



A further look at household portfolio choice and health status

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Abstract

This paper investigates the effect of changes in health status on household financial wealth and financial portfolio choice. It is shown that the impact of health events on household financial and non-financial wealth is asymmetric. A diagnosis of a new disease leads to a larger decrease in financial wealth than in non-financial wealth. Moreover, we find that the puzzle pertaining to the relationship between health status and portfolio choice discussed in the extant literature generally disappears after controlling for differences in the amount of financial assets held by healthy and sick people. The results suggest that the effect of changes in health status on household financial portfolios is indirect. A health shock significantly reduces household total financial wealth, in turn leading households to restructure the composition of their financial assets.

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1. Introduction

How health status affects household wealth and how that wealth is allocated can have major implications for the development of capital markets. This issue has assumed special importance in recent years with the ageing of the baby boomers, and economists have paid increasing attention to the impact of health shocks on household economic status. For example, [Smith \(1998\)](#) has found that a serious decline in health leads to a large decline in household wealth, and he has also shown ([Smith, 1999](#)) that, across all age groups, people in excellent health in 1984 had 74% more wealth than those in fair or poor health. [Wu \(2003\)](#) has demonstrated that a wife's health status has a larger impact on household wealth than that of the husband. In a recent study, [Rosen and Wu \(2004\)](#) go a step further and test the impact of health status on household financial portfolio choices. Using the US Health and Retirement Survey (HRS) data, [Rosen and Wu \(2004\)](#) find that when the head of a household or the spouse is sick, it is less likely to own stocks, and that such a household invests a smaller proportion of its financial assets in stocks relative to healthy ones. The above studies provide clear evidence of a significant health effect on household economic status. However, there remain important unresolved questions: Does a health shock affect household financial and non-financial wealth in a similar fashion, and why does health status affect household financial portfolio choices?

The first objective of this study is to test for differences in the impact of health shocks on households' financial versus non-financial assets. A large number of studies have examined the effect of health shocks on household wealth but no study has examined the effect of health shocks on household financial and non-financial wealth separately. Changes in financial and non-financial wealth engendered by changes in health status could have quite different impacts on capital markets. Health effects on financial wealth may affect stock-market activity while those on non-financial wealth may be more relevant for the housing market.

There are sound reasons for believing that health shocks have differential effects on household financial and non-financial wealth. For example, when a household member becomes sick, the income of the household is reduced and medical expenses increase. Since financial assets generally are more liquid than non-financial ones, the immediate impact on the household's overall wealth will be a reduction in its financial assets. Thus, one could expect that the change in health status will have a larger impact on a household's financial than on its nonfinancial wealth, at least in the short run. Note that some non-financial assets, such as homes, are excluded from the spend-down requirement for eligibility in the US Medicaid program, which may make sick households more willing to spend financial instead of non-financial assets in order to qualify for Medicaid.

This study finds that health events have a significantly larger impact on household financial assets than on non-financial assets. For single households, a health shock leads to a significant decline in financial but not in non-financial assets. For married households, a health shock to the wife leads to a decline in financial assets nearly three times larger than that in non-financial assets. The results indicate that the

effects of health events on household financial and non-financial wealth are asymmetric.

The second objective of this paper, which may be more important, is to offer an explanation of the channel through which health status affects the composition of a household's financial portfolio. Rosen and Wu (2004) analyze the impact of health status on household financial assets and find that sick households hold less risky assets in their financial portfolios than healthy ones. They test several possible channels through which health status can affect a household's financial assets, such as risk attitude, planning horizon, life expectancy and bequest motives. None of these channels, however, adequately explain the health effect; thus, how health status affects the risk of a household's financial portfolio remains a puzzle.

Like most studies of household portfolio choice, Rosen and Wu (2004) focus on the effect of health status on financial asset allocation. Since a health shock can have a large impact on household wealth, in turn affecting portfolio choices, Rosen and Wu use total wealth (including financial and non-financial wealth) to control for the wealth effect of a change in health status on financial portfolio choices. It is not clear, however, whether total household wealth adequately captures the wealth effect of the health shock in an analysis of financial asset allocation. In a standard portfolio choice model with one risky and one riskless asset, where the risky asset represents stocks and the riskless asset represents other financial assets (bonds, CDs, checking accounts), the relevant measure of total wealth is financial wealth.¹ Given the earlier evidence that the impact of health events on financial and non-financial assets is asymmetric, it is important to consider the effect of financial wealth on household financial portfolio choices. If a health shock leads to a significant reduction in household financial wealth, then, as predicted by standard portfolio theory, a sick household will restructure its portfolio in response to such a wealth effect by decreasing its holdings of risky financial assets (stocks).

In order to consider the role of a financial wealth effect in the relationship between household health status and financial portfolio choices, we explicitly control for differences in financial assets between healthy and sick households when analyzing the effect of health status on financial asset allocation. Interestingly, we find that the health effect largely disappears after controlling for financial wealth effects. This suggests that the operation of the health effect is indirect; a health shock can significantly reduce household total financial assets and lead to a restructuring of the composition of its financial assets. In other words, the effect of health status on household financial portfolios can be explained by the financial wealth effect induced by a health shock.

The rest of the paper proceeds as follows: Section 2 briefly discusses the data sources of this study. Section 3 investigates the impact of health events on household

¹ In principle, private business investments, housing, and other highly non-liquid assets should be treated as risky assets. If one wants to analyze the allocation of overall household assets, it would be more appropriate to use household total wealth to control for the wealth effect.

financial and non-financial wealth. Section 4 analyzes the effect of health status on financial portfolio choices. Section 5 summarizes and concludes the paper.

2. Data

The data used in this study are from the first six waves of the Health and Retirement Survey (HRS). The HRS is a biennial panel sponsored by the National Institute of Ageing and administered by the Institute for Social Research at the University of Michigan. The panel began in 1992 with follow-up surveys in 1994, 1996, 1998, 2000 and, 2002. While this sample is not representative of the overall age distribution of households, it has been shown that older households own a large percentage of national wealth (see, for example, [Poterba, 1994](#)). At the same time, since health is more of a concern to the elderly, the HRS dataset is relevant for studying health-related issues.

The survey includes comprehensive information on the household head and spouse (for married couples) consisting of demographics, health status, financial and housing data, income, social security, health insurance, family structure, retirement plans and employment history. For our study, we focus on household demographics, health status and economic data. In particular, the HRS provides detailed information on household financial assets, namely checking, savings, and money market accounts, CDs, bonds and bond funds, government bonds and T-bills, stocks, mutual funds, and IRA and Keogh accounts. Following [Rosen and Wu \(2004\)](#), and for ease of comparison, we use a four-way classification of these assets into safe assets (checking and savings accounts, money market funds, CDs, government savings bonds and T-bills), bonds (corporate, municipal and foreign bonds, and bond funds), risky assets (stocks and equity mutual funds), and retirement accounts (IRAs and Keoghs). Similar to [Wu \(2003\)](#), we use the information on new severe health conditions reported between the two waves of the survey as the exogenous measure of new health shocks. Severe health conditions include a heart problem, stroke, cancer or malignant tumor, lung disease and diabetes.² In this way, we are able to mitigate concerns about an endogeneity problem in the relationship between health status and wealth.

[Table 1](#) provides summary statistics for single and married households. The average age of a single household is 60.6%, and 8.5% have been diagnosed with new severe conditions during the sample period. For married households, the average age of wives is 57.7 which is about 4 years younger than that of husbands. About 9.7% of husbands have been diagnosed with new severe conditions compared to 6.2% of wives. Whether married or single, household non-financial assets comprise a larger proportion of total assets than financial ones. For single households, the average financial and non-financial assets are \$61,224 and \$100,902, respectively. For mar-

² Individuals with mild conditions such as high blood pressure and arthritis are not considered sick in the empirical analysis.

Table 1
Summary statistics of single and married households

	Single households	Married households
Age (singles)	60.6	
Husband age		61.5
Wife age		57.5
New severe condition (singles)	8.5%	
Husband new severe condition		9.7%
Wife new severe condition		6.2%
College degree (singles)	16.5%	
Husband college degree		23.9%
Wife college degree		15.9%
Financial assets	\$61,224	\$141,746
Non-financial assets	\$100,902	\$235,243
Owners of stock	20.5%	37.7%
Owners of bonds	4.2%	8.7%
Owners of retirement assets	27.5%	50.1%
Owners of safe assets	74.4%	88.9%
Conditional on having positive financial assets		
Share of stock in financial assets	12.9%	17.1%
Share of bonds in financial assets	1.1%	1.8%
Share of retirement assets in financial assets	18.8%	28.6%
Share of safe assets in financial assets	67.2%	52.5%
Number of observations	10,346	18,165

This table provides the basic summary statistics of the first six waves of the Health and Retirement Survey. The sample includes the households that were surveyed in all six waves. Columns 2 and 3 are the summary statistics for single households and married households, respectively. Stock includes the combination of common shares and equity mutual funds. Retirement assets include IRA and Keogh accounts. Bonds include corporate, municipal and foreign bonds and bond funds. Safe assets include checking, savings and money market accounts, CDs, government savings bonds and T-bills. Financial assets are the sum of the four asset classes (stock, retirement, bonds, and safe assets). Non-financial assets include real estate vehicles, business assets and residence.

ried households, the average financial and non-financial assets held are \$141,746 and \$235,243, respectively. It appears that, compared to single households, married households have significantly higher financial and non-financial assets.

Table 1 shows the different portfolio allocations made by single and married households. A greater percentage of married households owns stock (37.7%) compared to single households (20.5%). The proportion of stocks in their respective financial asset portfolios is similar, with stocks comprising 17.1% of the financial assets of married households and only 12.9% of the financial asset portfolio of single ones. Married households also invest more often in retirement assets and bonds, and have a higher proportion of their financial wealth invested for retirement and in bonds compared to single households. For all households, however, bonds are the least favored investment and comprise the smallest percentage of household portfolios. The picture that emerges from these summary statistics is that married households accept more risk than single ones, which may be due to the fact that married households are wealthier than single ones and more willing to accept risks in their portfolios.

3. The impact of health events on household financial and non-financial assets

The impact of health status on household wealth has been examined extensively. None of the extant literature, however, has distinguished between the impact of health status on financial and non-financial wealth. There are good reasons for believing that a health shock could have an asymmetric impact on household financial and non-financial assets. One reason involves a liquidity effect. Consider two people with equal financial and non-financial wealth. When one becomes sick, her income is reduced (see, Wu, 2003), and her medical expenses increase. The initial impact on the household's overall wealth will be a reduction in its financial assets, which are presumably more liquid than its non-financial assets. Thus, the impact of health status on wealth would first be reflected in the differences between the financial wealth of the individuals being compared.

A second possible reason for the differential impact of a health shock on the financial and non-financial assets of a household is the eligibility requirements for public health insurance. Elderly individuals who are poor are provided with health insurance through both Medicare and Medicaid, where Medicaid fills in the gaps in Medicare coverage. Some non-financial assets, such as homes, are excluded from the spend-down requirement for eligibility in public insurance programs and are also protected in cases of bankruptcy. Thus, moving investment resources into a home by paying down a mortgage would be prudent for someone with potentially high medical expenses. Consequently, a health shock may induce a household to shift financial assets into non-financial assets and to have a larger adverse impact on household financial assets than on non-financial wealth.

To test the impact of health events on household financial and non-financial wealth, we use separate regression analyses to assess the impact of a diagnosis of a new health problem. In the regressions, the dependent variables are the logarithm of household financial assets and non-financial assets, respectively.³

The key independent variable capturing the effect of a health event is a dummy variable indicating whether a household member was diagnosed with a new severe health condition between the two waves of the survey. We further control for household initial health status and initial financial and non-financial assets.⁴ This specification allows us to capture the exogenous effects of a new health event on changes in financial and non-financial assets. Our choices of the other control variables in the equation are quite conventional and include the following variables: age; $\text{age}^2/10^3$; a dummy variable equal to one if the person has a college degree, and zero otherwise; a dummy variable equal to one if the person's education level is less than high school, and zero otherwise; an indicator variable for race which is equal to one if the person is white, and zero otherwise; the logarithm of household labor income which cap-

³ Log (financial assets) or Log (non-financial assets) is set to 0 if financial or non-financial assets equal 0. Setting Log (financial assets) or log (non-financial assets) to a very small number when financial or non-financial assets are equal to 0 has virtually no effect on the results.

⁴ This specification is similar to that in Wu (2003). Initial health status is categorized on a self-reported 1–5 scale: excellent, very good, good, fair and poor. A larger number indicates a worse health status.

tures the income effect on household wealth. We use the random effect model to test for the impact of the health event on household financial and non-financial assets; the tests are carried out separately for married households and single households.

Table 2 reports the results of the impact of a new health shock on single households' financial and non-financial assets.⁵ For financial assets, the effect of a new severe health condition is -0.2756 and is significant at the 1% level. In contrast, for non-financial assets, the effect of a new severe condition is only -0.0863 but is not significant at any conventional level. The results indicate that the impact of a new health shock on a single household's financial wealth is larger and more significant than on its non-financial wealth. The results on other control variables are consistent with economic intuition. For example, higher educational levels increase the level of both financial and non-financial assets, and labor income is positively associated with both financial and non-financial assets.

Table 3 shows the results for married households. Notice that the diagnosis of a new severe health condition of a wife has a significantly negative effect on financial and non-financial assets; however, a new severe health condition of a husband does not generate significant effects on these variables. The results are consistent with the findings of Wu (2003) that the effect of a health shock on a married household's total wealth is larger and more significant for women than for men. This is the case even when we separate total wealth into financial and non-financial wealth. Wu (2003) offers several potential explanations for the asymmetric impact of these health shocks; one is that a wife engages in productive household chores which must be purchased externally if she becomes sick; or, a health shock to a wife is more of an unexpected event than a shock to a husband given that the husbands in the sample are, on average, 4 years older than the wives and that women have a longer life expectancy.

Although the results show that a wife's health shock has a significantly negative impact on both household financial and non-financial assets, the magnitudes of these impacts are quite different. The coefficients on a wife's new severe health condition are -0.2808 and -0.1028 in the regression on financial and non-financial assets, respectively. Since the dependent variable in these regressions is measured as a natural logarithm, these results suggest that a health shock to a wife leads to a decline of 28.08% and 10.28% of household financial and non-financial assets, respectively. Thus, the impact of a wife's health shock on financial wealth is almost 3 times as large as its impact on non-financial wealth.

The results show that the impacts of health shocks on household financial and non-financial assets are asymmetric. As we argued earlier, this can be explained by the following two factors: a liquidity effect and the eligibility requirements for health insurance. The asymmetric impact of a health event on household financial and non-financial assets is interesting not only in its own right, but also for understanding the impact of health status on household portfolio decisions, a question to which we turn next.

⁵ Since we need to control for initial health status and initial financial and non-financial assets, the first wave of the HRS is not used in this analysis.

Table 2

The impact of health events on financial and non-financial assets: single households

	Log (financial assets) _{<i>t</i>}	Log (non-financial assets) _{<i>t</i>}
New severe condition _{<i>t</i>}	-0.2756 (0.106)	-0.0863 (0.092)
Age _{<i>t</i>}	0.0108 (0.102)	0.0129 (0.015)
Age _{<i>t</i>} ² /10 ³	0.1865 (0.832)	-0.1697 (0.7151)
College	0.5536 (0.093)	0.0247 (0.078)
Less than high school	-0.8629 (0.075)	-0.2207 (0.066)
White	0.8108 (0.075)	0.1016 (0.715)
Log (household labor income) _{<i>t</i>}	0.0491 (0.007)	0.0256 (0.006)
Female	-0.1339 (0.073)	0.0423 (0.061)
Log (financial assets) _{<i>t-1</i>}	0.5771 (0.009)	0.0859 (0.008)
Log (non-financial assets) _{<i>t-1</i>}	0.1117 (0.009)	0.7627 (0.007)
Initial health condition _{<i>t-1</i>}	-0.2318 (0.030)	-0.1449 (0.025)
Control for year effects	Yes	Yes
Number of observations	8208	8208
R-squared	0.65	0.71

This table reports the results on the impact of health events on single household financial and non-financial assets using a random effect model. The dependent variables are the logarithm of household financial assets and non-financial assets, respectively. The independent variable is a dummy variable indicating whether that individual has a new severe health condition such as a heart problem, stroke, cancer or malignant tumor, lung disease and diabetes. Other control variables include single's age and age squared/10³; a dummy variable that is equal to one if the person has a college degree and zero otherwise; a dummy variable that is equal to one if the single's educational level is less than high school, and zero otherwise; an indicator variable for the race of the person which is equal to one if he/she is white, and zero otherwise; the logarithm of household labor income; a dummy variable indicating the gender of the person which is equal to one if the person is female, and zero otherwise; household initial financial assets and non-financial assets; household initial health conditions. Standard deviations of coefficients are in the parentheses. Coefficients significant at the 5% level or better are in bold.

4. Health status and financial portfolio choice

Given recent demographic changes in US, it has become important to understand the implications of ageing to financial decision making. Health status is obviously an

Table 3
The Impact of health events on financial and non-financial assets: married households

	Log (financial assets) _t	Log (non-financial assets) _t
Husband new severe condition _t	-0.0495 (0.062)	-0.0147 (0.031)
Wife new severe condition _t	-0.2808 (0.076)	-0.1028 (0.038)
Husband age _t	0.1537 (0.043)	0.0062 (0.022)
Husband age _t ² /10 ³	-1.1341 (0.346)	-0.0829 (0.180)
Wife age _t	0.0394 (0.033)	0.0236 (0.017)
Wife age _t ² /10 ³	-0.1676 (0.294)	-0.2422 (0.153)
Husband college	0.2456 (0.051)	0.1429 (0.055)
Husband less than high school	-0.4996 (0.048)	-0.0881 (0.025)
Wife college	0.1004 (0.057)	0.0525 (0.030)
Wife less than high school	-0.5704 (0.050)	-0.0984 (0.026)
Husband white	0.4606 (0.105)	0.1429 (0.055)
Wife white	0.3594 (0.106)	-0.0613 (0.056)
Log (household labor income) _t	0.0229 (0.004)	0.0039 (0.002)
Log (financial assets) _{t-1}	0.6037 (0.006)	0.0505 (0.003)
Log (non-financial assets) _{t-1}	0.1889 (0.011)	0.7108 (0.006)
Husband's initial health condition _{t-1}	-0.1149 (0.018)	-0.0278 (0.009)
Wife's initial health condition _{t-1}	-0.1081 (0.018)	-0.0279 (0.009)
Control for year effects	Yes	Yes
Number of observations	14,669	14,669
R-squared	0.62	0.67

This table reports the results on the impact of health events on married households' financial and non-financial assets using a random effect model. The dependent variables are the logarithm of household financial assets and non-financial assets, respectively. The independent variable is a dummy variable
(continued on next page)

Table 3 (continued)

indicating if a household member has a new severe health condition such as a heart problem, stroke, cancer or malignant tumor, lung disease and diabetes. Other control variables include married couples' ages and ages squared/ 10^3 ; a dummy variable that is equal to one if the husband/wife has a college degree and zero otherwise; a dummy variable that is equal to one if the husband/wife's educational level is less than high school, and zero otherwise; an indicator variable for the race of the husband/wife is equal to one if he/she is white, and zero otherwise; the logarithm of household labor income; household initial financial assets and non-financial assets; household members' initial health conditions. Standard deviations of the coefficients are in parentheses. Coefficients significant at the 5% level or better are in bold.

important factor in the determination of the effect of age on household financial asset allocation. The impact of health status on household financial asset allocation has attracted great attention recently. Edwards (2003) has argued that health status could affect household portfolio choices through its effect on risk aversion if health status is an argument in the household utility function and the marginal utility of consumption decreases with an increase in health. Rosen and Wu (2004) have pointed out that there are various channels through which health status can affect household portfolio choices, such as risk aversion, planning horizon, and life expectancy. They try to identify empirically the channels through which health status affects household portfolio choices, but find that the effect of health status remains significant even after controlling for such factors as risk attitude, planning horizon, life expectancy and bequest motives. Thus, why health status is related to household financial portfolio choices remains a puzzle.

We have shown that a health shock leads to a much larger decline in household financial assets than in non-financial assets. This result is important for understanding the effect of health status on household financial asset allocation. Consider a standard portfolio choice model with one risky asset and one riskless asset, where the risky asset represents stocks and the riskless asset represents the other financial assets (bonds, CDs, checking accounts). Wealth would correspond to total financial assets. Given that a health shock significantly reduces household financial wealth, portfolio theory predicts that a wealth effect will lead households to restructure the composition of their financial assets. This is not to say that non-financial assets have no impact on household financial asset choices. We simply note that in analyzing the impact of health status on financial portfolio choices, one may need to consider the role of financial and non-financial wealth separately.

To investigate the role of financial wealth in the relationship between a health shock and household financial portfolio choice, we use a specification similar to that of Rosen and Wu (2004) but include in the independent variables the natural logarithm of financial assets as an explanatory variable. In order to see the relative importance of financial and non-financial assets in explaining household portfolio choices, we also include the natural logarithm of non-financial assets in the regression. The key independent variable is a dummy variable indicating the health status of a household member. A household member is defined as sick if that individual has

been diagnosed as having a severe health condition.⁶ Other independent variables employed are household characteristics such as age, $\text{age}^2/10^3$, education, race and household labor income. Following Rosen and Wu (2004), and for ease of comparison, we test the effect of health on the allocation of financial assets among four types of assets: risky assets, retirement accounts, bonds and safe assets.

Table 4 reports the effect of health status on the ownership of different types of financial portfolios for single households using a random effect probit model. Table 5 presents the effect of health status on the proportions of different types of financial assets for single households using a random effect tobit model, with 0 as the lower limit and 1 as the upper limit. One observation about the results in these two tables is that financial assets have significant and large effects on both the likelihood of owning, and the proportions of, different types of financial assets in household financial asset portfolios. In contrast, the effect on non-financial assets is much smaller. For example, in the stock ownership equation in Table 4, the coefficient on log (financial assets) is 0.5571 while the coefficient on log (non-financial assets) is only 0.0544. In the stock share equation in Table 5, the coefficient on log (financial assets) is 0.1448 while the coefficient on log (non-financial assets) is only 0.0210. In results not reported here, we find that excluding log (non-financial assets) from the regressions has very little effect on the estimations. This suggests that financial wealth better captures the wealth effect when one is analyzing household financial portfolio choices.

Rosen and Wu (2004) have shown that when the head or spouse of a household is sick, the household is less likely to own stocks, and invests a smaller proportion of its financial assets in stocks than does a healthy household. In contrast, an inspection of the coefficients of severe health conditions in Tables 4 and 5 reveals that none of them is significant at the 5% level. The results indicate that, after controlling for the financial assets of the household and other basic household characteristics, there is no independent effect of single household health status on financial portfolio choices. In their study, Rosen and Wu (2004) use a quadratic function of total wealth to control for the wealth effect while we use logarithm functions of financial and non-financial wealth. A logarithm function is arguably preferable to a quadratic function because the latter assumes that when wealth is beyond a certain threshold, households will invest less in stocks. Yet we do not expect that risky securities are inferior goods. What is more important, as we argued above, is that total wealth may not be an adequate control for a wealth effect given that health events affect financial and nonfinancial wealth asymmetrically, and that financial wealth is a stronger and more significant determinant of financial portfolio choices. Using total wealth as a control variable does not allow for

⁶ Rosen and Wu (2004) use self-reported health status as a measure of health condition. Since there may be a difference between self-reported health status and a diagnosed health condition, we check the robustness of the results and find that our conclusions hold even if self-reported health status is used as the measure of health condition.

Table 4
Health status and financial asset ownership: single households

	Stock Ownership	Retirement assets ownership	Bond ownership
Single severe condition	0.0824 (0.080)	−0.0447 (0.095)	−0.0116 (0.099)
Log (financial assets)	0.5571 (0.021)	0.7852 (0.029)	0.4148 (0.031)
Log (non-financial assets)	0.0544 (0.014)	0.0391 (0.028)	0.0456 (0.023)
Age	−0.092 (0.089)	0.2114 (0.107)	0.1513 (0.129)
Age ² /10 ³	0.628 (0.752)	−1.847 (−0.887)	−1.3302 (1.078)
College	0.4081 (0.107)	−0.0663 (0.136)	0.2675 (0.109)
Less than high school	−0.5324 (0.126)	−0.6622 (0.148)	−0.2109 (0.158)
White	0.4839 (0.118)	0.2822 (0.134)	0.1455 (0.144)
Log (household labor income)	0.0105 (0.007)	0.0303 (0.008)	−0.0009 (0.009)
Female	0.0464 (0.096)	0.1735 (0.117)	0.0096 (0.106)
Control for year effects	Yes	Yes	Yes
Number of observations	10,346	10, 346	10,346

This table reports the impact of health status on the ownership of different types of financial portfolios for single households using a random effect probit model. The dependent variables are ownership of stocks, retirement assets and bonds, respectively. The independent variable is a dummy variable indicating if an individual has been diagnosed with a severe health condition such as a heart problem, stroke, cancer or malignant tumor, lung disease and diabetes. Other control variables include the logarithm of household financial assets; the logarithm of household non-financial assets; single's age and age squared/10³; a dummy variable that is equal to one if the person has a college degree and zero otherwise; a dummy variable that is equal to one if the person's educational level is less than high school, and zero otherwise; an indicator variable for the race of the person that is equal to one if he/she is white, and zero otherwise; the logarithm of labor income; a dummy variable indicating the gender of the person. Standard deviations of the coefficients are in parentheses. Coefficients significant at the 5% level or better are in bold.

differentiation between the channels (financial or non-financial) through which health status affects portfolio choices.⁷

⁷ Both the logarithm function and the separation of financial and non-financial wealth contribute to the difference between the results here and those in Rosen and Wu (2004). Using log (total assets) as a control variable for the wealth effect cannot fully explain away the effect of health status on portfolio choices, especially if self-reported health condition is used as the measurement of health status.

Table 5
Health status and financial portfolio shares: single households

	Stock share	Retirement assets share	Bond share	Safe assets share
Single severe condition	0.0441 (0.027)	-0.0126 (0.024)	0.0123 (0.031)	-0.0290 (0.019)
Log (financial assets)	0.1876 (0.007)	0.1759 (0.006)	0.1143 (0.009)	-0.2040 (0.004)
Log (non-financial assets)	0.0183 (0.005)	0.0127 (0.004)	0.0136 (0.007)	-0.0150 (0.004)
Age	-0.0226 (0.029)	0.0581 (0.027)	0.0345 (0.039)	-0.0322 (0.021)
Age ² /10 ³	0.1227 (0.038)	-0.5256 (0.226)	-0.3056 (0.325)	0.3450 (0.181)
College	0.1112 (0.034)	-0.0259 (0.036)	0.0751 (0.034)	-0.0421 (0.029)
Less than high school	-0.1748 (0.041)	-0.2079 (0.041)	-0.0745 (0.049)	0.1932 (0.029)
White	0.1261 (0.038)	0.0525 (0.040)	0.0472 (0.045)	-0.0709 (0.029)
Log (household labor income)	0.0034 (0.002)	0.0127 (0.004)	0.0136 (0.007)	-0.0065 (0.001)
Female	0.0190 (0.031)	0.0307 (0.033)	0.0050 (0.034)	-0.0449 (0.026)
Control for year effects	Yes	Yes	Yes	Yes
Number of observations	7865	7865	7865	7865

This table presents the impact of health status on the proportions of different types of financial assets in the financial assets for single households using a random effect tobit model with 0 as the lower limit and 1 as the upper limit. The dependent variables are the proportions of stocks, retirement assets, bonds, and safe assets in financial assets, respectively. The independent variable is a dummy variable indicating if an individual has been diagnosed with a severe health condition such as a heart problem, stroke, cancer or malignant tumor, lung disease and diabetes. Other control variables include the logarithm of household financial assets; the logarithm of household non-financial assets', single's age and age squared/10³; a dummy variable that is equal to one if the single has a college degree and zero otherwise; a dummy variable that is equal to one if the single's educational level is less than high school, and zero otherwise', an indicator variable for the race of the single is equal to one if he/she is white, and zero otherwise; the logarithm of labor income; a dummy variable indicating the gender of the person which is equal to one if the person is female, and zero otherwise. Standard deviations of the coefficients are in parentheses. Coefficients significant at the 5% level or better are in bold.

There is no consensus in the literature on the relevant measure of the wealth constraint in the analysis of financial portfolio choices; some use financial wealth (for example, Haliassos and Bertaut, 1995; Bertaut and Starr-McCluer, 2000; Faig and Shum, 2002) while others use total wealth (for example, King and Leape, 1998; Hong et al., 2004). Our results suggest that, depending on the question, it may be important to separate financial and non-financial wealth effects in portfolio choice analysis.

Table 6
Health status and financial asset ownership: married households

	Stock ownership	Retirement assets ownership	Bond ownership
Husband severe condition	0.0382 (0.046)	-0.0337 (0.056)	0.0260 (0.054)
Wife severe condition	-0.1093 (0.051)	-0.1052 (0.062)	-0.0117 (0.061)
Log (financial assets)	0.5383 (0.014)	0.7545 (0.017)	0.3992 (0.018)
Log (non-financial assets)	0.0932 (0.018)	0.0247 (0.019)	0.0538 (0.023)
Husband age	-0.1181 (0.046)	0.2007 (0.051)	-0.0498 (0.060)
Husband age ² /10 ³	0.9022 (0.379)	-1.6365 (0.423)	0.4654 (0.486)
Wife age	0.0462 (0.035)	0.1232 (0.042)	0.0619 (0.046)
Wife age ² /10 ³	-0.4114 (0.323)	-0.9537 (0.382)	-0.5573 (0.4123)
Husband college	0.3079 (0.070)	0.1992 (0.092)	0.3637 (0.070)
Husband less than high school	-0.2970 (0.072)	-0.2590 (0.089)	-0.0677 (0.087)
Wife college	0.0169 (0.078)	0.0559 (0.102)	0.0552 (0.076)
Wife less than high school	-0.3853 (0.076)	-0.3704 (0.092)	-0.2788 (0.097)
Husband white	0.2115 (0.161)	-0.1601 (0.191)	-0.0323 (0.197)
Wife white	0.0769 (0.157)	0.5869 (0.186)	0.0794 (0.192)
Log (household labor income)	0.0134 (0.004)	0.0149 (0.005)	0.3992 (0.019)
Control for year effects	Yes	Yes	Yes
Number of observations	18,165	18,165	18,165

This table reports the impact of health status on the ownership of different types of financial portfolios for married couples using a random effect probit model. The dependent variables are ownership of stocks, retirement assets and bonds, respectively. The independent variable is a dummy variable indicating if a household member has been diagnosed with a severe health condition such as a heart problem, stroke, cancer or malignant tumor, lung disease and diabetes. Other control variables include the logarithm of household financial assets; the logarithm of household non-financial assets; married couples' ages and ages squared/10³; a dummy variable that is equal to one if the husband/wife has a college degree and zero otherwise; a dummy variable that is equal to one if the husband/wife's educational level is less than high school, and zero otherwise; an indicator variable for the race of the husband/wife is equal to one if he/she is white, and zero otherwise; the logarithm of household labor income. Standard deviations of the coefficients are in parentheses. Coefficients significant at the 5% level or better are in bold.

Table 7
Health status and financial portfolio shares married households

	Stock share	Retirement assets share	Bond share	Safe assets share
Husband severe condition	0.0148 (0.012)	0.0032 (0.011)	0.0099 (0.015)	-0.0184 (0.010)
Wife severe condition	-0.0213 (0.014)	-0.0155 (0.013)	-0.0056 (0.017)	0.0178 (0.011)
Log (financial assets)	0.1447 (0.003)	0.1518 (0.003)	0.0195 (0.005)	-0.1787 (0.003)
Log (non-financial assets)	0.0210 (0.004)	0.0039 (0.004)	0.0018 (0.006)	-0.0111 (0.003)
Husband age	-0.0432 (0.012)	0.0267 (0.013)	-0.0150 (0.017)	0.0063 (0.009)
Husband age ² /10 ³	0.3267 (0.101)	-0.2619 (0.105)	0.1384 (0.137)	-0.0159 (0.080)
Wife age	0.0104 (0.009)	0.0145 (0.009)	0.0153 (0.013)	-0.0165 (0.007)
Wife age ² /10 ³	-0.1121 (0.087)	-0.0984 (0.086)	-0.1411 (0.117)	0.1489 (0.067)
Husband college	0.0729 (0.020)	-0.0153 (0.021)	0.1071 (0.020)	-0.0106 (0.016)
Husband less than high school	-0.0966 (0.022)	-0.0650 (0.021)	-0.0161 (0.025)	0.0763 (0.017)
Wife college	-0.0039 (0.021)	0.0156 (0.021)	0.0084 (0.022)	-0.0198 (0.018)
Wife less than high school	-0.0966 (0.022)	-0.0591 (0.022)	-0.0707 (0.028)	0.0658 (0.018)
Husband white	0.0825 (0.046)	-0.0208 (0.048)	-0.0043 (0.057)	-0.0341 (0.035)
Wife white	-0.0095 (0.045)	0.0900 (0.040)	0.0109 (0.055)	-0.0343 (0.034)
Log (household labor income)	0.0047 (0.001)	0.0018 (0.004)	0.0018 (0.001)	-0.0041 (0.001)
Control for year effects	Yes	Yes	Yes	Yes
Number of observations	16,580	16,580	16,580	16,580

This table presents the impact of health status on the proportions of different types of financial assets in financial assets for married households using a random effect tobit model with 0 as the lower limit and 1 as the upper limit. The sample is married households. The dependent variables are proportions of stocks, retirement assets, bonds and safe assets in financial assets, respectively. The independent variable is a dummy variable indicating if a household member has been diagnosed with a severe health condition such as a heart problem, stroke, cancer or malignant tumor, lung disease and diabetes. Other control variables include the logarithm of household financial assets; the logarithm of household non-financial assets; married couples' ages and ages squared/10³; a dummy variable that is equal to one if the husband/wife has a college degree and zero otherwise; a dummy variable that is equal to one if the husband/wife's education level is less than high school, and zero otherwise; an indicator variable for the race of the husband/wife is equal to one if he/she is white, and zero otherwise; the logarithm of household labor income. Standard deviations of the coefficients are in the parentheses. Coefficients significant at the 5% level or better are in bold.

Tables 6 and 7 report the effect of health status on ownership and proportions of different types of financial assets for married households. Consistent with the results for single households, the husband and wife's health events in general do not have independent effects on the ownership and proportion of different types of financial assets.⁸ These results clearly indicate that the effect of health status on household financial asset allocation is not significant. However, they do not imply that there is no health effect on portfolio choices. Instead, they suggest that health status affects household portfolio choices primarily through a wealth effect engendered by a reduction in household financial wealth. Therefore, depending on the risk preferences of households, the effect of health status on portfolio choices can be quite different among sick households. For example, if a household has a utility function with increasing relative risk aversion, a reduction in financial wealth due to a health shock could lead to a greater reduction in holdings of risky than in safe assets. In contrast, a household with constant relative risk aversion will draw down financial assets proportionally if a health shock occurs.

5. Conclusion

This paper examines how health events affect household financial wealth and financial portfolio choices. It is shown that the impact of health events on household financial and non-financial wealth is asymmetric. A diagnosis of a new illness of a household member leads to a much larger decline in financial wealth than in non-financial wealth. This asymmetric impact could be attributed to a liquidity effect and to eligibility requirements for public insurance. We propose possible channels through which health status affects household financial assets allocation. We show that differences in the financial portfolios of healthy and sick households can be primarily explained by differences in their financial wealth. Although the results indicate that there is no "mysterious" component in health status that could affect a household's financial portfolio other than household characteristics, one should not interpret the results to mean that health has no effect on household portfolio choice. On the contrary, the main conclusion to be drawn from this study is that a household's health status is an important factor determining its financial wealth and financial portfolio choice. A health event could lead to a significant reduction in household financial wealth and, consequently, to a restructuring of the composition of its financial portfolio.

⁸ The only exception is that there is a residual effect of a wife's poor health on a married household's stock ownership. However, the effect of wife's poor health on stock share is insignificant. We hesitate to put too strong an interpretation on this result.

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