No Pain, No Strain:
Impact of Health on the Financial Security of the Elderly

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Abstract

This study uses data from the 2004 Health and Retirement Study to investigate the impact that health problems have on the financial strain of the elderly. Two-stage probit models are estimated for a series of financial ratio guidelines that take into account household liquidity, solvency, and wealth accumulation. We control for possible endogeneity between health and financial strain using instrumental variable technique. We test the robustness of our findings using a subjective measure of self-reported health status and two objective measures of health that control for the severity of specific health conditions. The results show that health problems significantly increase the likelihood of financial strain for the elderly, especially those with severe chronic conditions. The findings provide insight into the future financial security of the elderly, especially the oldest elderly and those with low income. The results have important implications for consumers as well as the health care industry and health policy.

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Over the next several decades, the population of U.S. seniors—people aged 65 and older—is expected to grow rapidly, more than doubling by 2040 (U.S. Congressional Budget Office 2004). At the same time, out-of-pocket health care expenditures are projected to increase to 35.0 percent of after-tax income for married couples and 30.0 percent of after-tax income for singles by 2030 (Johnson and Penner 2004). If these projections are accurate, the elderly will be particularly vulnerable to financial strain from rising health care burdens, especially those who are aged 85 or older (Crystal et al. 2000) and who have severe chronic conditions such as cancer (Langa et al. 2004). Elderly persons in the lower-income brackets are also at high risk (Gross et al. 1999; Johnson and Penner 2004). According to Johnson and Penner (2004), if current health policies continue, those in the bottom 20 percent of the income distribution will spend more than 50 percent of their after-tax income on insurance premiums and medical expenses by 2030. Elderly widow(er)s also are at high financial risk since they spend on average 30 percent of the couple's annual income on out-of-pocket health care expenses in the final two years of their

spouse's life, with widow(er)s in the bottom quarter of the income distribution spending up to 70 percent of the couple's income (McGarry and Schoeni 2005).

Currently, Medicare and health insurance supplements such as employer-sponsored plans, Medicare HMOs, and Medicaid help to mitigate the impact of health care expenses (Goldman and Zissimopoulos 2003). However, individuals aged 65 or older still spend on average 19 percent of their income on out-of-pocket health care expenditures, including health insurance premiums (Crystal et al. 2000; Gross et al.1999). Costs associated with prescription medications and nursing home care largely have contributed to out-of-pocket expenses (Coughlin et al. 1992; Langa et al. 2004; Stewart 2004).

In addition to rising health care costs, the elderly also have experienced dramatic growth in household debt levels. According to a recent report by the Employee Benefit Research Institute (Copeland 2006), the average total debt held by families near or in retirement rose significantly from $29,309 in 1992 to $51,791 in 2004. This trend represented a real increase in average debt levels of about 77.0 percent. The oldest elderly incurred the largest amounts of debt; the average debt held by a family head aged 75 or older rose from $7,769 in 1992 to $20,234 in 2004, an increase of over 160 percent. The Employee Benefit Research Institute also reported that debt levels grew fastest for lower-income families. Specifically, families in the lowest income quartiles experienced the largest percentage point increases in debt, from 38.0 percent in 2001 to 47.0 percent in 2004.

As the U.S. population continues to age, it is expected that health care costs and household debt levels will continue to rise, resulting in greater financial strain for the elderly. Using the 2004 wave of the Health and Retirement Study, we investigate the impact that health problems have on the financial strain of the elderly. Specifically, we contribute to the existing

literature in the following ways. First, we take a more comprehensive approach than previous research and examine the effect that health status has on overall level of household financial strain using a series of financial ratio guidelines that take into account household liquidity, solvency, and wealth accumulation. To examine the effect of health on financial strain, we use a representative sample of the U.S. population aged 65 or older and estimate a series of two-stage probit models. To control for possible endogeneity between health and financial strain, we use instrumental variable technique. We also test the robustness of our findings using a subjective measure of self-reported health status and two objective measures of health that control for the severity of specific health conditions. The findings from this study provide insight into the future financial security of the elderly, especially the oldest elderly and those with low income. The results have important implications for the aging U.S. population as well as the health care industry and health policy.

MEASURING THE FINANCIAL STRAIN OF THE ELDERLY

The ratio of out-of-pocket health care expenditures relative to income has been widely used to assess the financial burden of health problems for the elderly. However, there has been some controversy over the methodologies used to calculate this ratio. Gross et al. (1999) estimated that Medicare beneficiaries spend 19 percent of their income on out-of-pocket health care expenditures, including health insurance premiums. However, Goldman and Smith (2001) question the estimates of Gross and her colleagues, arguing that these percentages are overestimated, due to underreporting and missing data on income. Goldman and Smith attempted to minimize the biases resulting from underreporting and misreporting of information related to income. They found that the ratio for the U.S. population was on average 8 to 10 percent, and 11 to 16 percent for low-income elders, less than half of that reported by Gross et al. (1999).

The ratio of out-of-pocket health care expenditures to income also has been used as a measure of an individual's ability to pay health care expenses. However, previous studies argue that this measure does not appropriately reflect the elderly's ability to pay. The elderly's ability to pay for health care expenses should take into consideration income as well as total financial resources, including accumulated assets (Holden and Smeeding 1990; Stum et al. 1998; Wyszewianski 1986). For example, wealth is a better measure of economic status for the elderly than income, because it measures command over economic resources, particularly consumption opportunities (Hurd 1990; Langa et al. 2004; Smith 1997).

In order to assess the financial burden of health problems for the elderly, some researchers have used wealth as a measure of their ability to pay (Adams et al. 2003; Kim and Lee 2005; Lee and Kim 2003; Smith 1999, 2003; Wu 2003). They also have used health problems themselves to represent the cause of financial burden instead of out-of-pocket health care expenditures. However, once elders have health problems, they have additional financial burden along with out-of-pocket health care expenses. For example, their earnings may decrease if they are unable to work or have to reduce their working hours. Also, their general expenses may increase due to difficulty in doing housework or in having to make modifications to their home to facilitate wheelchair access (Smith 1999). These studies typically have used self-reported health status (i.e., excellent, very good, good, fair, poor) to measure the degree to which the elderly are in poor health. They also have used measures that control for specific health conditions and the severity of those conditions such as controls for severe conditions (i.e., cancer or heart conditions) and mild conditions (i.e., high blood pressure). The results of these studies have showed that health problems lead to significant wealth depletion for the elderly, resulting in

4

substantial financial burden in later years (Kim and Lee 2005; Lee and Kim 2003; Smith 1999, 2003; Wu 2003).

Several financial ratios have been used in the personal finance and applied finance literature to measure the financial burden or "financial strain" of individuals and households. These ratios focus on assessing a households' ability to maintain adequate liquidity (liquidity ratio), avoid excessive debt (solvency ratio), and make progress toward financial goals (wealth accumulation ratio) (Baek and DeVaney 2004; Garman and Forgue 1997; Moon, Yuh, and Hanna 2002). Since each financial ratio captures a slightly different aspect of the financial position of the household, a single ratio may not be comprehensive enough to accurately capture the degree to which households are under financial strain (Baek and DeVaney 2004; DeVaney 2000; Lyons and Yilmazer 2005). Several researchers have attempted to establish a set of financial ratio guidelines that are based on research related to household liquidity and solvency (i.e., Baek and DeVaney 2004; DeVaney 1994, 2000; DeVaney and Lytton 1995; Lyons and Yilmazer 2005; Zeldes 1989). Greninger, Hampton, Kitt and Achacoso (1996) go as far as to survey a sample of financial educators and planners to establish a set of "expert recommendations" based on common financial ratio guidelines used by practitioners.

According to Moon, Yuh, and Hanna (2002), expected utility theory can provide a theoretical framework for explaining the economic impact of financial ratio guidelines using either a life-cycle or portfolio allocation model. While some researchers have attempted to develop or describe the guidelines using these theoretical contexts (i.e., Chang et al. 1997; Chen and Finke 1996; Fan, Chang and Hanna, 1993), few have been able to provide a set of theory-based guidelines. Despite the fact that these guidelines are not founded in rigorous economic theory, they have been widely used and accepted in the personal finance and applied finance

literature (Moon, Yuh, and Hanna 2002). Many previous studies have demonstrated the usefulness of these financial ratios in predicting financial strain, and in particular household insolvency (Baek and DeVaney 2004; DeVaney 1994; Greninger, Hampton, Kitt and Achacoso 1996; Yao, Hanna, and Montalto 2003).

Although these ratios have been used to assess the overall financial status of households in general, there has been little research that has examined the link between these ratios and health status. An exception is a recent study by Lyons and Yilmazer (2005), which used financial ratios to examine the association between health problems and financial strain. Using pooled cross-sectional data from the Survey of Consumer Finances (SCF), Lyons and Yilmazer (2005) used three measures of financial strain to examine the relationship between self-reported health status and financial strain, controlling for the fact that financial strain can be both a cause and a consequence of poor health. Individuals were identified in the SCF as being financially strained using the following three measures: (1) *delinquent on loan payment by two months and more*; (2) *total assets/total debts < 1.0*; and (3) *liquid assets/income < 0.25*). They found that, for all three measures, poor health significantly increased the likelihood of financial strain. There was little evidence to show that financial strain contributed to poor health.

While this study has contributed significantly to the growing body of literature related to health and wealth issues, it has its limitations. First, Lyons and Yilmazer (2005) focused on the U.S. population in general. While they placed some emphasis on educational differences, they paid little attention to how the relationship between health and financial strain varies for specific subgroups of the population who are particularly vulnerable to changes in health and wealth such as the elderly. Given that older people have fixed incomes and a higher prevalence and incidence of health problems, the impact of health on financial strain is more critical for this sub-

6

population than for those at other stages of the life-cycle. Second, Lyons and Yilmazer's analysis

fell short in that they did not include one important ratio, a measure of wealth accumulation.

According to Garman and Forgue (2003), the two most revealing ratios for retirees are the basic

liquidity ratio and the investment assets/net worth ratio. Third, Lyons and Yilmazer (2005) only

looked at self-reported health status (SRH), which is a subjective measure of poor health rather

than an objective measure such as an indicator for a specific health problem.

We improve upon the existing research by focusing on older people and including a

wealth-accumulation ratio. We also use both a self-reported measure of health status and two

objective measures of health that use information on specific health conditions to control for the

severity of the conditions.

METHODS

Theoretical Framework

The life-cycle theory of consumption provides a theoretical framework for explaining

how older people may spend down their financial resources during retirement. The fundamental

idea is that older people accumulate wealth before retirement and use it after retirement in order

to finance consumption over the remainder of their lives (Modigliani and Brumberg 1954).

Within the life-cycle framework, individuals maximize their lifetime utility function subject to

their lifetime resource constraint. The lifetime utility function is derived solely from

consumption and is time separable from consumption. The resource constraint is a function of

initial wealth and annuity income. Wealth cannot be negative, and borrowing against future

annuities (e.g., Social Security benefits) is not allowed. Based on these assumptions, this model

yields the path of consumption that maximizes lifetime utility, and in turn, lifetime wealth, where

lifetime wealth is a function of initial wealth, annuity income, age, and survivorship (Haider,

7

Hurd, Reardon and Williamson 2000; Hurd and Reardon 2003; Yaari 1965). This model predicts that wealth declines with age. That is, older people choose the consumption path that will exhaust wealth at the time of death, assuming that the date of death is known (Yaari 1965). Although other factors (including real interest rates, bequest intentions, and actual life expectancy) can affect the spending rate of wealth, this model still predicts that wealth will decline with increases in age (Haider, Hurd, Reardon, and Williamson 2000; Hurd and Reardon 2003).

This simple model, however, does not consider an important factor which influences wealth—unexpected health problems. Actual changes in household wealth may differ from intended changes due to unexpected expenditures such as those stemming from health problems (Haider et al. 2000; Hurd and Reardon 2003; Smith 1999). Health problems lead to wealth depletion mainly through increased health care expenditures in later life. While health insurance may help to mitigate the impact, health problems, especially chronic conditions, can result in significantly large and unexpected increases in health care expenditures (Haider et al. 2000; Lee and Kim 2003; Smith 1999, 2003). Health problems also can increase non-medical consumption such as household work, transportation expenses, and reconfiguration of the home care environment (Kutty 1999). These medical and non-medical expenditures from health problems can result in individuals spending down their financial resources more quickly than expected during retirement. This accelerated depletion of resources can lead to financial strain.

Previous research has examined the two-way interaction between health and socio-economic status (SES) (i.e., income, wealth, and occupation). A number of these studies have focused on the impact that financial strain has on health status examining how and why low socio-economic status leads to poor health (Caplovitz 1974; Drentea and Lavrakas 2000; Havlik

8

et al. 1992; Jacoby 2002; Meer et al. 2003; Parker 1990; O'Neill et al. 2005; Roberts et al.1999; Smith 1998, 1999; Weyerer and Wiedenmann 1995). These studies have found that lower SES can lead to poor health, either by the physical stress that financial strain creates or because of limited access to quality health care services.

However, health status also can affect the financial position of the household (Lyons and Yilmazer 2005). Health problems may lead to financial strain through increased expenditures and decreased earnings. Poor health can increase out-of-pocket medical expenses and reduce working hours, affecting current and future earnings. In such cases, savings may be depleted fairly quickly placing financial strain on individuals, and in turn, threatening their overall financial well-being. A few recent studies have investigated the impact of health on the SES of older people. These studies have found that poor health significantly increases wealth depletion (Hurd and Kapteyn 2003; Kim and Lee 2005; Lee and Kim 2003; Smith 1999, 2003).

The health and financial status of older people are the accumulated results of their lifetime decisions. By the time they reach retirement age, they are no longer paying into their retirement plans but withdrawing from them. Their focus has shifted from accumulating wealth to spending it down. Also, as individuals grow older, there is a point where additional spending on health services results in little improvement in health status. For these reasons, a pathway from financial strain to health is likely to be minimal for those who are elderly. Instead, the pathway from health to financial status is more likely to be dominant. In fact, Smith (1997, 1999) reported that as individuals grow older changes in economic resources have little additional impact on health. Smith and Kington (1997a, 1997b) and Lee and Kim (2003) also found that the dominant causation for older populations does not come from wealth to health, but from health to wealth. Given this, we focus our attention on investigating the effect that health status

has on the financial strain of the elderly, and we assume the effect of financial strain on health status is negligible for this target population.

Empirical Model

To investigate the effect that health problems (H_i) have on the financial strain (FS_i) of the elderly, we estimate a two-stage probit model. The relationship can be expressed as follows:

$$FS_i^* = \alpha + \beta H_i^* + \gamma' X_i + \varepsilon_i. \tag{1}$$

FS_i^* and H_i^* are continuous, latent random variables that represent the degree to which the ith individual is financially strained and in poor health, respectively. Within this framework, FS_i^* and H_i^* are not observable. However, the discrete dependent variables FS_i and H_i are observable such that:

$$FS_i = 1 \quad iff \quad FS_i^* > 0 \text{ and } 0 \text{ otherwise,} \tag{2}$$

$$H_i = 1 \quad iff \quad H_i^* > 0 \text{ and } 0 \text{ otherwise.}$$

Under the standard assumptions, FS_i is equal to one if the ith respondent reports being financially strained and zero otherwise. H_i is equal to one if the ith respondent reports being in fair or poor health and zero otherwise. FS_i is a function of the endogenous regressor H_i^* and a vector of exogenous factors, X_i. Included in X_i are financial characteristics of the household such as income, assets, and monetary transfers. Also included are demographic factors that control for an elderly person's age, education, gender, marital status, race/ethnicity, living arrangements, and employment status. The vector X_i also controls for how well an individual is covered by health insurance. Specific details on how FS_i and H_i are defined using the HRS data are

presented in the next section. We also discuss how the variables in X_i are constructed using the HRS survey questions.

The key parameter of interest in this model is β, which measures the impact of health problems on an elderly person's level of financial strain. H_i, like FS_i, depends on a number of factors and is not exogenous. Thus, if we were to assume H_i was exogenous and estimate Equation (1) using a standard probit model our estimates of β would be biased. For this reason, we use a two-stage approach to estimate β. In the first stage, we obtain predicted values for H_i^* by estimating the following equation:

$$H_i^* = \pi_1 S_i + \pi_2 E_i + \pi_3' X_i + u_i, \tag{3}$$

In this model, X_i is the vector of exogenous variables from Equation (1). We instrument for H_i^* using two variables – smoking (S_i) and exercise (E_i). These variables were selected based on previous studies and the availability of data (Lee and Kim 2003; Lyons and Yilmazer 2005; Smith 1999). Financial behaviors such as smoking and exercise are likely to directly affect health but unlikely to affect financial strain, except to the extent that these factors indirectly affect wealth and wealth affects financial strain.[1] As a test, we included smoking and exercise in the financial strain equation and found that the instruments did not have significant predictive power.[2]

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[1] Previous research shows that smoking and wealth may be negatively correlated. There is additional evidence that smoking and exercise may be proxies for an individual's time preference such that individuals with low rates of time preference are more likely to engage in activities that increase human capital and future earnings as well as improve future health (i.e., Barsky et al. 1997). For the elderly, time preference issues are not likely to be an issue since they are at the end of the life-cycle stage.

[2] We also tested the validity of the instrument variables using the following two conditions: (1) *corr (S_i or E_i, H_i) $\neq$ 0* and *corr (S_i or E_i, ε_i) = 0*. For the first condition, test results in Table 1 of the Appendix showed that S_i (smoking) and E_i (exercise) were significantly associated with H_i (health status). For the second condition, we regressed the residuals from Equation (4) on the instruments (S_i and E_i) along with other control variables to see if the coefficients on the instruments were statistically equal to zero. Overall, the coefficient on S_i was zero, indicting no relationship between smoking and financial strain while the coefficient on E_i was not statistically equal to zero. However, we

We obtain predicted values for health, $\hat{H}_i^* \left(= \hat{\pi}_1 S_i + \hat{\pi}_2 E_i + \hat{\pi}_3' X_i \right)$, by estimating Equation

(3). The predicted values are then substituted into the right-hand side of Equation (1) such that:

$$FS_i^* = \alpha + \beta \hat{H}_i^* + \gamma' X_i + \varepsilon_i, \tag{4}$$

In the second stage, the probit method is used to estimate Equation (4) and obtain unbiased

estimates of β, the impact of health problems on financial strain. Below is a detailed description

of the data and variables included in our model.

DATA

The data for this study are taken from the Health and Retirement Study (HRS), a national

longitudinal study of the economic, health, and family status of older Americans. For the

purposes of this study, we use cross-sectional data from the 2004 HRS survey year. Between

March 2004 and February 2005, the HRS interviewed a nationally representative sample of

20,129 respondents who were born in 1948 or earlier (51 years old and older in 2004). The 2004

HRS data provide in-depth information about the economic status of households including

income, assets and debts, allowing us to construct a series of financial ratios. The data also

provide comprehensive information about the health status of individuals, including both

subjective and objective measures of health such as self-reported health status and whether the

individual has a specific health condition. It also includes information on the frequency and

severity of specific conditions.

As we are interested in how financial strain affects the health problems of older people,

we have restricted the sample to include only respondents who are 65 years old and older in the

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concluded that our instrumental variables were sufficient since at least one of them met these two conditions (Stock
and Watson, 2006).

2004 HRS. Thus, our sample consists of 11,293 elderly respondents. Note that the HRS collects individual-level data on some factors such as health status; it also collects household-level data on other factors such as financial resources. If a couple is married in the HRS, both the husband and wife are included as respondents. Because our analysis is conducted at the individual level, we calculate financial ratios at the household level and then assign the same ratio to both the husband and wife. It should be noted that information on consumption is not available in the HRS.

Financial Strain Measures

To test the robustness of our results, we use three separate financial ratios to construct our measures of financial strain: a solvency ratio (total assets/total debts), a liquidity ratio (liquid assets/monthly income), and a capital accumulation ratio (investment assets/net worth). Based on these ratios, older people are identified as being "financially strained" if they have one or more of the following three characteristics: *total assets/total debts < 1.0, liquid assets/monthly income < 2.5*, and *investment assets/net worth < 0.25*.[3] Recall that each of the three measures captures a slightly different aspect of financial strain.

The first measure *(liquid assets/monthly income < 2.5)* captures the extent to which the elderly have sufficient assets to cover about 2.5 months of income. Liquid assets include checking accounts, savings accounts, and money market funds.[4] For older individuals who are still working, about three months is considered a reasonable time period to find a job if they are

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[3] Note that in order to calculate each ratio a value of one was added to any amount in the denominator that was equal zero.

[4] The HRS asks respondents: "If you added up all such accounts (any checking or savings accounts or money market funds), about how much would they amount to right now?" This question is used to define liquid assets. The HRS also asks respondents to report the amount of assets they have in certificates of deposit, government savings bonds, and treasury bills. These amounts are reported in total and cannot be separated by type of asset. We estimated our models also using this alternative definition of liquid assets (e.g., summation of checking or savings accounts, money market funds, CDs, government savings bonds, and treasury bills). The results were robust to this alternative definition.

laid off (Greninger et al. 1996; DeVaney 2004). In addition, having an emergency fund with liquid savings worth about three months of living expenses insures that individuals, especially the elderly, are adequately prepared for unexpected expenses such as those related to health. Older retirees have fixed income that may not cover unexpected health problems. Although most of the elderly have Medicare (98 percent), it only covers about 45 percent of their medical expenses (Hurd and McGarry 1997). The coverage is also limited. For example, after 100 days, Medicare no longer covers nursing home services. In these instances, three months gives the elderly the time they need to convert some of their non-liquid assets into liquid funds.

The second measure of financial strain (*total assets/total debts < 1.0*) is used to identify older respondents who are highly leveraged and close to being insolvent. These households are facing a wide range of financial challenges since their liabilities exceed their assets and they have retired or are close to retiring. Total assets include financial assets such as checking accounts, savings accounts, money market funds, certificates of deposit, mutual funds, stocks, bonds, individual retirement accounts, and non-financial assets such as primary residence and other real estate. Total debts are all debts including mortgage debt.

The third measure (*investment assets/net worth < 0.25*) identifies older individuals who have less than 25 percent of their net worth in investment assets. Baek and DeVaney (2004) recommend that baby boomers, especially those in their 40s and 50s, have more than 25 percent of net worth in the form of investment assets. For the purposes of this study, investment assets include stocks, bonds, certificates of deposit, individual retirement accounts, real estate, and business or farm equity, but not the primary residence or vehicles. This definition follows that used by Baek and DeVaney (2004). Net worth is defined as total assets minus total debts.

Health Status Measures

Health status is measured using the following two variables—self-reported health status (SRH) and chronic health conditions. SRH is used to control for respondents' subjective perceptions of their health status while chronic conditions is used to more objectively capture health status by controlling for specific health conditions (Wallace and Herzog 1995). Respondents are classified as being in poor health using the SRH measure if they reported being in either "poor" or "fair" health. They are classified as *not* being in poor health if they responded that they were in "good," "very good," or "excellent" health.[5] A dummy variable was created to control for this measure of SRH.

The HRS also includes information on eight types of chronic health conditions that commonly occur in later life. They include diabetes, cancer, lung disease, heart condition, stroke, high blood pressure, psychiatric problems, including emotional or nervous conditions, and arthritis. These eight conditions can be divided into two groups based on their severity and the associated financial burden (Wallace and Herzog 1995; Smith 1999): the first five are severe conditions and the rest are mild conditions. To measure the impact of severe or mild chronic conditions on financial strain, we create binary variables to control for whether the respondent has, or does not have, a severe or mild chronic condition.

Other variables

A number of demographic characteristics are included in our models such as age (80 or older=1), gender (female=1), race/ethnicity (black or Hispanic=1) and education (years). Marital status also is included as a categorical variable, where the categories are married, divorced/never

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[5] Previous literature indicates that this dichotomous measure of self-reported health status (SRH) is reliable. To test the robustness of our results to our definition of SRH, we defined poor health to include only those respondents who reported being in "poor" health, excluding those who reported being in "fair" health. Our findings were robust to changes in the definition of SRH.

married, and widowed.[6] In addition, a series of categorical variables are used to control for

whether the respondent has supplemental health insurance coverage in addition to Medicare A

and B (the reference group). The first insurance variable controls for having Medicare plus an

employer-supported insurance plan. The second variable controls for having Medicare plus

Medigap, a private insurance plan that fills gaps in coverage by Medicare. The next variable

controls for whether the individual is on Medicaid, which is a low-cost version of Medigap

provided by the federal government to the poor. The final variable is used to account for whether

the respondent has a Medicare HMO plan.

In addition to these variables, we control for whether the respondent is living with one of

their children (child=1) and whether they are currently working part-time or full-time

(working=1). We also include in our models household income and liquid assets using the

logarithm of these values in 2004 dollars. Income is measured using a self-reported measure of

annual gross income for the household, and liquid assets are defined again to be the sum of

checking accounts, savings accounts, and money market funds. A binary variable also is

included to account for whether the respondent has received a lump sum transfer (lump sum

transfer =1). This variable identifies individuals who received money or property in the form of

an inheritance, a trust fund, an insurance settlement, or any other large lump sum payment.

Finally, we use two measures that control for health behaviors – smoking and exercise.

Smoking=1 if the respondent currently smokes. Exercise=1 if the respondent participates in

vigorous physical activity at least one to three times per month (i.e., running, jogging,

swimming, cycling, tennis, other aerobic activity or gym workout, heavy housework, or other

physical labor).

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[6] The categorical variable "divorced/never married" includes married couples who also were separated.

RESULTS

Descriptive analysis

Table 1 presents demographic and financial characteristics for the entire sample and for each measure of financial strain. All statistics have been weighted. For the entire sample, the percentages of older respondents reporting *assets/debts < 1.0* is 7.5 percent, while those reporting *liquid assets/monthly income < 2.5* is 51.8 percent and those with *investment assets/net worth < 0.25* is 64.0 percent. For the most part, demographic differences between older respondents who are financially strained and not financially strained are the same across all three measures. In general, those who are financially strained are more likely than those who are not financially strained to report being in poor health. Specifically, 40.6 percent of older respondents who have *assets/debts < 1.0* report being in poor health compared to 29.7 percent of those who have more assets than debts. Also, 34.4 percent of older respondents who have *liquid assets/monthly income <2.5* and 35.6 percent of those with *investment assets/net worth < 0.25* report being in poor health compared to only 26.3 percent of those with sufficient liquid assets and 21.5 percent of those with sufficient investment assets, respectively.

With respect to the more objective measures of health status, financially-strained respondents tend to be more likely than those who are not financially strained to report having a mild or severe chronic condition. Specifically, 63.3 percent of older respondents with *assets/debts < 1.0* and 60.7 percent of those with *investment assets/net worth < 0.25* report having a severe chronic condition compared to 57.8 percent of those who have sufficient assets to pay off debts and 53.7 percent of those with adequate investment assets. However, there does not appear to be a significant difference in the likelihood of having a mild or severe condition for the liquidity ratio.

An examination of the demographics shows that older respondents who are financially strained are more likely to be black or Hispanic, living with one of their children, and non-married. They also are more likely to be a Medicaid beneficiary and less likely to have additional health insurance coverage such as Medigap or employer-sponsored private insurance. In addition, those who are financially strained are less likely to have received an unexpected lump sum of money. For example, only 3.8 percent of older respondents with *liquid assets/monthly income <2.5* reported receiving a lump sum transfer compared to 7.3 percent of those with sufficient liquid assets. With respect to risky health behaviors, financially strained respondents are more likely to be smokers and less likely to exercise. It is not surprising that older respondents who are financially strained are more likely to report lower levels of income, liquid assets, and net worth. These findings hold true for all three measures of financial strain.

Table 1 also shows that older respondents who are financially strained by one measure are more likely to be financially strained by the other measures. For instance, those who have *liquid assets/monthly income <2.5* are more likely than those who have sufficient liquid assets to have *assets/debts < 1.0* (11.8 percent compared to 3.0 percent) and *investment assets/net worth < 0.25* (69.8 percent compared to 57.7 percent). Overall, Table 1 suggests that it is likely that health status is an important factor in explaining why some elderly individuals are under financial strain. The next step is to examine the extent to which the regression results support these descriptive findings.

Two-stage multivariate analysis

In the first stage, we estimate Equation (3) to obtain predicted values for the three measures of health status: 1) self-reported poor health, 2) having a mild chronic condition, and 3) having a severe chronic condition. Table A1 in the Appendix presents the probit results for the

18

probability the respondent is in poor health using the measure of self-reported health status. The probit results for the two objective measures of health status are consistent with those presented in Table A1 and are available from the authors upon request. In general, the results show that those with more income and liquid assets are significantly less likely to be in poor health as are those with more education, who are female, working, and who have more adequate health insurance. Those who are more than 80 years old, black or Hispanic, living with one of their children, and divorced/never married are significantly more likely to be in poor health. In addition, smoking and exercise are significant predictors of health status such that those who currently smoke are more likely to be in poor health while those who regularly exercise are less likely to be in poor health.

Table 2 presents the results from the second-stage probit model (see Equation (4)) for the probability of being financially strained using the self-reported measure of health status. For all three measures of financial strain, the results show that poor health significantly increases the likelihood that older people are under financial strain. Note that liquid assets are not included in the first model since the measure of financial strain includes total assets. For the same reason, income and liquid assets are excluded from the second model.

For demographics and other variables, the findings are similar, yet slightly different, across the three measures of financial strain. Age decreases the probability of having *assets/debts < 1.0* and *liquid assets/monthly income < 2.5,* but increases the probability of having *investment assets/net worth < 0.25.* Additional years of education significantly decrease the probability of having *liquid assets/monthly income < 2.5* and *investment assets net worth < 0.25*, but increase the probability of having *assets/debts < 1.0.* Being female significantly decreases the probability of having *liquid assets/monthly income < 2.5*, but is insignificant for the first and third measures

19

of financial strain. Living with a child and working part-time or full-time significantly increases the probability of financial strain according to the first and second measures, but are insignificant for the third measure. Compared to being married, being divorced/never married increases the probability of having *assets/debts < 1.0*, while being widowed increases the probability of having *investment assets/net worth < 0.25*.

The finding for race/ethnicity is consistent across all three measures of financial strain. The probability of being financial strained significantly increases for those who are black or Hispanic. In addition, having supplemental health insurance from an employer-sponsored insurance plan, Medigap, or Medicare HMO significantly decreases the probability of financial strain for all measures. However, being a beneficiary of Medicaid significantly decreases the probability of having *assets/debts < 1.0,* but increases the probability of having *liquid assets/monthly income < 2.5* and *investment assets/ net worth < 0.25*. Receiving lump sum transfers decreases the probability for all measures of financial strain, but is only statistically significant for having *liquid assets/monthly income < 2.5*.

Table 3 presents the results from the second-stage probit model, where we used having a severe chronic condition as the measure of health status. Once again, we find that poor health (i.e., having a severe chronic condition) significantly increases the likelihood that older people are under financial strain for all three measures. With respect to the demographics, the results in Table 3 are almost the same to those in Table 2 with just a few notable differences. Being female significantly increases the probability of having *liquid assets/monthly income < 2.5* and *investment assets/net worth < 0.25*, while being divorced/never married is insignificant for all three measure of financial strain.

We re-estimated the models using the health status variable for whether an individual has a mild chronic condition. The results showed that having a mild chronic condition significantly increases the probability of having *liquid assets/monthly income < 2.5* but does not have a significant impact on the other two measures of financial strain. (The results are available from the authors upon request.)

Table 4 summarizes the findings from the two-stage models by presenting the marginal effects for the three measures of health status according to the three measures of financial strain. Marginal effects were calculated at the weighted sample means and represent the effect that a change in health status has on a change in financial strain. The predicted probabilities for being in poor health also are reported. These probabilities have been weighted and provide the baseline probabilities that are used to calculate the marginal effects and assess how changes in health status affect changes in financial strain.

In comparing the magnitudes of the various marginal effects, three findings are worth noting. First, the effect of self-reported health on financial strain appears to be largest for the third measure—*investment assets/ net worth < 0.25*. According to the self-reported measure, being in poor health significantly increases the probability of having *investment assets/ net worth < 0.25* by 6.9 percentage points while only increasing the probability of having *assets/debts < 1.0* by 2.9 percentage points and the probability of having *liquid assets/monthly income <2.5* by 5.8 percentage points.

Second, the largest effects of health on financial strain were found for those who had severe health conditions. Specifically, a severe health condition increased the probability of having *assets/debts < 1.0* by 4.8 percentage points compared to only 2.9 percentage points for the self-reported measure of poor health. For the other two measures of financial strain, a severe

health condition increased the probability of having *liquid assets/monthly income < 2.5* by 11.9 percentage points (compared to 5.8 percentage points for self-reported poor health), and by 11.7 percentage points for *investment assets/ net worth < 0.25* (compared to 6.9 percentage points, respectively).

Finally, the marginal effect of a mild chronic health condition on financial strain was only significant for having *liquid assets/monthly income < 2.5*. Interestingly, the magnitude of the effect was similar to that for having a severe chronic condition. Specifically, having a mild chronic condition increased the probability of having *liquid assets/monthly income < 2.5* by 10.9 percentage points compared to 11.9 percentage points for having a severe chronic condition.

DISCUSSION

This study used data from the 2004 Health and Retirement Study to investigate the impact that health problems have on the financial strain of the elderly. We used three financial ratio guidelines that took into consideration the overall financial position of the household (i.e., the household's liquidity, solvency, and wealth accumulation). We also tested the robustness of our findings using a subjective measure of self-reported health status and two objective measures of health that controlled for the severity of specific health conditions. The findings showed that health problems increased the likelihood of financial strain for the elderly. This finding was consistent for all measures of financial strain and health.

Interestingly, the results also showed that the magnitude of the effects varied by the measure of financial strain and how health status was defined. For example, when using the measure of self-reported health status, we found that poor health had a larger effect on a household's overall liquidity and wealth accumulation than on its degree of solvency. The magnitude of the effect of poor health on financial strain was even larger for respondents who

had severe chronic conditions. These findings support the life-cycle hypothesis that elders who are in poor health spend down their assets to pay health care expenditures. If they have saved up and adequately planned for health care expenditures during retirement, these types of expenses are not likely to affect their overall debt-service burden unless they develop a serious and long-term health condition early on.

We also found that the impact of poor health on financial strain was significantly larger for severe chronic conditions than for mild chronic conditions or poor self-reported health. In fact, having a mild chronic condition did not significantly affect a household's debt-service burden or wealth accumulation; it only had a significant impact on liquidity, which is what one might expect to find.

Another key finding was that having some type of supplementary health insurance coverage (i.e., Medigap, an employer-sponsored health insurance plan, or a Medicare HMO) significantly mitigated financial strain for the elderly. This finding reflects how critical it is that the elderly maintain adequate health insurance coverage, especially to pay for health care expenses that are not covered by Medicare. Also, recall that beneficiaries of Medicaid were more likely to have *liquid assets/monthly income <2.5* and *investment assets/net worth < 0.25*, but less likely to have *assets/debts < 1.0.* Since Medicaid is a means-tested program (e.g., only individuals with very low income and asset holdings qualify), this finding may simply reflect low financial resources rather than lower levels of financial strain. Thus, Medicaid may not be enough to minimize financial strain resulting from increased health care expenditures such as increases in general spending, transportation, and home improvements.

Our analysis also showed that the oldest elderly (aged 80 or older) may be more vulnerable to financial strain than others, especially those who have severe chronic conditions.

Being age 80 or older significantly increased the likelihood of having *investment assets/net worth < 0.25.* This result is consistent with the life-cycle theory of consumption in that invested assets decline with age, indicating that they are drawing down on their retirement accounts. However, being age 80 or older significantly decreased the probability of having *liquid assets/monthly income < 2.5* and having *assets/debts < 1.0.* This result is somewhat inconsistent with the life-cycle theory. A plausible explanation is that older people with more financial resources (i.e., more liquidity and lower debt-service burdens) can live longer.

The findings from this study have important implications for further research related to the health and financial well-being of the elderly. Recall that previous research has focused on using either (1) income and wealth depletion or (2) the ratio of out-of pocket health care expenditures to measure the financial burden of health problems for the elderly. We have shown that financial ratio guidelines (i.e., liquidity, solvency, and wealth accumulation ratios) can provide a more comprehensive look at how poor health affects the overall financial security of the household. The measures of financial strain used in this study are applicable to not only the general population but also to older people who are more likely to have health problems and less likely to have financial security. Our findings also show that using both subjective and objective health measures can help to provide a clearer picture of who is likely to bear the greatest financial burden.

The findings also have important implications for the elderly population in general. As the U.S. population continues to age and larger shares of their income go toward health care expenditures, the elderly are likely to experience significant increases in financial strain. For elderly persons who have not adequately saved for retirement, a severe chronic condition could result in rapid wealth depletion, resulting in serious financial strain. For low-income individuals,

especially those who do not qualify for Medicaid or who fall below the poverty line, the results could be devastating. Elderly persons with lower incomes who are in poor health could find themselves in a vicious cycle, such that additional financial strain further limits their access to health care and ultimately impacts their remaining quality of life during retirement.

If current projections are accurate, we are likely to see a growing gap in health inequality between the elderly and non-elderly. There also is likely to be an increase in the number of elderly who are dependent on government assistance, because they did not adequately prepare for retirement and save enough for health care. State governments, which largely control health care policy, may need to expand governmental support programs for health care such as Medicaid coverage to protect vulnerable subgroups of the elderly population. Financial education can help future retirees better prepare for rising health care costs and avoid unnecessary financial burden in later life. In particular, individuals need more information about supplemental health insurance plans and the critical role they play in helping to mitigate financial strain that results from health problems. Also, individuals need guidance on how to build future health care expenditures into their existing savings and retirement plans so that they are setting aside an adequate amount in a "health care fund."

Finally, while this study provides substantial insight into the impact that poor health can have on the financial strain of the elderly, we recognize that it has some limitations. First, some may question whether smoking and exercise are adequate instruments for health status. It is possible that these instruments are affected by other factors that drive both financial strain and health problems. It also is possible that these instruments are proxies for other factors besides health behaviors. With this said, the findings are consistently robust for each measure of health and financial strain and the magnitude of these effects are fairly large.

Also, we provide a snapshot of how health problems affect the financial strain of the elderly using cross-sectional data. However, with cross-sectional data it is difficult to establish whether the onset of a health condition exacerbated an already existing financial problem, or an existing health condition resulted in financial strain. Some additional insight might be gained from exploiting the longitudinal aspect of the HRS data and attempting to distinguish between new and existing conditions. However, the issue of timing may be irrelevant since the elderly are already at the end of the life-cycle process. Also, regardless of whether they have a new or existing condition, we still find that poor health significantly contributes to financial strain.

Finally, we assumed, based on previous research, that the direction of causality for the elderly was from health to financial strain and not vice versa. While this is a reasonable assumption, it is possible that there may be dual causality for some subgroups of the elderly population (i.e., low-income elders who are in poor health). Future research may want to explore this relationship further, especially for subgroups of the elderly population that are particularly vulnerable to increased financial strain.

APPENDIX

TABLE A1
First-Stage Estimates for Probability of Poor Health (Self-Reported Measure of Health) (2004 HRS; N=11,268)

| | Probability of Self-Reported Poor Health | | | | | |
| | Assets/debts < 1.0 | | Liq Assets/income < 2.5 | | Inv assets/networth < 0.25 | |
Variable	Coeff	SE	Coeff	SE	Coeff.	SE
log (household income)	-0.044	(0.012)**	-.----	(-.----)	-0.032	(0.012)**
log (liquid assets)	-.----	(-.----)	-.----	(-.----)	-0.020	(0.004)**
Age 80$^+$	0.082	(0.031)**	0.088	(0.003)**	0.090	(0.031)**
Education (yrs)	-0.055	(0.004)**	-0.058	(0.004)**	-0.051	(0.004)**
Female	-0.161	(0.028)**	-0.155	(0.028)**	-0.161	(0.028)**
Black or Hispanic	0.153	(0.033)**	0.164	(0.033)**	0.121	(0.033)**
Living with a child	0.189	(0.033)	0.193	(0.033)**	0.181	(0.033)**
Divorced/ Never married	0.105	(0.044)*	0.136	(0.043)**	0.093	(0.044)*
Widowed	-0.000	(0.033)	0.025	(0.033)	-0.004	(0.033)
Working	-0.462	(0.038)**	-0.486	(0.037)**	-0.463	(0.038)**
Medicare+ Employer insurance	-0.114	(0.039)**	-0.131	(0.039)**	-0.088	(0.039)*
Medicare+ Medigap	-0.082	(0.039)**	-0.092	(0.038)*	-0.055	(0.039)**
Medicare+ Medicaid	0.275	(0.050)**	0.285	(0.049)**	0.247	(0.050)**
Medicare HMO	-0.109	(0.045)*	-0.121	(0.044)**	-0.088	(0.045)
Smoking	0.147	(0.043)**	0.150	(0.043)**	0.148	(0.043)**
Exercise	-0.636	(0.031)**	-0.642	(0.031)**	-0.631	(0.031)**
Constant	0.918	(0.132)**	0.499	(0.063)**	0.896	(0.130)**
Observations		11,268		11,268		11,268
No. of positive observations		909		6,179		7,538
Log L		-6295.3		-6305.4		-6283.3

Note: "Coeff" represents the coefficient estimates for the probit models. Robust standard errors are reported in parentheses. "Liq assets/income<2.5" represents the ratio of liquid assets to *monthly* income. Omitted categories include: Age<80, white, married, and not receiving Medicare.
*$p < 0.05$; **$p < 0.01$

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TABLE 1

Summary Statistics by Measure of Financial Strain (2004 HRS, N=11,293)

Weighted Mean Values	All (11,293)	Assets/debts<1.0[a]		Liq assets/income<2.5[b]		Inv assets/net worth<0.25	
		FS=1 (909)	FS=0 (10,384)	FS=1 (6,179)	FS=0 (5,114)	FS=1 (7,538)	FS=0 (3,755)
Percentage of sample	100.0	7.5	92.5	51.8	48.2	64.0	36.0
Health							
Self-reported poor health	30.5	40.6	29.7	34.4	26.3	35.6	21.5
Mild chronic conditions	84.0	87.1	83.8	84.2	83.7	85.2	81.8
Severe chronic conditions	58.2	63.3	57.8	58.5	57.8	60.7	53.7
Demographics							
Age	74.8	72.5	75.0	74.1	75.5	75.6	73.3
Education (yrs)	12.1	11.7	12.1	11.6	12.7	11.5	13.2
Female	55.9	52.6	56.1	55.2	56.6	59.2	50.0
Black or Hispanic	16.9	29.3	15.9	24.0	9.3	22.0	7.8
Living with a child	18.1	28.9	17.2	22.1	13.8	20.6	13.6
Married	57.2	55.5	57.2	55.4	59.0	48.8	71.7
Divorced/Never married[c]	11.9	17.1	11.5	14.4	9.3	13.6	8.8
Widowed	30.9	27.4	31.2	30.2	31.7	37.4	19.3
Working	20.5	27.2	20.0	22.7	18.2	16.9	26.9
Medicare A and B only	14.5	23.7	13.8	17.8	11.0	17.2	9.8
Medicare+ Employer insurance	31.1	24.8	31.6	27.7	34.8	27.2	38.1
Medicare+ Medigap	30.7	22.5	31.4	26.1	35.6	28.1	35.4
Medicare+ Medicaid	8.1	13.0	7.7	13.5	2.3	11.8	1.4
Medicare HMO	15.6	16.0	15.5	14.9	16.3	15.7	15.3
Lump sum transfer	5.5	0.5	5.6	3.8	7.3	4.3	7.6
Smoking	9.9	14.8	9.5	11.1	8.5	11.1	7.7
Exercise	32.5	29.5	32.8	30.1	35.2	27.5	41.5
Income and Wealth ($1000)							
Household income	49.2	40.8	49.9	50.5	47.8	34.2	75.8
Liquid assets	29.8	8.3	31.6	3.5	58.2	22.1	43.5
Net worth	472.2	62.6	505.8	341.9	612.5	261.7	847.1
Measures of Financial Strain							
% (assets/debts) < 1.0	7.5	100.0	0.0	11.8	3.0	10.5	2.2
% (liquid assets/income) < 2.5	51.8	80.7	49.4	100.0	0.0	56.5	43.4
% (inv. assets/net worth) < 0.25	64.0	89.3	61.9	69.8	57.7	100.0	0.0

[a] For each measure of financial strain, FS=1 indicates the respondent is financially strained and FS=0 indicates the respondent is not financially strained.
[b] "Liq assets/income<2.5" represents the ratio of liquid assets to *monthly* income.
[c] "Divorced/Never Married" includes respondents who are divorced, separated, or never married.

TABLE 2

Two-Stage Probit Models: Effect of Self-Reported Health on Probability of Financial Strain (2004 HRS, N=11,268)

Variable	Assets/debts < 1.0		Liq assets/income < 2.5		Inv assets/networth < 0.25	
	Coeff	SE	Coeff	SE	Coeff.	SE
Predicted value: Self-reported poor health	**0.225**	**(0.063)****	**0.146**	**(0.042)****	**0.194**	**(0.046)****
log (household income)	-0.006	(0.013)	-.----	(-.----)	-0.334	(0.043)**
log (liquid assets)	-.----	(-.----)	-.----	(-.----)	-0.039	(0.005)**
Age 80$^+$	-0.318	(0.046)**	-0.210	(0.030)**	0.250	(0.033)**
Education (yrs)	0.016	(0.006)*	-0.029	(0.005)**	-0.030	(0.006)**
Female	-0.013	(0.038)	-0.009	(0.027)*	0.042	(0.029)
Black or Hispanic	0.224	(0.045)**	0.378	(0.034)**	0.292	(0.039)**
Living with a child	0.222	(0.044)**	0.145	(0.045)**	0.024	(0.039)
Divorced/Never married	0.110	(0.055)*	0.077	(0.042)	0.094	(0.051)
Widowed	-0.039	(0.047)	-0.018	(0.031)	0.198	(0.040)**
Working	0.302	(0.054)**	0.264	(0.040)**	0.079	(0.042)
Medicare+ Employer insurance	-0.261	(0.053)**	-0.336	(0.037)**	-0.072	(0.040)
Medicare+ Medigap	-0.300	(0.054)**	-0.366	(0.037)**	-0.284	(0.041)**
Medicare+ Medicaid	-0.209	(0.067)**	0.587	(0.060)**	0.334	(0.079)**
Medicare HMO	-0.130	(0.059)*	-0.306	(0.043)**	-0.011	(0.048)
Lump sum transfer	-0.072	(0.085)	-0.326	(0.055)**	-0.056	(0.058)
Constant	-1.135	(0.152)**	0.665	(0.064)**	4.555	(0.421)**
No. of positive observations		909		6,179		7,538
Log L		-3004.1		-7017.7		-5865.1

Note: "Coeff" represents the coefficient estimates for the probit models. Robust standard errors are reported in parentheses. "Liq assets/income<2.5" represents the ratio of liquid assets to *monthly* income. Omitted categories include: Age<80, white, married, and not receiving Medicare.
*p < 0.05; **p < 0.01

TABLE 3

Two-Stage Probit Models: Effect of Severe Chronic Conditions on Probability of Financial Strain (2004 HRS; N=11,268)

Variable	Assets/debts < 1.0		Liq assets/income < 2.5		Inv assets/networth < 0.25	
	Coeff	SE	Coeff	SE	Coeff.	SE
Predicted value: Severe chronic condition	**0.370**	**(0.127)****	**0.299**	**(0.086)****	**0.331**	**(0.092)****
log (household income)	-0.011	(0.013)	-.----	(-.----)	-0.337	(0.043)**
log (liquid assets)	-.----	(-.----)	-.----	(-.----)	-0.042	(0.005)**
Age 80$^+$	-0.317	(0.047)**	-0.215	(0.030)**	0.251	(0.034)**
Education (yrs)	0.006	(0.005)	-0.036	(0.004)**	-0.039	(0.005)**
Female	0.094	(0.059)	0.081	(0.040)*	0.140	(0.045)**
Black or Hispanic	0.316	(0.047)**	0.448	(0.035)**	0.369	(0.041)**
Living with a child	0.234	(0.044)**	0.148	(0.034)**	0.034	(0.039)
Divorced/Never married	0.106	(0.056)	0.070	(0.043)	0.087	(0.052)
Widowed	-0.093	(0.052)	-0.060	(0.035)	0.149	(0.042)**
Working	0.308	(0.059)**	0.285	(0.043)**	0.088	(0.046)
Medicare+ Employer insurance	-0.359	(0.057)**	-0.413	(0.040)**	-0.156	(0.044)**
Medicare+ Medigap	-0.383	(0.057)**	-0.431	(0.039)**	-0.355	(0.044)**
Medicare+ Medicaid	-0.272	(0.078)**	0.525	(0.066)**	0.273	(0.084)**
Medicare HMO	-0.193	(0.060)**	-0.353	(0.043)**	-0.064	(0.048)
Lump sum transfer	-0.073	(0.085)	-0.325	(0.055)**	-0.055	(0.058)
Constant	-1.366	(0.161)**	0.595	(0.071)**	4.534	(0.425)**
No. of positive observations		909		6,179		7,538
Log L		-3006.3		-7017.7		-5867.8

Note: "Coeff" represents the coefficient estimates for the probit model. Robust standard errors are reported in parentheses. "Liq assets/income<2.5" represents the ratio of liquid assets to *monthly* income. Omitted categories include: Age<80, white, married, and not receiving Medicare.
*p < 0.05; **p < 0.01

TABLE 4

Marginal Effects: The Effect of a Change in Health Status on the Probability of Financial Strain

Models	Assets/debts < 1.0		Liq assets/income <2.5[a]		Inv assets/networth < 0.25	
	ME[b]	Pred Prob[c]	ME	Pred Prob	ME	Pred Prob
Self-reported poor health	0.029**	0.067	0.058**	0.533	0.069**	0.686
Mild chronic condition	0.021	0.068	0.109**	0.533	0.066	0.686
Severe chronic condition	0.048**	0.068	0.119**	0.533	0.117**	0.686

[a] "Liq assets/income<2.5" represents the ratio of liquid assets to *monthly* income.
[b] "ME" represents the marginal effect for a change in financial strain; Marginal effects have been calculated at the weighted sample means.
[c] "Pred Prob" is the predicted probability of being under financial strain calculated for each measure of financial strain and measure of health status.
*$p < 0.05$; **$p < 0.01$