote to portfolio management. Persons in better health may also have higher cognitive ability (an important component of health) and thus may make better investment decisions.

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Appendix Table 2-1. Regression estimates for the probability that an event will occur by 2008

	coeffi-cient	std. error	t-stat	coeffi-cient	std. error	t-stat
		Diabetes			*Cancer*	
age	-0.0014	0.0016	-0.85	0.0078	0.0015	5.12
health in 1992*	0.0030	0.0002	16.32	0.0005	0.0002	2.79
constant	0.1472	0.0916	1.61	-0.2910	0.0842	-3.46
R^2	0.0414			0.0058		
N	6178			6178		
		Lung disease			*Heart disease*	
age	-0.0013	0.0013	-0.95	0.0075	0.0018	4.19
health in 1992*	0.0022	0.0001	14.78	0.0032	0.0002	15.89
constant	0.0864	0.0733	1.18	-0.2976	0.0994	-2.99
R^2	0.0341			0.0436		
N	6178			6178		
		Stroke			*Report poor health*	
age	0.0039	0.0011	3.58	0.0023	0.0017	1.31
health in 1992*	0.0010	0.0001	8.59	0.0051	0.0002	26.71
constant	-0.1888	0.0600	-3.15	-0.1034	0.0959	-1.08
R^2	0.0146			0.1050		
N	6178			6178		
		Hospital stay			*Nursing home stay*	
age	0.0035	0.0018	1.93	0.0020	0.0006	3.40
health in 1992*	0.0024	0.0002	11.66	0.0003	0.0001	4.19
constant	-0.0353	0.1004	-0.35	-0.1042	0.0330	-3.16
R^2	0.0227			0.0051		
N	6178			6178		

* Percentile rank of latent health in 1992 where 1 is best and 100 is worst