Health Shocks and Couples' Labor Supply Decisions

Courtney Coile, Wellesley College

Prepared for Department of Labor Conference:
"Employee Benefits and Two-Earner Households"
May 7, 2004

Acknowledgements
The author gratefully acknowledges financial support from the Department of Labor through Contract J-9-P-2-0035 and from the Center for Retirement Research at Boston College. Helpful comments were provided by Deborah Dwyer, Jonathan Gruber, and seminar participants at MIT, the Retirement Research Consortium Conference, and the NBER Summer Institute Workshop on Aging. A preliminary version of this paper was circulated under the title "The Effect of Health Events and Health Insurance on Couples' Labor Supply Decisions." The opinions expressed herein are those of the author and should not be attributed to any of the funding agencies.

For people of near-retirement age, unexpected negative health events are unfortunately quite common. For example, men and women in the Health and Retirement Study (HRS) have a 5% chance of having a heart attack, stroke, or new cancer diagnosis, a 10% chance of being diagnosed with a new chronic illness, and a 3% chance of having an accidental injury over a two-year period. These negative health events, or health shocks, are likely to have significant effects on labor supply decisions. Indeed, McClellan (1998) shows that health shocks lead affected individuals to decrease their labor supply, resulting in a loss in lifetime income for the family.

One natural response to a health shock is for the spouse to increase his or her labor supply, effectively providing within-family insurance against the effects of the negative event. Yet this expected response may fail to materialize for several reasons. First, the response of both spouses to the health shock is likely to be complicated by the family's access to employer-provided and government benefits such as health insurance, disability insurance, and pensions. If the family's only access to health insurance is through the affected spouse's employer, for example, then the family may not be able to shift labor supply towards the healthy spouse. If the family has access to government-provided disability benefits, then this may "crowd out" the expected increase in the spouse's labor supply. Second, the health shock may change the value of time the spouses spend together, for example because the affected spouse needs more assistance with activities of daily living or has a shortened expected lifespan.

The spousal labor supply response to health shocks may have important policy implications. If it is found that spouses increase their labor supply in order to provide health insurance for the family, this might suggest that the government could make families better off by extending the period that workers are allowed to purchase health insurance through a former employer under COBRA or by allowing them to buy in to Medicare (as suggested by President

Clinton). If it is found that Disability Insurance (DI) benefits crowd out the spousal labor supply response, this suggests that the DI program may not raise family income substantially, though presumably it raises family utility by allowing the spouse to have more leisure time.

The purpose of this study is to explore the effect of negative health shocks, such as heart attacks or new cancer diagnoses, on the labor supply of both spouses. This analysis is similar to studies such as Gruber and Cullen (2000) that look for an "added worker effect" (AWE) of wives' increasing their labor supply when husbands become unemployed, but explores the AWE in the context of a negative health shock rather than an unemployment shock. This analysis also provides a link between the large literature on the effect of health status and health insurance on retirement and the small but growing literature on couples' labor supply decisions by carefully considering the effect of health on labor supply in a family context.

The analysis uses the first six waves of the Health and Retirement Study (HRS), a recent, nationally representative survey of the young elderly with extensive information on health, labor force status, and demographics. The analysis proceeds in several steps. First, I examine the effect of health shocks on own labor supply to confirm the findings of earlier research that affected workers reduce labor supply. Second, I estimate the aggregate spousal response to health shocks, which is expected to be positive due to the AWE, in the absence of complicating factors such as those previously mentioned. Third, I interact the health shocks dummy with other family characteristics, such as access to health or disability insurance or changes in self-reported survival probabilities, to test the hypothesis that families' responses to health shocks differ from what the simple AWE theory would suggest in predictable ways that are related to these characteristics. Particular attention is paid to whether men and women respond similarly to a spouse's health shock, as Coile (2003) finds that men are more responsive to their wives' financial incentive for retirement than vice versa, likely due to feeling a stronger complementarity of leisure with their wives.

The paper has several major findings. First, health shocks have an important effect on own retirement: a heart attack accompanied by a significant decrease in functioning is associated with a labor supply reduction of 966 hours for men and of 658 hours for women. Second, in the sample as a whole, a spouse's health shocks has only a small effect on labor supply for men and no significant effect on labor supply for women, suggesting that the AWE in the work force as a whole is quite small. Third, there is some evidence that couples respond to health shocks in predictable ways depending on their access to employer-provided and government benefits and other factors – for example, by decreasing hours if the sick spouse has retiree health insurance or is awarded Disability Insurance benefits. This suggests that the aggregate non-response to health shocks may be explained at least in part by offsetting responses by different groups, and that the AWE may be crowded out in some cases by the availability of these benefits. These responses often differ by gender; a hypothesis is suggested and tested to explain this in one case, but the asymmetries in other cases remain a puzzle.

The remainder of the paper is organized as follows. Section I describes the theoretical motivation for the analysis and previous literature on the topic. Section II discusses the data and empirical strategy. Section III presents the empirical results, first for models incorporating only the effect of own health shocks, then for models incorporating the effects of the spouse's health shocks. Section IV discusses the implications of the findings.

I. Background

Theoretical Motivation

The theory of spousal labor supply as insurance against negative shocks is developed in the context of unemployment in papers by Ashenfelter (1980), Heckman and MaCurdy (1980) and Lundberg (1985), and is summarized by Gruber and Cullen (2000). In a simple model, the negative shock results in a loss of lifetime income, which will cause the spouse to increase their labor supply, assuming that their leisure is a normal good – this is known as the Added Worker Effect (AWE). Furthermore, the increased time at home of the affected spouse may lower the opportunity cost of work for the other spouse if there is substitution in home production, strengthening the AWE. An additional reason to expect a spousal labor supply increase in the context of health shocks is that the family may be liquidity constrained if they have not reached the Social Security eligibility age and cannot tap in to retirement wealth to smooth consumption.

As discussed briefly above, there are several reasons why a negative health shock might not cause the spouse to increase their labor supply. First, there may be complementarity rather than substitution in spousal leisure; indeed, this is the conclusion of most studies on couples' retirement. Further, a negative health shock could strengthen complementarity of leisure if the affected spouse requires assistance with activities of daily living (and the family prefers to have the spouse provide this care) or has a shortened life expectancy. Second, the access of the family to employer-provided and government benefits may crowd out the spousal labor supply response. Thus the spousal labor supply response to a health shock is theoretically ambiguous and is expected to differ across families according to the importance of these factors.

Previous Literature

Three strands of literature are relevant for this project. The first is the literature on health and retirement. One method used in this literature is to include self-reported health status or work limitations in the retirement model. Studies using this method have found large effects of health on retirement.[1] However, this method is subject to measurement error, as individuals' subjective judgements of what constitutes poor health may vary substantially, and to endogeneity concerns, as self-reported measures may not be independent of labor force outcomes if people rationalize their retirement status by claiming a health problem (the "justification hypothesis"). Thus estimates from these models may understate or overstate the true importance of health. A second set of studies uses objective measures of health such as information on medical conditions or subsequent mortality.[2] These measures may be only imperfectly correlated with working capacity, making these estimates subject to measurement error; studies using objective health measures have found significant but smaller effects of health on retirement. A third set of papers instrument for self-reported measures using objective measures.[3]

There is no consensus on the preferred method of estimating the effect of health on retirement. Although Dwyer and Mitchell (1999) report little evidence of the justification hypothesis or of measurement error in objective health measures, Bound (1991) finds evidence of both and shows that instrumenting for self-reported measures with objective measures may lead to bias in estimating the effect of other explanatory variables. Baker et. al. (2001) compares self-reports of objective measures of health such as cancer status with data from health records and finds that there is considerable error in the self-reports and that the error is correlated with labor force status, providing a further rationale against using objective measures .

---

[1] See, for example, Diamond and Hausman (1984) or Hanoch and Honig (1983).
[2] See, for example, Anderson and Burkhauser (1985), Bazzoli (1985), and Chirikos and Nestel (1984).

McClellan (1998) uses negative health shocks that occur between waves 1 and 2 of the HRS, such as a heart attack or new cancer diagnosis, to estimate the effect of health on labor supply. The appeal of this approach is that it exploits the arrival of unexpected new information about health to estimate the effect of changes in health on changes in labor supply. This approach avoids the justification hypothesis concern by not using self-reported health status, and more generally addresses the potential problem of (time-invariant) unobserved heterogeneity that is correlated with both health and retirement. Health shocks are defined based on objective health information, however, so this method is still subject to the concerns raised above about these measures.[4] In analyzing the spousal response, the use of health shocks is also appealing as it allows for comparison to studies of the AWE in other contexts. This paper will go beyond McClellan (1998) in fully exploring the spousal response to health shocks and how the own and spousal responses are affected by access to employer-provided and government benefits.

Second, the literature on health insurance and retirement is relevant for this analysis, as access to insurance may influence the spousal response to the health shock. Several studies have found access to health insurance in retirement to be an important determinant of retirement decisions. Using the first two waves of the HRS, Blau and Gilleski (1997) find that the availability of employer-provided retiree health insurance increases labor force exit by 2 percentage points if the individual shares the cost of coverage with the firm and 6 percentage points if the firm pays the entire cost. Exploiting federally mandated continuation of coverage provisions through COBRA, Gruber and Madrian (1995) find that an additional year of available coverage increases the probability of retirement by 2.2 percentage points.

[3] See, for example, Stern (1989) and Bound (1991)

[4] However, much of the analysis here focuses on health shocks that are accompanied by a major loss in functioning, and Baker et. al. (2001) find that the probability of reporting error drops with the severity of the health condition.

Third, the literature on couples' retirement decisions is relevant, as this study explores labor supply in a family context. Structural models of joint retirement are estimated in several studies, including Hurd (1990), Maestas (1999), and Gustman and Steinmeier (2000); these authors employ different models, but all find that complementarity of leisure is a key factor in explaining why husbands and wives often retire simultaneously. A second set of studies, including Baker (1998), Coile (2003), and Johnson and Favreault (2001), estimate reduced-form models exploring the cross effects of one spouse's characteristics on the other spouse's retirement decision; Coile (2003) finds that husbands are more responsive to wives' financial incentives for retirement than vice versa, so the symmetry of spousal labor supply responses will be examined here. A feature common to both sets of studies, however, is that they either do not control for health or do so using self-reported health status, subjecting them to the critique that their estimates of the effect of health are biased.[5]

In summary, this analysis will extend and connect the literatures on the AWE, health and retirement, health insurance and retirement, and couples' retirement by estimating reduced-form models that measure the labor supply responses of both spouses to negative health shocks. The empirical analysis will explore the extent to which spousal labor supply serves as insurance for the family, will allow the labor supply response to vary by factors such as access to health insurance, and will test for asymmetrical responses by husbands and wives.

[5] Johnson and Favreault (2001) control for both self-reported health status and an objective measure, the number of functional impairments, in the analysis. However, that study does not look at the change in functional impairments or in other health measures over time, as is done here, or explore whether the effect of health measures on the spouse's labor supply depends on factors such as the family's access to health insurance.

II. Data and Empirical Strategy

The data for the project is the Health and Retirement Study (HRS), a survey of persons aged 51-61 in 1992 and their spouses. The survey contains extensive information on health, labor supply, and demographic characteristics. Data for the first six waves of the study, 1992-2002, are used.[6] The sample is constructed using the 4,617 married couples who are in the sample at wave 1 and are observed for at least two consecutive waves of the survey. The male and female samples consist of all person-year observations for waves 2-6 in which the individual is between the ages of 50 and 69 and was working at the previous wave.[7] The final sample size is 11,006 male person-year observations and 9,592 female person-year observations.[8]

Following McClellan (1998), three types of health shocks are examined: acute health events (heart attack, stroke, new cancer), onset of new chronic illnesses (diabetes, lung disease, heart failure, and arthritis), and accidental injuries or falls.[9] Another key health variable is the functional impairment index. The index is based on whether the individual reports any difficulty in performing a series of seventeen activities of daily living (ADL), such as walking, climbing stairs, lifting ten pounds, and getting out of bed; the index ranges from 0 (difficulty in no activities) to 1 (difficulty in all 17 activities).[10] The analysis also makes use of the self-reported

---

[6] The wave 6 data is the preliminary release; all other waves are final release data.
[7] Wave 1 observations cannot be used because the paper examines the effects of changes in health during the previous two years on labor supply, and it is not possible to determine whether health problems reported at wave 1 began within the past two years or at an earlier point in time.
[8] The standard errors in the regressions below are corrected for repeated observations on the same individuals.
[9] Measures are constructed so as to be as compatible across waves as possible. The two most significant changes are that asthma is included in the chronic illness measure only for waves 1-2 due to lack of data thereafter and that the question about accidents changes from recent accident or injury in waves 1-2 to fall-related injury in waves 3-6 (the fall-related injury question is also only asked of older respondents). Measures are also constructed to be similar to McClellan (1998); the most significant difference is the exclusion of back pain from chronic illness, due to implausibly large fluctuations in the number of new diagnoses in later waves.
[10] The choices offered to respondents for the ADL questions change across waves:

- Wave 1: "Is [the activity] not at all difficult, a little difficult, somewhat difficult, very difficult, or something that you can't do at all?"
- Wave 2: "Do you have any difficulty [with the activity]?" followed by "Is that a little or a lot of difficulty?"
- Waves 3-6: "Do you have any difficulty [with the activity]?"

survival probabilities, as health shocks provide new information about mortality and this may influence labor supply decisions.

Table 1 shows the summary statistics for the male and female samples. Over a two-year period, the typical male decreases annual hours by 375 hours and has a 19% chance of exiting the labor force completely. Over a two-year period, nearly 7% of men experience acute health events, 11% are diagnosed with a new chronic illness, and 3% are injured in an accident; 12% of men have experienced an acute health event at some point in the past and 47% have been diagnosed with a chronic illness. The typical male reports difficulty performing 10% of the 17 activities of daily living and has experienced a 1.5% increase in the ADL index during the past two years; he rates his odds of living to age 75 as 66%.[11] The average age of the male sample is 60. In the male sample, 23% of individuals have less than a high school education, 32% have high school only, 20% have some college, 11% have graduated from college, and 14% have graduate education. Median household net worth is $138,000 and median liquid assets are $5,000. The sample statistics for women are similar, except as noted. The typical female decreases hours by 284. Compared to men, women have a higher incidence of past chronic illness, 55%, and a higher ADL index, 14%. The typical female in the sample is younger (58) and has less education than the typical male.

The empirical strategy is to exploit exogenous shocks to health between waves of the survey to explore the effect of health on one's own and one's spouse's labor supply. Two

---

In creating the index, individuals reporting any level of difficulty are treated as impaired, as this is the only measure available for all waves. On average, individuals are 1-2% more disabled at each passing wave; however, individuals are 4% less disabled at wave 2 than wave 1, presumably due to the change in definition. To make the measure more comparable across time, I decrease each individual's wave 1 impairment index by one activity (roughly 6%).

[11] This average corresponds well with the actual probability of living to age 75 from the 1995 life tables, which is .68 for the average man in the sample. Interestingly, men greatly overestimate their probability of living to age 85 (sample average of .45 vs. .32 from life tables), while women greatly underestimate their probability of living to age 75 (sample average of .68 vs. .78 from life tables) but make an accurate predication regarding age 85. Using wave 1 of the HRS, Hurd and McGarry (1995) have a similar finding.

dependent variables will be used: the change in hours (continuous) and exit from the labor force (dummy).[12] In addition to the health measures, the regressions will include a full set of age dummies, education dummies, industry and occupation dummies, net worth and liquid assets, and year dummies.

Table 2 displays trends in the incidence of health shocks and in the impairment index across waves of the survey. The fraction of men experiencing an acute event such as a heart attack, stroke, or new cancer diagnosis rises over time, from 5% in wave 2 to 9% in wave 6. The fraction receiving a new diagnosis of a chronic illness such as diabetes or lung disease varies from 9% to 12% with no clear time trend. The fraction experiencing an accident fluctuates wildly due to changes in the question (see above). Overall, the percent of men experiencing any health event fell is 20% at wave 2 and 18% at the other waves. The ADL index remains roughly constant at 10%, despite the fact that the average person typically experiences a 1-2% increase in the ADL index between waves. This apparent anomaly can be explained by sample selection: higher-ADL people are more likely to exit the labor force, so the overall ADL average is constant even though those remaining in the sample experience increases in impairment. Sample selection may also explain the relatively flat trend in any health shock. The average self-reported survival probability to age 75 rises slightly across the waves and the typical change in survival probability between waves ranges from near 0% to 2%.[13] This matches up well with the change in survival probability calculated from life tables.[14]

---

[12] Results are very similar using a dummy=1 if hours go to zero or a dummy=1 if the individual switches from reporting himself as not retired or partly retired to completely retired. Labor force re-entry is also an interesting phenomenon to explore, though it is sufficiently infrequent (affecting about 3% of the sample between each wave) so as to make such analysis infeasible.

[13] The decrease in survival probabilities between waves 1 and 2 is most likely due to the increase in the number of categories offered from 1-10 to 1-100. The decrease in survival probabilities between waves 3 and 4 is less easily explained, though it is interesting that the incidence of missing data is much lower at wave 4 than at waves 3 or 5.

[14] Surviving an additional year is associated with a decrease in life expectancy of approximately 0.8 years for this sample, so that the probability of living to a given age rises modestly as the individual ages.

The trends for females are very similar for chronic illnesses and accidents. For acute health events, there is more fluctuation, from a low of 3% in wave 2 to a high of 9% in wave 3. Interestingly, women's ADL index is about 4% higher than men's, indicating that the typical woman has difficulty with 2.5 out of 17 activities, vs.1.8 activities for men.

III. Results

Results Excluding Spouse Variables

The first set of results explores the effect of health shocks on own retirement, ignoring any response to the spouse's health shocks. Table 3a presents the regression results for men using the change in hours as the dependent variable; all models include dummies for age, education, occupation/industry, and year, as well as net worth and liquid assets. The first specification includes dummy variables for whether the individual has had an acute health event, a new chronic illness, or an accident since the last wave. An acute health event leads to a highly significant decrease in work of 318 hours, a large change relative to the baseline average reduction of 375 hours. The onset of a new chronic illness reduces hours by 146 and an accident reduces hours by 70; only the former is significant. The second specification breaks the acute health event variable into three separate dummy variables for heart attack, new cancer, and stroke. All types of event are found to have a significant effect on hours, though the effect of the heart attack dummy, a 528 hour decrease, is nearly three times as large as the effect of other acute events. The third specification tests whether health shocks have long-term effects by including dummy variables for whether the individual has ever had a health shock. Past acute health events have no effect on current hours, though past chronic illnesses reduce hours by 66.

The fourth specification explores the role of the individual's level of functioning by adding a dummy variable indicating a large change in the ADL index (difficulty with 4 or more new ADLs) since the last wave, the value of the ADL index at the last wave, and interactions between the ADL change dummy and the health shock dummies. The coefficients on the ADL change dummy and past ADL level are both large and highly significant: having a past ADL of 1 instead of 0 is associated with a decrease of 338 hours and having a large increase in the ADL index between waves is associated with a decrease of 220 hours. Including the ADL variables lowers the magnitude of the health shocks variables by approximately half, but the interaction of the ADL change dummy and the acute health event dummy is significant and extremely large, indicating a 586-hour decrease. Taken together, the point estimates from this specification suggest that someone experiencing a heart attack and a decrease in functioning of 4 ADLs would decrease labor supply by 966 hours more than would someone with no heart attack or change in the ADL index; this is two and a half times the average reduction in hours.

Finally, the fifth specification examines whether a change in expected mortality amplifies the effect of a health shock. This specification adds a dummy variable indicating a significant change in the self-reported survival probability to age 75 (a decrease greater than 20%) since the last wave, the survival probability from the last wave, and interactions of the survival change dummy with the health event dummies.[15] Surprisingly, a large change in survival probability is not associated with a reduction in labor supply; the past survival probability also has no effect. However, the interaction of the change in survival probability dummy and the acute health event dummy is negative and significant, suggesting that a heart attack accompanied by a 20+% reduction in survival probability is associated with a decrease in labor supply of 454 hours.

[15] Results are quite similar if the cutoff for a large change in survival probabilities is a 10% decrease or a 25% decrease.

Table 3b presents the linear probability model estimates using labor force exit between waves as the dependent variable.[16] The results are quite similar. For example, an acute event such as a heart attack that is accompanied by a large decrease in functioning is associated with a 45% higher probability of exiting the labor force; this increase is more than twice the 18% baseline probability of exit. Similarly, a heart attack with a large decrease in survival probability is associated with a 22% increase in the probability of labor force exit.

The results for women are shown in Tables 4a and 4b. The results are largely similar to those for men, except that the accident dummy here is wrong-signed as well as insignificant. The health shock coefficients are consistently smaller for women than for men, though they are similar when compared to the average decrease in hours. For example, the additional reduction in hours for a woman experiencing a heart attack and a large decrease in functioning is 658 hours (2.3 times baseline), versus 966 hours (2.6 times baseline) for a man. Interestingly, while heart attacks have the largest effect of any acute health event for men, for women all types of acute events have a similar effect on hours and a stroke has the largest effect on labor force exit.

Basic Results Including Spouse Health Shocks

To assess the spousal response to health shocks, the labor supply models discussed above are expanded by adding an equivalent set of health shock variables for the spouse, as well as all of the spouse's demographic variables. The coefficients on the spouse health shock variables resulting from this exercise are shown in Tables 5a and 5b; although not reported on the tables, the effects of own health variables are virtually identical to the earlier results.

In the simplest specification for men (columns 1 and 5 on Table 5a), a wife's health shock of any type is associated with an increase in hours or a decrease in the probability of

[16] Estimating these specifications using probit models yields qualitatively similar results.

exiting the labor force, as predicted by the AWE. The effects are small relative to the effects of own health shocks, on the order of an increase of 50 hours or a 1.5 percentage point decrease in the probability of retirement, and are not statistically significant, although replacing the individual health shock dummies with a single dummy variable for any type of health shock (columns 2 and 6) yields a significant coefficient in the hours regression.

For women (see Table 5b), a husband's health shock is not associated with a consistent increase in labor supply as predicted by the AWE, and the coefficients are small and insignificant, whether the individual health shock dummies or a single dummy is used. Though caution should be exercised in drawing conclusions from these results given the general lack of significance, there is some suggestion in the data that men in aggregate are more responsive to their spouse's health shocks than vice versa, in that the coefficients in the male regression have consistent signs and that the any shock dummy is statistically significant in the hours model. Interestingly, previous work by Coile (2003) hypothesizes that the stronger results for men in that paper are due to a stronger complementarity of leisure effect for men, but if the same were true here, this would work against finding a larger increase in labor supply for men. I return to this subject in the following section.

Complementarity of Leisure and Caregiving

One possible explanation for the small and often insignificant effects of spouse's health shocks in Tables 5a and 5b is that the overall results may mask the fact that different families are responding to the shocks in predictable but offsetting ways. For example, workers whose spouses experience a significant loss in functioning or a large decrease in their subjective survival probabilities may decrease their labor supply in order to care for the spouse or because they now value their time with their spouse more highly. This possibility is examined in the remaining columns on Tables 5a and 5b, which add interactions of the spouse's health shock dummies with dummies for changes in the spouse's level of functioning or subjective survival probabilities. Other possible reasons for different responses by different families, such as access to health insurance, are explored in the following sections of the paper.

The response to a spouse's health shock that is accompanied by a major loss in functioning or decrease in survival probability is very different for men and women. If anything, men appear to increase labor supply by even more when this is the case, though the additional effects are not statistically significant. Women, on the other hand, decrease labor supply by more when the spouse's health shock is accompanied by a major decline in functioning or survival probability. The effect is on the order of 6 percentage points, or roughly one-third of baseline retirement, and the key coefficients in the retirement models are significant (one at the 5% level, one at the 10% level); the coefficients in the hours models also indicate a decrease in labor supply but are insignificant.

A hypothesis that could explain the difference in the results for men and women is that the onset of a serious health shock that is accompanied by a decline in functioning may have a different effect on the complementarity of leisure for men and women. Specifically, if this event reduces the complementarity of leisure for men and increases it for women, for example because women feel more comfortable than men in assuming the role of caregiver for their spouse, that would be consistent with men increasing labor supply and women decreasing labor supply as a result of the severe health shock.

To test this theory, I make use of the question in the HRS about whether the respondent finds time spent together with their spouse to be enjoyable (on a 4-point scale – extremely, very, somewhat, or not too enjoyable – where 1 is extremely enjoyable), and treat this as a proxy for complementarity of leisure. The test involves regressing the change in this index since the last wave on the value of the index at the last wave and dummies for having any health shock or a major change in functioning over the period for each spouse. The same model is estimated for each spouse via seemingly unrelated regression (SUR), and the coefficients on the spouse's major functioning change dummy in each regression are tested for equality. Unfortunately, the question about enjoyment of time spent together was only asked of all respondents in waves 1 and 2, so the analysis is based on the change between those waves only.

The results of this analysis are shown on Table 6. The average value of the index is 1.83 for men and 1.96 for women and the average change in the index is quite small, about 0.03 for both men and women; as the index is constructed so that it rises as enjoyment falls, a positive change in the index indicates a decrease in complementarity of leisure. For women, a major change in the spouse's level of functioning is associated with an insignificant decrease of 0.08 in the index (e.g., an increase in complementarity of leisure), while for men, it is associated with a highly significant increase of 0.35 in the index (e.g., a decrease in complementarity of leisure). Most importantly, the hypothesis that these coefficients are equal can be rejected at the 1% significance level. This exercise lends support to the hypothesis that the observed differences in how men and women respond to a spouse's severe health shock are driven by differences in the effect of this event on their enjoyment of time spent with their spouse.

A second hypothesis that may explain the differences in men's and women's responses to a spouse's health shock is that women may be more likely to decrease labor supply in order provide care for a sick spouse. A simple cross-tabulation indicates that 8.7% of men who have suffered any health shock receive assistance with activities of daily living from a spouse and

1.6% receive assistance from other caregivers, while the comparable figures for women who have suffered a health shock are 7.6% and 2.6%. Yet it is difficult to conclude from this that the desire to provide care has a causal effect on labor supply decisions; women may reduce labor supply in response to a spouse's health shock for other reasons and simply provide assistance because it is convenient to do so.

A cleaner, if less direct, way to explore the role of caregiving in labor supply decisions is to look at whether the presence of adult children living within 10 miles prior to the health shock is associated with a larger labor supply increase by the healthy spouse, as these children can serve as alternate caregivers. Results of this exercise are presented in Table 7. The key coefficients are insignificant, but the results again suggest a differential response by men and women. For men, having kids nearby allows them to increase hours by 75 more or reduce the probability of labor force exit by 2.1 percentage points more in response to a spouse's health shock than if kids were not nearby; these effects are comparable in size to the average effects shown on Table 5a, and while insignificant, the key coefficients in the two labor supply models are of opposite sign as expected. For women, however, the coefficients do not have the opposite sign as expected and are highly insignificant. This suggests that men may make use of the presence of other potential caregivers to do less caregiving and increase labor supply, while women may not.

Health Insurance

The preceding section has explored how spouses' responses to health shocks may be affected by complementarity of leisure or caregiving needs, but responses are also likely to be affected by access to employer-provided and government-provided benefits. The first such benefit explored is health insurance. A husband or wife may increase labor supply in response to a spouse's health shock if he or she needs to work to provide health insurance for the sick spouse, and conversely may decrease labor supply if there is no such need. Table 8 explores this hypothesis by augmenting the basic model with dummy variables for whether each spouse had employer-provided health insurance and employer-provided retiree heath insurance at the last wave and an interaction of the retiree health insurance dummy with the any health shock dummy. For simplicity, I focus on the results for labor force exit; results for changes in hours are similar.

The coefficient on own employer-provided health insurance is expected to be negative, as jobs with insurance may have other attractive attributes that make people less likely to retire; indeed, having employer-provided health insurance is found to reduce the probability of retirement by 4.2 percentage points for men and 8.5 percentage points for women, and both effects are highly significant. The coefficient on own and spouse employer-provided retiree health insurance are both expected to be positive, as people are more likely to retire when they and their spouse have retiree health insurance because it is not necessary to continue working to obtain this coverage for the family. Having retiree health insurance is found to increase the probability of retirement by 5.9 percentage points for men and 5.1 percentage points for women, and both effects are highly significant. Having one's spouse have retiree health insurance is found to increase the probability of retirement by 2.4 percentage points for men, and the effect is significant at the 10% level; for women, the effect is small and insignificant.

The interaction term between the spouse's retiree health insurance and the spouse's health shock allows us to assess whether the response to a spouse's health shock is affected by the spouse's access to retiree health insurance. Taking the coefficients together, a wife's health shock is associated with a decreased probability of retirement of 2 percentage points for the husband if the wife does not have retiree health insurance vs. an increased probability of retirement of 3.6 percentage points if she does have it. The results should be interpreted cautiously because the coefficient on the interaction term is not statistically significant, but the results point to an important role for retiree health insurance in the husband's response to the wife's health shock. By contrast, the husband's access to retiree health insurance has no apparent effect on the wife's response to a husband's health shock.

Income and Retirement Benefits

Finally, families may be able to weather a health shock without a spousal labor supply response if they have access to private pensions, Social Security benefits, and Disability Insurance (DI) benefits. Several variables are added to the model to test this hypothesis, and results are presented in Table 9. Specifically, dummy variables are added for whether each spouse is eligible for Social Security (defined here as being age 62 or older; individual age dummies are still included in the model) or for a private pension and for whether the individual has applied for or received DI, and the SS and pension dummies are interacted with own and spouse's health shocks.

If the respondent is eligible for Social Security or pension, this is associated with a large and statistically significant decrease in labor supply. The interactions of these variables with own health shocks are right-signed but insignificant, suggesting that individuals are no more likely to reduce labor supply in response to a health shock when these benefits are available. The effects of the spouse's benefit variables on labor supply are largely insignificant, except that husband reduce labor supply (by 66 hours more, or a 6.2 percentage point higher probability of retirement) when the wife has a health shock and is pension-eligible. This suggests that for men, wives' pensions crowd out the AWE, although Social Security benefits do not, and a similar effect is not observed for women.

If the respondent applies for DI benefits, this is associated with a very large and statistically significant decrease in labor supply, as one would expect given that applicants must be out of the labor force. Being awarded DI benefits is associated with a further significant decrease in labor supply. We would expect a spouse's application for DI benefits to be associated with an increase in labor supply due to the AWE while the application was pending or after an unsuccessful application, but would expect a spouse's DI award to be associated with a decrease in labor supply if the DI benefits crowd out the AWE. For men, the effects of the spouse's DI variables are inconsistent and insignificant, but for women, the signs are as predicted and a DI award for the husband is associated with a decrease in labor supply of 296 hours (significant) or an increase in the probability of retirement of 3.4 percentage points (insignificant). This suggests that the receipt of DI benefits may crowd out a labor supply increase by women in response to the husband's health shock.

To recap, a spouse's health shock is found to be associated with a small increase in men's labor supply and no change in women's labor supply in the aggregate. However, there is some evidence that different groups of spouses are reacting differently and that these responses differ by gender. If the spouse has a severe health shock accompanied by a loss in functioning, wives reduce labor supply, but husbands do not. Evidence suggests that the lack of a similar response by husbands may be due to a weakening of his traditionally stronger complementarity of leisure effect when the health shock occurs. Evidence also suggests that men increase labor supply in response to a wife's health shock when substitute caregivers are available in the form of adult children living within 10 miles.

The presence of employer-provided and government benefits also affects the response to a spouse's health shock. Husbands appear to reduce labor supply in response to a wife's health shock when she has retiree health insurance and to increase it when she does not. Husbands also reduce labor supply when their wives have access to private pension benefits, while wives reduce labor supply when their husbands are awarded DI benefits. There is no clear explanation for the finding that men are more responsive to employer-provided benefits and women to government-provided benefits.

IV. Conclusions

Health events such as heart attacks or new diagnoses of chronic illnesses have a large effect on labor supply decisions for both men and women, particularly when accompanied by large changes in functioning. The onset of a heart attack or stroke accompanied by new difficulty in performing 4 ADLs is projected to decrease men's hours by 966 or to raise the probability of men's exiting the labor force by 45 percentage points. The comparable effect for women is a 658 decrease in hours or a 31percentage point increase in the probability of labor force exit, which is comparable as a percentage of baseline retirement.

The labor supply response of workers to spouse's health shocks is small for men and insignificant for women in aggregate. Thus, the AWE is minimal for the typical family, suggesting that health shocks represent real financial losses for the family. There is some evidence that the availability of employer-provided and government benefits affects workers' responses to their own and their spouses' health shocks in predictable ways. Notably, husbands reduce labor supply when their wives have access to retiree health insurance or private pension benefits, and wives reduce labor supply when their husbands have access to Disability Insurance benefits.

These two findings in particular may be of interest to policy makers. The former suggests that providing access to health insurance, for example by allowing buy-in to Medicare prior to age 65, may make families better off. The latter suggests that the availability of DI benefits may not always raise family income as much as expected, though DI benefits will presumably raise family utility by allowing the healthy spouse to have more time at home. More generally, the paper suggests that the aggregate non-response to health shocks may be explained at least in part by offsetting responses by different groups, and that the AWE may be crowded out in some cases by the availability of these benefits. Future research may help to explain why men's and women's responses are not always symmetric, although the paper has suggested that differences in the complementarity of leisure may play a role in some cases.

References

Anderson, K. H. and R. V. Burkauser (1985). "The Retirement-Health Nexus: A New Measure of an Old Puzzle," Journal of Human Resources 20: 315-330.

Ashenfelter, Orley (1980). "Unemployment as Disequilibrium in a Model of Aggregate Labor Supply, " Econometrica 48:547-564

Baker, Michael, Mark Stabile, and Catherine Deri (2001). "What Do Self-Reported, Objective, Measures of Health Measure?" NBER Working Paper #8419.

Baker, Michael (1999). "The Retirement Behavior of Married Couples: Evidence from the Spouse's Allowance," NBER Working Paper #7138.

Bazzoli, G. J. (1985). "The Early Retirement Decision: New Empirical Evidence on the Influence of Health," Journal of Human Resources 20: 215-234.

Blau, David M. and Donna B. Gilleskie (1997). "Retiree Health Insurance and the Labor Force Behavior of Older Men in the 1990s," NBER Working Paper #5948.

Bound, John (1991). "Self-Reported Objective Measures of Health in Retirement Models," Journal of Human Resources 26(1): 106-138.

Bound, John, et. al. (1998). "The Dynamic Effects of Health on the Labor Force Transitions of Older Workers," NBER Working Paper #6777.

Chirikos, T. N. and G. Nestel (1984). "Economic Determinants and Consequences of Self-Reported Work Disability," Journal of Health Economics 3: 117-136.

Coile, Courtney (2003). "Retirement Incentives and Couples' Retirement Decisions," NBER Working Paper #9496.

Diamond, Peter A., and Jerry A. Hausman (1984). "The Retirement and Unemployment Behavior of Older Men," in H. Aaron and G. Burtless, eds., Retirement and Economic Behavior, Washington, D.C.: Brookings Institution.

Dwyer, Debra S. and Olivia S. Mitchell (1999). "Health Problems as Determinants of Retirement: Are Self-Rated Measures Endogenous?" Journal of Health Economics 18: 173-193.

Gruber, Jonathan, and Julie Berry Cullen (2000). "Spousal Labor Supply as Insurance: Does Unemployment Insurance Crowd Out the Added Worker Effect?" Journal of Labor Economics.

Gruber, Jonathan and Brigitte Madrian (1995). "Health Insurance Availability and the Retirement Decision," American Economic Review, 938-948.

Gustman, Alan L. and Thomas Steinmeier (2000). "Retirement in a Family Context: A Structural Model for Husbands and Wives," Journal of Labor Economics, 18.

Hanoch, Giora, and Majorie Honig (1983). "Retirement, Wages, and Labor Supply of the Elderly," Journal of Labor Economics, 1:131-151.

Heckman, James J. and Thomas E MaCurdy (1980). "A Life Cycle Model of Female Labor Supply, " Review of Economic Studies 47:47-74.

Hurd, Michael D. (1990). "The Joint Retirement Decisions of Husbands and Wives," in David A. Wise, ed., Issues in the Economics of Aging. Chicago: University of Chicago Press: 231-254.

Hurd, Michael D. (1998). "Comment on: Health Events, Health Insurance, and Labor Supply," in David A. Wise, ed., Frontiers in the Economics of Aging, Chicago: University of Chicago Press.

Hurd, Michael D. and Kathleen McGarry (1995). "Evaluation of the Subjective Probabilities of Survival in the Health and Retirement Study," Journal of Human Resources 30: S268-S292.

Hurd, Michael D. and Kathleen McGarry (1997). "The Predictive Validity of Subjective Probabilities of Survival," NBER Working Paper #6193.

Johnson, Richard W. and Melissa M. Favreault (2001). "Retiring Together or Working Alone: The Impact of Spousal Employment and Disability on Retirement Decisions," mimeo, The Urban Institute.

Lundberg, Shelly (1985). "The Added Worker Effect, " Journal of Labor Economics 3: 11-37

Maestas, Nicole (2001). "Labor, Love, and Leisure: Complementarity and the Timing of Retirement by Working Couples," mimeo, University of California at Berkeley.

McCllelan, Mark (1998). "Health Events, Health Insurance, and Labor Supply: Evidence from the Health and Retirement Survey," in David A. Wise, ed., Frontiers in the Economics of Aging, Chicago: University of Chicago Press.

Stern, Steven (1989). "Measuring the Effects of Disability on Labor Force Participation," Journal of Human Resources 24:361-395.

Table 1: Summary Statistics

Variable	Male Sample		Female Sample	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev**
Labor Force Variables				
Change in Hours	-375	1,026	-284	860
Exited Labor Force	0.185	0.388	0.189	0.391
Health Variables				
Acute Health Event	0.067	0.249	0.050	0.219
New Chronic Illness	0.107	0.309	0.098	0.298
Accident	0.036	0.186	0.030	0.170
Past Acute Event	0.122	0.327	0.109	0.311
Past Chronic Illness	0.475	0.499	0.546	0.498
ADL Index	0.103	0.141	0.141	0.161
Change in ADL Index	0.015	0.122	0.011	0.130
Self-Reported Prob Live to 75	0.660	0.274	0.684	0.267
Change in Prob Live to 75	0.002	0.266	0.000	0.259
Demographics				
Age	60.4	4.1	58.3	4.5
Educ: <HS	0.234	0.423	0.188	0.391
Educ: HS	0.320	0.466	0.407	0.491
Educ: Some college	0.198	0.398	0.228	0.420
Educ: College	0.111	0.315	0.080	0.272
Net Worth (median)	138,000	1,190,334	135,000	1,125,822
Liquid Assets (median)	5,000	249,060	4,000	262,320
Number of Obs	11,006		9,592	

Table 2: Changes in Health Status

Variable	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Men					
Acute Event	0.047	0.074	0.070	0.070	0.090
Chronic Illness	0.118	0.110	0.094	0.088	0.120
Accident	0.058	0.005	0.030	0.037	0.052
Any Health Shock	0.204	0.175	0.179	0.179	0.179
Impairment Index	0.106	0.096	0.098	0.102	0.116
Change in Index	0.028	0.001	0.012	0.015	0.020
Self-Reported Prob Live to 75	0.651	0.664	0.658	0.669	0.669
Change in Prob Live to 75	-0.007	0.018	-0.008	0.010	-0.001
Number of Obs	3,228	2,595	2,147	1,736	1,300
Women					
Acute Event	0.026	0.090	0.042	0.047	0.046
Chronic Illness	0.123	0.099	0.086	0.084	0.092
Accident	0.058	0.002	0.023	0.028	0.038
Any Health Shock	0.193	0.180	0.144	0.150	0.161
Impairment Index	0.148	0.136	0.136	0.138	0.147
Change in Index	0.013	-0.001	0.012	0.016	0.019
Self-Reported Prob Live to 75	0.664	0.684	0.689	0.700	0.694
Change in Prob Live to 75	-0.019	0.018	-0.003	0.009	-0.001
Number of Obs	2,342	2,140	1,947	1,723	1,440

Table 3a: Effects of Own Health Shocks on Men's Hours

Variable	Specification				
	(1)	(2)	(3)	(4)	(5)
Acute Event Dummy	-317.7		-311.0	-159.7	-216.8
	(43.7)		(45.4)	(46.1)	(58.1)
Heart Attack		-528.1			
		(78.5)			
Stroke		-190.4			
		(76.8)			
Cancer		-186.5			
		(63.7)			
Chronic Illness Dummy	-145.8	-139.0	-154.9	-91.8	-86.8
	(34.1)	(34.0)	(34.1)	(36.2)	(43.9)
Accident Dummy	-69.6	-68.9	-62.0	-20.0	-172.7
	(55.1)	(55.4)	(55.3)	(58.9)	(87.8)
Past Acute Dummy			-4.4		
			(28.2)		
Past Chronic Dummy			-66.1		
			(17.0)		
Increase in ADL Dummy (change>=4 activities)				-219.8	
				(46.8)	
Past ADL (0-1 Index)				-337.8	
				(74.8)	
Acute * ADL Change				-586.0	
				(117.8)	
Chronic * ADL Change				-87.9	
				(99.0)	
Accid * ADL Change				-31.6	
				(149.3)	
Decrease in Age75 Survival Prob (change<-.20)					-9.7
					(33.7)
Past Age 75 Surv Prob (0-1 Index)					57.5
					(39.2)
Acute * Survival Change					-237.2

Table 3b: Effects of Own Health Shocks on Men's Labor Force Exit

Variable	Specification				
	(1)	(2)	(3)	(4)	(5)
Acute Event Dummy	0.161		0.143	0.088	0.104
	(0.018)		(0.019)	(0.018)	(0.023)
Heart Attack		0.220			
		(0.030)			
Stroke		0.155			
		(0.035)			
Cancer		0.083			
		(0.027)			
Chronic Illness Dummy	0.054	0.053	0.057	0.031	0.042
	(0.012)	(0.012)	(0.012)	(0.013)	(0.016)
Accident Dummy	0.024	0.023	0.020	0.003	0.069
	(0.022)	(0.022)	(0.022)	(0.023)	(0.033)
Past Acute Dummy			0.049		
			(0.013)		
Past Chronic Dummy			0.029		
			(0.008)		
Increase in ADL Dummy (change>=4 activities)				0.106	
				(0.018)	
Past ADL (0-1 Index)				0.238	
				(0.034)	
Acute * ADL Change				0.258	
				(0.048)	
Chronic * ADL Change				0.024	
				(0.038)	
Accid * ADL Change				-0.009	
				(0.059)	
Decrease in Age75 Survival Prob (change<-.20)					0.003
					(0.011)
Past Age 75 Surv Prob (0-1 Index)					-0.054
					(0.016)
Acute * Survival Change					0.118
					(0.050)
Chronic * Survival Change					0.030
					(0.038)
Accid * Survival Change					-0.048
					(0.066)
R-Squared	0.111	0.112	0.114	0.130	0.101
Number of Obs	11,006	11,006	11,006	11,006	7,827

Note:
(1) Regressions include dummies for age, education, industry/occupation, and year, net worth and liquid assets.
(2) Standard errors are corrected for repeated observations on same individuals.
(3) Specification 5 has fewer observations due to missing subjective mortality data.

Table 4a: Effects of Own Health Shocks on Women's Hours

Variable	Specification				
	(1)	(2)	(3)	(4)	(5)
Acute Event Dummy	-249.9		-263.2	-150.5	-170.8
	(46.8)		(51.6)	(50.3)	(59.1)
Heart Attack		-206.3			
		(125.8)			
Stroke		-228.5			
		(80.0)			
Cancer		-245.5			
		(60.5)			
Chronic Illness Dummy	-86.4	-85.2	-91.4	-67.3	-96.1
	(32.9)	(32.9)	(33.1)	(36.6)	(37.5)
Accident Dummy	36.0	35.6	35.5	101.3	87.3
	(62.6)	(62.6)	(62.5)	(66.6)	(83.8)
Past Acute Dummy			34.3		
			(30.1)		
Past Chronic Dummy			-21.4		
.			(16.0)		
Increase in ADL Dummy				-167.7	
(change>=4 activities)				(40.6)	
Past ADL (0-1 Index)				-293.9	
				(61.7)	
Acute * ADL Change				-339.2	
				(121.6)	
Chronic * ADL Change				-9.7	
				(91.2)	
Accid * ADL Change				-167.0	
				(158.2)	
Decrease in Age75 Survival Prob					25.0
(change<-.20)					(30.3)
Past Age 75 Surv Prob (0-1 Index)					-6.0
					(36.0)
Acute * Survival Change					-48.7
					(121.7)
Chronic * Survival Change					102.9
					(95.1)
Accid * Survival Change					-294.2
					(212.9)
R-Squared	0.038	0.038	0.038	0.045	0.042
Number of Obs	9,592	9,592	9,592	9,592	8,188

Note:
(1) Regressions include dummies for age, education, industry/occupation, and year, net worth and liquid assets.
(2) Standard errors are corrected for repeated observations on same individuals.

The most interesting findings come from the specification including changes in the ADL index. The spouse's acute health event dummy is now associated with a larger increase in labor supply, while the spouse's ADL change * acute interaction is associated with a decrease in labor supply; many of the coefficients are significant at the 10% level or better. This suggests that there may in fact be offsetting labor supply responses by different groups. For example, a wife's acute event results in a 108 hour *increase* in the husband's labor supply if there is no major change in functioning, versus a 60 hour *decrease* if there is a major functioning decline; similarly, a husband's acute event *lowers* the wife's probability of labor force exit by 3.3 percentage point if there is no major change in functioning or *raises* it by 11 percentage points if there is a functioning decline. The hypothesis that there are offsetting responses by different groups is addressed at further length in the following sections. There is no evidence to this point that men and women respond differently to spouse's health shocks.

Table 4b: Effects of Own Health Shocks on Women's Labor Force Exit

Variable	Specification				
	(1)	(2)	(3)	(4)	(5)
Acute Event Dummy	0.097		0.105	0.040	0.031
	(0.021)		(0.022)	(0.021)	(0.024)
Heart Attack		0.049			
		(0.053)			
Stroke		0.139			
		(0.043)			
Cancer		0.077			
		(0.025)			
Chronic Illness Dummy	0.043	0.043	0.049	0.027	0.037
	(0.014)	(0.014)	(0.014)	(0.015)	(0.016)
Accident Dummy	0.001	0.001	0.001	-0.031	-0.034
	(0.026)	(0.026)	(0.026)	(0.027)	(0.031)
Past Acute Dummy			-0.022		
			(0.015)		
Past Chronic Dummy			0.027		
.			(0.008)		
Increase in ADL Dummy				0.080	
(change>=4 activities)				(0.017)	
Past ADL (0-1 Index)				0.215	
				(0.032)	
Acute * ADL Change				0.189	
				(0.056)	
Chronic * ADL Change				0.039	
				(0.041)	
Accid * ADL Change				0.068	
				(0.068)	
Decrease in Age75 Survival Prob					0.001
(change<-.20)					(0.012)
Past Age 75 Surv Prob (0-1 Index)					-0.008
					(0.017)
Acute * Survival Change					0.132
					(0.055)
Chronic * Survival Change					-0.010
					(0.038)
Accid * Survival Change					0.085
					(0.083)
R-Squared	0.085	0.085	0.086	0.099	0.084
Number of Obs	9,592	9,592	9,592	9,592	8,188

Note:

(1) Regressions include dummies for age, education, industry/occupation, and year, net worth and liquid assets.

(2) Standard errors are corrected for repeated observations on same individuals.

(3) Specification 5 has fewer observations due to missing subjective mortality data.

Table 5a: Effects of Spouse's Health Shocks on Men's Labor Supply

Variable	Change in Hours				Exit Labor Force			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Spouse Health Variables								
Acute Event	61.7				-0.022			
	(38.8)				(0.015)			
Chronic Illness	29.8				-0.006			
	(33.4)				(0.012)			
Accident	74.5				-0.013			
	(62.5)				(0.023)			
Any Health Shock		54.7	58.0	-34.7		-0.014	-0.018	0.004
		(26.0)	(28.9)	(36.9)		(0.010)	(0.010)	(0.013)
Increase in ADL Dummy			-35.3				-0.002	
(change>=4 activities)			(43.6)				(0.015)	
Past ADL (0-1 Index)			-7.3				0.007	
			(52.5)				(0.023)	
Any * ADL Change			29.1				0.001	
			(76.5)				(0.027)	
Decrease in Age75 Survival Prob				11.7				-0.012
(change<-.20)				(35.1)				(0.013)
Past Age 75 Surv Prob (0-1 Index)				-55.1				0.024
				(44.4)				(0.017)
Any * Survival Change				108.3				-0.024
				(80.5)				(0.029)
R-Squared	0.065	0.062	0.728	0.757	0.115	0.109	0.128	0.106
Number of Observations	10,690	10,690	10,646	6,722	10,690	10,690	10,646	6,722

Note:
(1) All regressions include the same own health shock variables; coefficients are very similar to those on Tables 3a-3b.
(2) Regressions include dummies for age, education, industry/occupation, and year, net worth and liquid assets.
(3) Standard errors are corrected for repeated observations on same individuals.

Table 5b: Effects of Spouse's Health Shocks on Women's Labor Supply

Variable	Change in Hours				Exit Labor Force			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Spouse Health Variables								
Acute Event	-17.1				0.005			
	(32.8)				(0.014)			
Chronic Illness	-40.6				0.022			
	(32.4)				(0.013)			
Accident	87.2				-0.008			
	(45.5)				(0.021)			
Any Health Shock		-10.5	4.6	13.9		0.008	0.000	-0.009
		(23.5)	(25.4)	(35.5)		(0.010)	(0.011)	(0.014)
Increase in ADL Dummy			-27.3				-0.035	
(change>=4 activities)			(43.1)				(0.016)	
Past ADL (0-1 Index)			-21.2				-0.005	
			(58.7)				(0.027)	
Any * ADL Change			-41.2				0.060	
			(70.4)				(0.029)	
Decrease in Age75 Survival Prob				66.7				-0.027
(change<-.20)				(40.1)				(0.015)
Past Age 75 Surv Prob (0-1 Index)				-64.7				0.017
				(42.0)				(0.019)
Any * ADL Change				-100.9				0.058
				(85.4)				(0.033)
R-Squared	0.047	0.044	0.052	0.053	0.099	0.096	0.112	0.100
Number of Observations	8,817	8,817	8,733	4,996	8,817	8,817	8,733	4,996

Note:
(1) All regressions include the same own health shock variables; coefficients are very similar to those on Tables 3a-3b.
(2) Regressions include dummies for age, education, industry/occupation, and year, net worth and liquid assets.
(3) Standard errors are corrected for repeated observations on same individuals.

Table 6: Change in Complementarity of Leisure Index

Variable	Wife's Change in CoL Index	Husband's Change in CoL Index
Spouse Variables		
Any Health Shock	0.101	-0.012
	(0.036)	(0.036)
ADL Change Dummy	-0.080	0.351
	(0.120)	(0.107)
Own Variables		
Any Health Shock	0.096	0.015
	(0.038)	(0.035)
ADL Change Dummy	0.039	0.048
	(0.112)	(0.115)
Past Comp of Leisure Index	-0.419	-0.536
	(0.020)	(0.021)
Test of Equality of Spouse ADL Change Dummy in 2 Models	chi2(1)=7.04	, p=0.008
Mean Value of Dependent Variab	0.028	0.039
R-Squared	0.194	0.259
Number of Observations	1,787	1,787

Note:
(1) Comp of Leisure Index is 1 if respondent says that time spent together with spouse is extremely enjoyable, 2 if very, 3 if somewhat, 4 if not enjoyable.
(2) All variables refer to change in CoL Index, health, etc. between waves 1 & 2. Sample is couples where both spouses were working at wave 1.
(3) Model is estimated via seemingly unrelated regression (SUR).

Table 7: Effects of Health Shocks -- Care-Giving

Variable	Dependent Variable: Men's Labor Supply		Dependent Variable: Women's Labor Supply	
	Hours	Exit	Hours	Exit
	(1)	(2)	(3)	(4)
Spouse Variables				
Any Health Shock	12.9	-0.002	8.1	0.018
	(38.5)	(0.014)	(35.1)	(0.015)
Any * Adult Kids w/in 10 miles	74.7	-0.021	-32.9	-0.016
	(52.1)	(0.019)	(47.8)	(0.020)
Own Variables				
Any Health Shock	-144.5	0.096	-188.3	0.046
	(69.7)	(0.015)	(42.2)	(0.018)
Any * Adult Kids w/in 10 miles	-52.8	-0.023	111.2	0.014
	(54.1)	(0.021)	(56.5)	(0.023)
Family Variables				
Adult kids w/in 10 miles	-14.7	0.018	-17.1	-0.004
(at last wave)	(22.0)	(0.009)	(20.5)	(0.010)
R-Squared	0.062	0.109	0.045	0.0965
Number of Observations	10,960	10,690	8,817	8,817

Note:
(1) Regressions include dummies for age, education, ind/occup, and year, net worth and liquid assets.
(2) Standard errors are corrected for repeated observations on same individuals.

Table 8: Effects of Health Shocks -- Health Insurance

Variable	Dependent Var: Men's Labor Supply		Dependent Var: Women's Labor Supply	
	Change in Hours	Labor Force Exit	Change in Hours	Labor Force Exit
	(1)	(2)	(3)	(4)
Spouse Variables				
Any Health Shock	54.7	-0.020	-2.0	0.007
	(28.0)	(0.010)	(27.4)	(0.012)
Employer HI	-1.8	-0.017	2.4	-0.010
	(28.5)	(0.010)	(24.3)	(0.011)
Retiree HI	-68.5	0.024	-40.4	0.004
	(37.3)	(0.013)	(28.1)	(0.012)
Retiree HI * Any	-11.5	0.032	-39.4	0.008
	(78.3)	(0.029)	(53.7)	(0.023)
Own Variables				
Any Health Shock	-168.3	0.085	-111.2	0.049
	(32.5)	(0.013)	(31.8)	(0.014)
Employer HI	-127.0	-0.042	-38.5	-0.085
	(25.3)	(0.009)	(23.3)	(0.010)
Retiree HI	-97.7	0.059	-95.2	0.051
	(25.6)	(0.009)	(27.1)	(0.011)
Retiree HI * Any	-13.2	-0.008	-45.3	0.017
	(56.0)	(0.022)	(68.3)	(0.028)
R-Squared	0.069	0.113	0.0477	0.104
Number of Observations	10,646	10,646	8,733	8,733

Note:
(1) Regressions include dummies for age, education, industry/occupation, and year, net worth and liquid assets.
(2) Standard errors are corrected for repeated observations on same individuals.

Table 9: Effects of Health Shocks -- Retirement Benefits

Variable	Dependent Variable: Men's Labor Supply		Dependent Variable: Women's Labor Supply	
	Hours	Exit	Hours	Exit
	(1)	(2)	(3)	(4)
Spouse Variables				
Any Health Shock	-84.5	-0.039	-52.9	0.024
	(47.2)	(0.011)	(46.1)	(0.017)
SS-eligible (age 62+)	-22.9	-0.006	-187.4	0.044
	(93.3)	(0.040)	(90.9)	(0.037)
Pension eligible	-27.6	0.010	-34.1	0.029
	(20.9)	(0.009)	(20.0)	(0.010)
Any * SS-eligible	79.1	0.000	18.4	0.001
	(71.0)	(0.027)	(47.2)	(0.020)
Any * Pension-eligible	-66.1	0.062	72.4	-0.034
	(53.2)	(0.020)	(46.5)	(0.019)
DI Applicant	-83.7	0.030	77.2	-0.001
	(90.2)	(0.022)	(89.6)	(0.032)
DI Recipient	213.3	0.016	-296.3	0.034
	(134.8)	(0.050)	(139.3)	(0.047)
Own Variables				
Any Health Shock	65.5	0.050	-51.8	0.015
	(34.0)	(0.016)	(42.5)	(0.016)
SS-eligible (age 62+)	-514.5	0.242	-140.9	0.250
	(170.3)	(0.057)	(131.0)	(0.063)
Pension eligible	-96.0	0.069	-75.5	0.007
	(20.2)	(0.009)	(19.4)	(0.010)
Any * SS-eligible	-22.5	0.028	-6.3	0.125
	(57.5)	(0.022)	(70.7)	(0.072)
Any * Pension-eligible	-40.2	-0.013	-49.3	0.028
	(53.6)	(0.019)	(54.2)	(0.022)
DI Applicant	-950.4	0.542	-1057.5	0.529
	(117.6)	(0.045)	(102.9)	(0.046)
DI Recipient	-420.0	0.190	-115.7	0.151
	(148.1)	(0.052)	(139.2)	(0.064)
R-Squared	0.089	0.174	0.075	0.144
Number of Observations	10,690	10,690	8,817	8,817

Note:

(1) Regressions include dummies for age, education, ind/occup, and year, net worth and liquid assets.

(2) Standard errors are corrected for repeated observations on same individuals.