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Abstract

Our research provides new econometric evidence concerning partial economic risk sharing between a frail elderly parent and an adult child. We estimate a jointly determined limited dependent variables system explaining the parent's entry into a nursing home, the adult child's visits to the parent, and the adult child's labor supplied. The time allocation of adult sons is unaffected by a parent's frail health. Adult daughters who visit a frail elderly parent daily decrease their annual labor supplied by about 1,000 hours annually, largely through labor force non-participation. The implied welfare loss to the daughter from a frail elderly parent in need of frequent visits is about $180,000. Our results run counter to the moral hazard argument against long-term care insurance and clarify the two sides' positions in the policy debate over the degree of generosity of recently proposed tax credits for adult children who help care for sick aged parents.

> "One mother can take care of several children, but several children do not take care of one mother."
>
> Seelig Freund, M.D.

1. Introduction

Economists and policymakers have a common goal of clarifying intergenerational economic linkages. Micro level motivations include better understanding of family economic decision making, the welfare implications of implicit insurance provided by families, developing economies prior to formal social insurance, and women's labor supply. Macroeconomic motivators include a possible need to have intergenerational concerns in models of the economy through overlapping generations and fiscal policy effectiveness issues related to the Lucas critique. The most influential empirical literature on interfamily economic connections focuses on consumption smoothing (Deaton 1997; Gertler and Gruber 1997; and Laitner 1997). Despite recent elegant econometric models intended to detect risk pooling within and between families there are few empirically well-supported examples of economically significant informal risk-sharing arrangements among families in the United States (Altonji, Hayashi, and Kotlikoff 1992; Hayashi, Altonji, and Kotlikoff 1996; Hess and Shin 2000). United States data generally reject complete inter-family risk sharing. Of course, the absence of full insurance does not necessarily mean that there is no risk sharing at between households. Here we provide new econometric evidence of the labor market and welfare consequences of partial economic risk sharing between elderly parents and their adult children.

A fundamental difficulty in empirical research on intergenerational familial links is that theory has outrun data. Economists have little data on actual interfamily transfers of time and money so that the mode research compares a full insurance framework, which implies a zero covariation between consumption and current income, to a more general situation where consumption covaries with current income. Economic data are generally not rich enough to disentangle complex underlying motives such as altruism versus strategic bequests among parents and children (McGarry 2000). Our more basic approach is to examine what a researcher can minimally infer from available micro information about intergenerational economic relationships.

In light of economists' inability to locate full risk sharing with complex models of consumption we take a step back and develop a simple conceptual framework for studying intergenerational risk sharing of an easily identifiable clearly exogenous costly event—a serious decline in an aged parent's health that may require a long-term stay in a nursing home. We treat as jointly determined the parent's nursing home entry, how much the adult son or daughter visits the parent in poor health, and the adult child's labor supply. In our theoretical model nursing home entry can have an income effect on the adult child's labor supply and earnings. The son or daughter may work more hours to enable sharing the financial burden of a nursing home. The child may also visit an aged parent in a nursing home more often than in another residential setting, which affects the adult child's labor supply by reducing time available for labor market activity. Our model allows for joint endogeneity of a parent's nursing home entry, how much an adult child visits his or her parents, and how much the adult child works for pay. When estimated our model reveals patterns of intergenerational economic linkages of general interest to economists and of specific interest to policy makers wrestling with issues of female labor supply and long term care for the elderly population in the United States.

Our data come from a unique supplement to the Panel Study of Income Dynamics (PSID) on frail elderly parents of panel members. Because adult daughters may behave differently from adult sons in sharing risk with elderly parents we stratify our econometric estimates by sex of the adult child. The focus of our research is on identifying the effect of the parent's long-term nursing home stay on the time allocation of adult sons versus adult daughters.

We find the following results of note for adult children with frail elderly parents. Sons labor supply is unaffected by the consequences of a parent in poor health. In contrast, daughters via reduced labor force participation reduce their labor supplied by an average of 1,000 hours annually with frequent visits to a frail elderly parent. In current dollars the implied welfare loss that a daughter experiences from an elderly parent in bad health is substantial, about $180,000. Our results have implications for the moral hazard argument against long-term care insurance and clarify the positions of the two sides in the debate over recently proposed tax credits for adult children who care for sick aged parents.

2. Theoretical Background

At the center of our conceptual model is the labor supply of the adult child because it is where there is the least research on the intergenerational consequences of poor parental health. It is also the place in our model where the data reveal the welfare cost of a frail elderly parent to the adult son or daughter. A related literature examines the cost of children (Blundell, Preston, and Walker 1994; Deaton 1997). A conceptual problem with the cost of children literature is that it takes a likely choice variable, an additional child, and assumes it is a bad from the parents' perspective. Here we study a clearly exogenous welfare-reducing event that is a serious decline in the health of ones parent.

We begin with the maintained hypothesis that the adult child cares sufficiently about the parent's well-being so that the child has essentially a pre-commitment to share the extra time and money costs of a parent whose health declines. The son or daughter is assumed to display gratitude for the parent's nurturing when young and feels obligated to repay the parent whose health is declining at the end of life. We view the underlying gratitude motive as a basic assumption that in turn produces testable behavioral implications of interest to economists and policymakers.

Applying the Canonical Labor Supply Model

For clarity and a desire for a model acknowledging the boundaries of our data we frame our discussion using the simplest applicable economic theory. The canonical model of labor supply (h) is summarized algebraically by

$$h = h(T, w, y \mid \alpha), \tag{1}$$

where T is total allocable time, w is the wage, y is nonwage income, and α is the vector of utility function parameters that give form to labor supply. *Ex ante*, one expects $h_T > 0$ and $h_y < 0$.

An adult child's desire to aid a parent in poor health means that an exogenous illness affects the child's labor supply through two components of full income, $wT + y$. Visits to help care for and comfort a parent lower allocable time, T, which reduces the child's h. The child may also help with uninsured medical expenses, which creates an exogenous reduction in y that lowers the child's own consumption and raises the amount the adult child will want to work to offset the lost income. If v is time spent visiting the parent, then $dv = -dT$, and if n is expenditures on the parent's health care, then $dn = -dy$. The two effects of the help that the son or daughter gives the parent are jointly offsetting on the adult child's labor supply as described by the total differential

$$dh = h_T(-dT) + h_y(-dy) = h_v dv + h_n dn. \tag{2}$$

Our econometric model is designed to separate the negative partial effect of visits to an unexpectedly sick parent on labor supply (h_v) from the positive partial effect of monetary transfers to a sick parent on labor supply that are economically equivalent to a reduction in the son's or daughter's nonlabor income (h_n).[1]

Intergenerational Welfare Implications of A Parental Health Decline

Estimates of the labor supply income effect, h_y, can be used with estimates of the labor supply parental nursing home entry effect, h_n, to infer the welfare effect on the adult child from having a parent in such bad health that a nursing home entry occurs. Deaton (1997) argues that Rothbarth's method strikes the optimal balance between theoretical foundation and empirical tractability in calculating welfare loss.

Ceteris paribus, the welfare effects of nursing home entry can be seen by considering the differential equation

$$dh = h_n dn + h_y dy = 0 . \tag{3}$$

The implied lump-sum payment that would exactly compensate the adult child for the economic burden of a parent in a nursing home is then

$$dy / dn = -h_n / h_y . \tag{4}$$

Similarly, the implied lump-sum payment that would exactly compensate the adult child for the time burden of a parent in a nursing home is

$$dy / dv = -h_v / h_y . \tag{5}$$

Estimating the child's welfare loss through the parameters of labor supply using the Rothbarth method described in (4) and (5) is depicted in Figure 1.

We now develop the econometric model that stochastically represents the canonical labor supply model extended to include intergenerational economic linkages as described by equations (1) through (5). Evidence consistent with intergenerational risk sharing here would include an effect of a parent's bad health on either the adult child's labor supply or visits to the parent.

3. Econometric Framework

As noted, we want to estimate the effect of informal caregiving (visits by children to elderly parents) and parents' living arrangements (nursing home versus living independently) on the labor supply of adult sons versus daughters. A labor supply regression including time spent visiting a parent as a regressor that is estimated in isolation may produce biased coefficients because adult children who care greatly about their parents' well-being (an unobserved attribute) may also be inclined to work relatively fewer hours and visit a parent more to provide relatively more hours of informal care. Because all can be affected by stochastic unobserved and potentially correlated factors we permit both visits to the parent and the parent's nursing home entry to be econometrically endogenous with respect to the labor supply of adult children.

In addition to being simultaneous, the outcome variables of interest are not continuous. Labor supply is left-censored at zero and visits to a parent and nursing home entry by a parent are observed as indicator variables in our data. We now discuss how we specify the joint latent distribution of each outcome variable underlying a simultaneous three equation limited dependent variables system.

Two-Stage Semiparametric Instrumental Variables Estimation

The model that produces our estimates corresponding to equations (1) through (5) is:

$$Y_{1i}^{*} = \gamma_1 Y_{2i} + \gamma_2 Y_{3i} + \beta_1' x_{1i} + \varepsilon_{1i}, \qquad (6)$$

where i indexes individuals (i = 1 to N), and Y_1 is the observed annual hours worked by the adult son or daughter during the year of parental frailty. Labor supply is censored according to the rule

$$Y_{1i} = 1(Y_{1i}^{*} > 0)Y_{1i}^{*}, \qquad (7)$$

where 1(.) is the indicator function, which equals unity if the inequality in the parentheses is true and zero otherwise. Y_2 and Y_3 are dummy endogenous variables representing whether the adult child visited the frail elderly parent daily and whether the elderly parent entered a nursing home coincident with frailty.

To avoid sensitivity to parametric assumptions, such as joint normality of the disturbance term ε_1 and the disturbance terms implicit in the equations for Y_2 and Y_3, we specify a two-stage semiparametric instrumental variables framework (Newey 1985).[2] Any consistent estimator could in principle be used to generate the first stage predicted values for the binary endogenous variables. We use semiparametric regression models based on the maximum score estimator (Manski 1975, 1985). In the first stage we estimate

$$\max_{\delta} \sum_{i=1}^{n} Y_{ji}\,\mathrm{sgn}(Z_{ji}\delta_j)/n, \tag{8}$$

where j = 2, 3, representing the two endogenous dummy variables, sgn(.) represents the sign function, which is 1 if the term in parentheses is positive and –1 otherwise, Z is a vector of covariates, and δ is a vector of coefficients to be estimated. The MSCORE estimators has the advantages of avoiding a possibly false error distribution assumption and maximizing the number of correct predictions by design and has the disadvantage of undefined marginal effects for the regressors, which is not a problem for us because we only use our MSCORE results to instrument potentially endogenous regressors in the labor supply function.

Using the estimated reduced form coefficients from (8), we generate predicted values of the binary indicators that are substituted into (6) yielding

$$Y_{1i}^{*} = \gamma_1 \hat{Y}_{2i} + \gamma_2 \hat{Y}_{3i} + \beta_1' x_{1i} + \varepsilon_{1i}. \tag{9}$$

Instead of following Newey's (1985) suggestion of using Powell's (1986) symmetrically trimmed least squares estimator, which depends on the assumption of a symmetric distribution. To estimate equation (9) we opt for the censored least absolute deviation (CLAD) estimator (Powell 1984).[3] The CLAD model minimizes the average absolute deviation between Y_{1i}^* and $\max(0, \gamma_1 \hat{Y}_{2i} + \gamma_2 \hat{Y}_{3i} + \beta_1' x_{1i})$, and makes no assumptions about normality or homoskedasticity. The CLAD model is consistent and asymptotically normal under mild regularity conditions.

Additional Econometric Model Specification Issues

Identification of the model requires that Z_{2i} and Z_{3i} contain at least one exogenous variable not present in x_{1i}. We estimate the model separately for sons and daughters because there may be different labor supply and care giving responses to parental frailty by gender (Stone and Short 1990; Mui 1995). To test the robustness of our semiparametric IV model, we also estimate it by two-stage least squares (2SLS). Although not completely appropriate for the limited dependent variables in our model, its lack of strong distributional assumptions makes 2SLS a useful comparison to our focal IV-CLAD model (Angrist 2001). As another check on how much of a difference avoiding a parametric assumption makes we also present complete results from a three-equation structural model of labor supply, informal care giving, and nursing home entry. The structural comparison model assumes joint-normality of the disturbance terms, and we estimate it using full-information maximum likelihood (FIML).

4. Data and Descriptive Statistics

The mode data set used to study annual household economic behavior is The Panel Study of Income Dynamics (Hill 1992). Occasionally the PSID includes surveys on special topics, such as the 1991 Parent Health Supplement (PHS), which we use with the main PSID family data files for 1979–1991 to determine the effect of care giving and elderly living arrangements on the labor supply of adult sons and daughters.

Using the Parental Health Supplement

The 1991 Parental Health Supplement asked for parental health information from regular PSID respondents who had at least one parent over the age of 70 or who had a parent over 70 that had died after 1980. The PHS contains detailed information on the elderly parent's health status, wealth, living arrangements, long-term care and informal health care use. The survey did not question the elderly directly; their adult sons and daughters were proxy respondents. Surveying the adult children has some advantages because the frail elderly parents can be unable to withstand a lengthy survey, and the adult children can be able to report the details of their parents' circumstances accurately. Even though some of the events of interest happened ten years before the survey date, because the questions are about a memorable event, the frailty or death of a parent, the quality of the PHS data should be relatively good.

We matched PHS records to the PSID Family Waves for the adult children in two years, the year when the parent became frail and the year before the parent became frail, which yielded a sample of 556 elderly parent-child pairs spanning 1979–1991. Frailty in the PHS is the condition when a person can no longer live independently and take care of daily needs without assistance. The adult sons and daughters in the PSID decided if and when their parents met the frailty criterion, in which case they answered questions concerning their frail elderly parents.

In addition to living arrangements the adult children reported the frequency of contact with their parents around the time of frailty. Frequency is reported as daily, weekly, monthly, yearly, less frequently than once a year, or no contact.

Because of our interest in examining the effect of a parent's frailty on the adult child's labor supply, we restrict our sample to prime-age sons and daughters (no older than 60 by 1991), which avoids having to model the adult child's decision to retire from the labor force. Although the PSID is the mode data set for United States longitudinal labor supply studies the elderly parent characteristics supplement covers only the year of the frailty episode. Because we could retrieve the work hours of the adult children in the year prior to the frailty we can get a flavor of the dynamics of the sons' and daughters' responses to parental frailty. Overall, our combined PHS-PSID data set includes the details of 556 frailty incidents along with labor supply information of one adult child in the year the parent became frail and in the year before the parent became frail during 1979–1991.

On the down side, the PHS did not survey respondents whose parents did not become frail, which eliminates a natural control group and makes a researcher compare the intergenerational consequences of varying degrees of parental frailty. The survey also did not ask the extent of any monetary assistance the sons and daughters provided their parents. The number of frail elderly parents limits the size of the PHS, which makes the number of co-resident adult child-elderly parent pairs too few to study in isolation. Although identifying the factors associated with shared living arrangements is a potentially important topic, only about 6 percent of adult children were co-residents, so we dropped them from our data set. Finally, a more complete picture of inter-generational care giving would be possible if the PHS had sampled all the adult children of an elderly person. In spite of the acknowledged defects the Parental Health Supplement to the Panel Study of Income Dynamics is a useful collection of information about the health and living arrangements of the frail elderly in the United States.

Descriptive Statistics

Table 1 contains descriptive statistics for the three endogenous variables. About 93 percent of the sons and 70 percent of the daughters worked during the year of a parent's frailty; the proportions were similar during the year before the frailty. Of persons who worked, sons worked slightly over 2,100 hours annually, and daughters worked roughly 1,600 hours annually, both in the year of frailty and the year before the frailty. The adult children had a relatively high degree of contact with their parents; 72 percent of daughters and 75 percent of sons visited their parents at least once a month and 28 percent of daughters and 23 percent of sons visited their parents daily. About 30 percent of frail elderly parents entered a nursing home at the time of their frailty.

Descriptive statistics for the elderly parents' exogenous characteristics stratified by the adult child's gender appear in Table 2. The descriptive statistics for the frail elderly parents include health status variables at the time of frailty: impairments to activities of daily living (ADL), impairments to instrumental activities of daily living (IDL), whether the person was hospitalized coincident with frailty, number of chronic conditions, and the specific chronic conditions of a broken hip, osteoporosis, stroke, and incontinence.[4] Parents' demographic variables also appearing in Table 2 include gender, education, age, race, number of sons and daughters, net worth, and whether the frail elder owned a home. Home ownership and net worth are for the time just prior to the onset of frailty. The average age at frailty was 78 years old. There are slightly more frail elderly women than frail elderly men in our data, and 75 percent of the frail elders are white. The typical frail elder in our data had four limitations to both ADLs and IADLs plus four chronic conditions. Over one-half the frail elderly in our data had a hospital stay accompanying the onset of frailty. Nearly one-half the frail elderly had a spouse present. To summarize their economic situation, nearly two-thirds of the frail elderly in our data owned a home at the time of frailty; the elders' average net worth was about $80,000 and their median net worth was about $50,000.

The exogenous variables for the adult children are shown in Table 3, stratified by gender. Included are age, education, marital status, lagged non-wage income, number of children in various age categories, and years of full-time work experience. The adult sons in our data had roughly twice the full-time work experience of the adult daughters and slightly higher levels of education. The sons and daughters were in their mid-forties at the time their parents became frail and lived in families with roughly $10,000 of annual income that was not their own labor market earnings. Because the typical sons and daughters are in their mid-forties when their parents became frail, only about 8 percent had young children in the year a parent became frail. Finally, the mode distance to the parent's residence was less than ten miles.[5]

5. Empirical Results

The exogenous identifying variables in the nursing home entry and daily visit equations are the parent's health and wealth as well as how close the adult child lives to the parent.[6] We assume the characteristics of the parents do not have a direct effect on the adult child's labor supply but rather affect the adult child's labor supply through the decision to provide assistance or the parent's decision to enter a nursing home. In the labor supply equation we condition out the wage with $\boldsymbol{Z}$, a vector of determinants of labor market earning power (age, education, marital status and fertility history), which facilitates including labor market non-participants by not having to predict their potential wage. In addition to contributing to identification, the effect of the adult child's lagged nonwage income on labor supplied enters into equations (4) and (5), which imply the adult child's welfare losses.

By way of overview, Tables 4 and 5 present labor supply results for daughters where the parent's nursing home entry and the adult child's visits to the parent are first treated as exogenous for comparison with the focal model where they are permitted to be endogenous econometrically. Tables 4 and 5 also clarify whether allowing for alternatives to joint normality of errors matters to the estimates.[7]

Comparative econometric results for sons reveal no noticeable economic connections among the son's labor supply, how much the son visits the parent, and whether the parent is in a nursing home.[8] Our results conform to the popular belief that daughters bear more of the burden of caring for elderly sick parents and are not inconsistent with prior research that has shown women provide more intensive informal care assistance to elderly parents (Stoller 1990). For example, among persons who in the Health and Retirement Study report spending at least 200 hours helping their parents, the mean time transfers to parents over a 24-month period was 1,008 hours for women and 547 hours for men (Johnson and Lo Sasso 2000). Because of the lack of a connection between adult sons' labor supply and parents' health that we find in what follows we discuss only the equation estimates and associated welfare implications for adult daughters.

Parametric Full-Information Results

Because the coefficients of interest are substantially different in both size and statistical significance, a comparison of the results in Tables 4 and 5 indicates rejection of exogeneity of daily visits to the parent and exogeneity of a parent's nursing home entry. When possible endogeneity is ignored daily parental visits and whether a parent is in a nursing home have no estimated effects on the adult daughter's labor supplied, and when visits and nursing home are allowed to be endogenous within the context of a full-information empirical framework based on joint normality then a significantly positive (income) effect of nursing home entry and a significantly negative (time) effect of daily visits appear.[9] Because the results more strongly suggest endogeneity than not, when discussing the econometric results presented in Table 5.

To facilitate understanding of the labor supply implications we present the marginal effect estimates from the FIML model in the second column of Table 5. Compared to a daughter who visits her parent less frequently, a daughter who visits her parent daily works about 75 percent less, or 858 fewer hours, annually. An adult daughter whose parent enters a nursing home works about 63 percent more, or 713 additional hours, annually.[10] The FIML estimates in

Table 5 indicate that the 8 percent of daughters who visit a parent in a nursing home daily will each work about 145 hours or 13 percent less annually.

For the normality-based model we can also separate the overall marginal labor supply effects of daily visits to and nursing home entry by a frail elderly parent into the two underlying conditional marginal labor supply effects. Compared to daughters who visit their parents less frequently, working daughters who visit daily work 32 percent fewer hours and have approximately double the likelihood of being a labor force non-participant. The conditional positive labor supply effect of having a parent enter a nursing home is 26 percent greater work hours among working women and a 100 percent lower rate of labor force non-participation. For working women the dual time and income effects of having a frail elderly parent are slightly fewer (5 percent less) annual hours of work.

Semi-Parametric Limited Information Results

Unlike OLS if the errors are non-normal in a nonlinear censored regression model based on normality of errors then parameter estimates are inconsistent (Greene 2000: 916). One recently suggested approach to limited-dependent variables systems such as ours begins by noting that, although possibly leading to predicted values that lie outside the theoretically limited ranges of the unit interval or strictly non-negative, two-stage least squares will at least avoid the bias of fitting the wrong stochastic structure (Angrist 2001). Because it is a limited information technique 2SLS will also avoid spreading any specification errors from the two structural equations for the parent's entry into a nursing home entry and the daughter's daily visits to the parent to the estimated daughter's labor supply function. The third column of Table 5 presents the possibly more robust 2SLS labor supply estimates applying the linear reduced form equations for visits and nursing home entry in Appendix B, Table B.1. A comparison of the 2SLS results in Table 5 with the analogous OLS results in Table 4 again suggests that exogeneity of daily visits is incorrect empirically. Compared to the FIML results the less tightly parameterized 2SLS results have an overall estimated effect of daily visits to the parent on the daughter's labor supply that is 15 percent smaller and an overall estimated effect of nursing home entry that is about 50 percent smaller and statistically insignificant.

As noted, a more statistically elegant and theoretically proper way to obviate possible parameter inconsistency due to an empirically incorrect assumption of normal errors is to estimate the daughter's labor supply with an instrumental variables censored least absolute deviations regression (Powell 1984; Newey 1985; Blundell and Powell 2000). Also a limited information technique, our IV-CLAD estimator first produces reduced-form fitted values for the binary potentially endogenous outcomes of nursing home entry and daily visits using the distribution-free maximum score (MSCORE) estimator described earlier (Manski 1985, 1986). The instrumented values from the MSCORE results displayed in Appendix B, Table B.1 then appear as right-hand side regressors in the CLAD regression whose coefficients and bootstrapped standard errors appear in the last column of Table 5. For comparison purposes a CLAD regression that assumes complete right-hand side exogeneity appears in the last column of Table 4.

The pair of CLAD regression results in Tables 4 and 5 are consistent with the other results from FIML and 2SLS in the sense of rejecting exogeneity of daily visits and nursing home entry. The IV-CLAD results are more similar to 2SLS than FIML in that nursing home entry has an insignificant coefficient. However, when estimated by IV-CLAD the effect of daily visits is the largest of the three estimators. According to Table 5, a daughter who visits her frail elderly parent daily works, on average, 1,092 hours less per year than a daughter who visits her parent less frequently than daily. The 60 percent lower labor supply is due largely to reduced labor force participation among daughters who need to visit their frail elderly parents daily.[11]

Crude calculations are that the reduced work hours of daughters who visit their parents daily go one-for-one into additional contact with their frail elderly parents.[12]

Welfare and Policy Implications

Because of their desirable econometric properties of satisfying the concept of a censored regression that is purged of any statistical inconsistency due to an incorrectly specified error distribution when discussing the economic implications of our labor supply results we focus on the IV-CLAD results. The robust IV-CLAD estimates indicate that of the two parental variables that are potentially endogenous influences on the daughter's labor supplied it is not where the parent lives but rather whether the daughter visits daily that matters to her work behavior.

Applying the Rothbarth welfare calculation in (5) using our IV-CLAD estimates of Table 5 yields the result that a daughter with a parent in such poor health that she finds it necessary to visit her frail elderly parent daily suffers a welfare loss in current dollars of approximately $180,000, which is significant at the 0.11 level using a one-tail test.[13] There is a substantial estimated economic burden on the daughter of a parent whose health declines as revealed by her change in labor supply in contrast to a son.

Because they apply to a population largely without long-term care insurance our results are informative concerning the current policy debate involving the elderly and their adult children. One result of interest is that children do not appear to visit frail elderly parents any more (or less) when the parent enters a nursing home for an extended stay (see Appendix A, Table A.4 and Appendix B, Table B.2). The optimality of publicly provided long-term care insurance has been hotly debated. A concern with governmentally provided long-term health insurance is that the elderly may not want it because they prefer care by a loved one (Pauly 1990; Zweifel and Strüwe 1998). Because the degree of care adult daughters personally provide for their parents seems largely to depend on how close the parents live (see Appendix B, Tables B.1

and B.2), and residential proximity to parent is also largely exogenous to parental health, there should be no reluctance to want long-term care insurance on the grounds that nursing home care crowds out higher-quality care by ones own adult children.

The other policy issue of current interest to which our results speak is the consequences of a tax credit for helping with the long-term care of an elderly person. Recent proposals to provide children who devote time or financial resources to the care of an aged parent with a tax credit of $5,000 have been accompanied by two extreme opinions (Pear 1999). The proponents of the credit contend that it is reasonably generous while the potential recipients of the credit express dismay at how little they believe it to be.

The confusion and debate over how generous is the proposed tax credit for sons and daughters who care for sick aged parents stems from confusion over the program's goal: is it to obviate the direct financial consequence of an adult child's decision to withdraw from the labor force to help care for a sick parent or is it to cancel most of the overall burden to the adult child of having a parent's health decline greatly? Our results can help reconcile the two positions because they are consistent with both. In particular, we find that the credit proposed is about 60 percent of the earnings loss daughters exhibit when they must visit their parent daily. In the limited sense of making the immediate opportunity cost financially less burdensome the proposed credit is reasonably generous. Alternatively, our estimated welfare loss to the daughter of a parent in need of daily visits is 36 times that of the credit. The greater implicit loss (over and above the opportunity cost of lost earnings) may come from the stress of having to interact so much with a parent whose health is extremely poor. In the sense of inoculating adult children against the overall losses from an elderly parent falling seriously ill the tax credit is far less generous than other programs to offset the welfare loss from an economic event such as unemployment.

6. Conclusion

We find economically significant labor supply responses by adult daughters to poor parental health necessitating frequent visits. The economic implications are varied. It provides evidence of meaningful intergenerational connections to the labor market. Our results also point to the need to consider help from the children when designing and considering a plan to provide governmentally subsidized long-term care insurance. The behavior we study reveals a major welfare loss on adult daughters from poor parental health, which helps to clarify the positions in the debate over recent proposals for a tax credit for a person who helps to care for a sick aged parent. In the limited sense of making the immediate opportunity cost financially less burdensome the proposed credit is reasonably generous. In the sense of insuring the children against the overall loss from an elderly parent falling seriously ill the typical tax credit is far less generous than existing programs.

More generally, the rise in married women's labor force participation rates threatens to weaken the family's role as primary care giver to the elderly. Although men in our data set appear no less likely than women to provide care for their elderly parents, women are much more likely to experience economically costly consequences of assisting their parents. Thus, women's increased work responsibilities may be incompatible with their traditional care giving responsibilities. Other demographic trends could apply additional pressure on families. For instance, declining mortality rates have increased the number of elderly in the population in recent years. Moreover, despite falling rates of disability among the aged over the past 15 years (Manton, Corder, and Stallard 1993, 1997), the total number of persons in need of personal care assistance continues to rise. At the same time, declining rates of fertility have reduced the number of children that will be available to provide care to their parents in the future.

How families balance caregiving responsibilities for elderly parents with paid employment will have important implications for retirement and long-term care policies. As baby boom women enter midlife and their parents develop disabilities, questions about the availability of long-term care for the frail elderly will become increasingly urgent, particularly if the rise in the labor force participation rate of married women results in a smaller share of women able to provide informal care to their elderly parents in coming years. Fewer adult children available to provide informal care could increase the number of older persons who turn to formal care, such as home health services and nursing home care, which could in turn increase the rate of growth of home care expenditures under Medicare and nursing home expenditures under Medicaid (Buchanan et al. 1991).

Appendix A

Additional Regressions for Men

Appendix Table A.1. Men's Labor Supply Under Exogeneity[a]

		Tobit		
	OLS	Coefficient	Marginal Effect[b]	CLAD
Daily visits	–0.0343 (0.1255)	–0.0477 (0.1312)	–0.0471	0.0738 (0.0729)
Nursing home entry	0.0052 (0.1160)	0.0109 (0.1209)	0.0108	0.0463 (0.0674)
Non-wage income	–0.4571 (0.3263)	–0.4909 (0.3404)	–0.4845	0.0811 (0.1466)
Children age 1–2	–0.0362 (0.1840)	–0.0424 (0.1914)	–0.0418	–0.1481 (0.1069)
Children age 3–5	0.1288 (0.1596)	0.1380 (0.1659)	0.1362	–0.0127 (0.0925)
Children age 6–13	0.0544 (0.0722)	0.0513 (0.0751)	0.0506	–0.0170 (0.0417)
Children age 14–17	0.0952 (0.1115)	0.1158 (0.1160)	0.1143	–0.0152 (0.0630)
Age	–1.8847*** (0.6795)	–2.0403*** (0.7082)	–2.0135	–1.0346*** (0.3765)
Education	0.8370*** (0.3200)	0.9019*** (0.3339)	0.8901	0.4030** (0.1832)
Married	0.0772 (0.2084)	0.0856 (0.2176)	0.0845	0.0720 (0.1176)
Years work experience	0.9710** (0.4186)	1.0199** (0.4358)	1.0065	0.3670 (0.2318)
Time trend	0.0598 (0.7567)	0.1108 (0.7884)	0.1093	–0.0348 (0.4235)
Time squared	0.0959 (0.6030)	0.0309 (0.6287)	0.0305	0.2195 (0.3419)
Non-white	–0.1219 (0.1398)	–0.1208 (0.1458)	–0.1192	–0.1090 (0.0792)
Constant	2.2960*** (0.5382)	2.3269*** (0.5605)	—	2.3138*** (0.2979)

[a]Standard errors in parentheses. Sample size 269. Dependent variable scaled by 1000, non-wage income scaled by 50,000, age scaled by 60, education scaled by 10, experience scaled by 42, time and time squared scaled by 10.

[b]To derive McDonald-Moffitt decomposition, multiply coefficient by 0.9107 to get change in hours conditional on positive hours, and by 0.0762 to get change in the probability of zero hours.

* $0.05 < p \leq 0.10$ ** $0.01 < p \leq 0.05$ *** $p < 0.01$

Appendix Table A.2. Men's Labor Supply Under Endogeneity[a]

	2SLS[b]	FIML[c] Coefficient	FIML[c] Marginal Effect[d]	IV-CLAD[b,e]
Daily visits	0.0600 (0.2035)	0.1183 (0.2572)	0.1164	0.6654 (0.6946)
Nursing home entry	–0.0775 (0.2229)	–0.4276 (0.2832)	–0.4209	0.2743 (0.4376)
Non-wage income	–0.4862 (0.3308)	–0.5927* (0.3087)	–0.5834	0.0935 (0.7414)
Children age 1–2	–0.0335 (0.1846)	–0.0552 (0.2905)	–0.0543	–0.0892 (0.1215)
Children age 3–5	0.1433 (0.1626)	0.1818 (0.2561)	0.1789	0.0427 (0.1033)
Children age 6–13	0.0490 (0.0735)	0.0541 (0.1082)	0.0532	0.0249 (0.0665)
Children age 14–17	0.1025 (0.1124)	0.1211 (0.1593)	0.1192	–0.0093 (0.1102)
Age	–1.8264*** (0.6901)	–1.9034* (1.0634)	–1.8735	–1.3872** (0.6635)
Education	0.9088*** (0.3372)	1.0789** (0.4795)	1.0619	0.4980* (0.2590)
Married	0.0789 (0.2089)	0.1336 (0.2386)	0.1315	0.0009 (0.1587)
Years work experience	0.9685** (0.4198)	1.0642* (0.5514)	1.0475	0.5996 (0.4387)
Time trend	0.0261 (0.7616)	0.0881 (0.9789)	0.0867	–0.3741 (0.6794)
Time squared	0.1319 (0.6080)	0.0809 (0.8090)	0.0796	0.5239 (0.6010)
Non-white	–0.1367 (0.1423)	–0.1867 (0.1965)	–0.1838	–0.1599 (0.1028)
Constant	2.2215*** (0.5500)	2.1524** (0.8610)	—	2.1316*** (0.4806)

[a]Standard errors in parentheses. Sample size is 269. Dependent variable is scaled by 1000, non-wage income scaled by 50,000, age scaled by 60, education scaled by 10, experience scaled by 42, time and time squared scaled by 10.

[b]First stage regression results displayed in Appendix Table A.3.

[c]Other FIML coefficient estimates displayed in Appendix Table A.4.

[d]To derive McDonald-Moffitt decomposition, multiply coefficient by 0.8979 to get change in hours conditional on positive hours, and by 0.0864 to get change in the probability of zero hours.

[e]Standard errors based on 20 bootstrap iterations.

* $0.05 < p \leq 0.10$ ** $0.01 < p \leq 0.05$ *** $p < 0.01$

Appendix Table A.3. Men's First Stage OLS and M-Score Regressions for Nursing Home Entry and Daily Visits[a]

	Nursing Home Entry		Daily Visits	
	OLS	M-Score[b]	OLS	M-Score[b]
Time trend	0.0214 (0.3789)	—	0.2505 (0.3225)	—
Time squared	–0.0609 (0.3044)	—	–0.1948 (0.2591)	—
Nonwhite	–0.0561 (0.0721)	—	0.0455 (0.0614)	—
Net worth	–0.2088* (0.1069)	–0.0900 (0.2096)	0.2373*** (0.0910)	0.2712 (0.2921)
ADLs	–0.1036 (0.1145)	—	0.0227 (0.0974)	–0.1382 (0.2083)
IADLs	0.4289*** (0.1518)	0.3753 (0.2471)	0.0396 (0.1292)	0.3051 (0.3195)
Chronic conditions	–0.1276 (0.1233)	—	0.2666** (0.1050)	0.3056 (0.2622)
Spouse present	–0.0849 (0.0609)	–0.2441 (0.1621)	–0.0107 (0.0519)	—
Own home	–0.0820 (0.0601)	–0.2026 (0.1436)	0.0234 (0.0512)	—
Parents < 1 mile	0.0831 (0.0808)	—	0.7156*** (0.0687)	0.5135*** (0.1425)
Parents 1–10 miles	0.0569 (0.0631)	—	0.2984*** (0.0537)	0.1391 (0.1561)
# Sons	–0.3658** (0.1660)	–0.2438 (0.2551)	0.1247 (0.1413)	—
# Daughters	0.1200 (0.2083)	—	–0.1624 (0.1773)	0.0554 (0.1747)
Age	0.2980* (0.1751)	—	–0.2954 (0.4637)	—
Education	–0.0951 (0.0607)	0.2971 (0.2934)	0.1047 (0.1490)	—
Mom frail	0.4032 (0.5448)	–0.0877 (0.1627)	–0.0433 (0.0517)	0.0999 (0.1413)
Hospitalized	0.2126*** (0.0532)	0.2859* (0.1672)	–0.0035 (0.0453)	—
Hip	0.1211 (0.0738)	0.1800 (0.2254)	–0.0110 (0.0628)	—

Appendix Table A.3. Continued

	Nursing Home Entry		Daily Visits	
	OLS	M-Score[1]	OLS	M-Score[1]
Stroke	0.1308	0.0987	–0.0241	–0.2696
	(0.1311)	(0.2633)	(0.1116)	(0.2526)
Stroke∗ADL	0.2255	—	–0.3045	0.2968
	(0.2246)		(0.1912)	(0.3798)
Stroke∗IADL	–0.0544	—	0.2748	–0.0990
	(0.3037)		(0.2585)	(0.2727)
Incontinence	0.0946	0.0888	–0.0141	—
	(0.0621)	(0.1493)	(0.0528)	
Beds/1000 pop	0.1711	—	–0.2064	–0.2167
	(0.1583)		(0.1348)	(0.2384)
Medicaid rate	–0.2969	–0.5812	0.1167	—
	(0.2807)	(0.5783)	(0.2390)	
Adult Child Characteristics				
Non-wage income	–0.1030	—	0.0341	—
	(0.1613)		(0.1373)	
Children age 1–2	0.0606	—	0.0462	—
	(0.0912)		(0.0777)	
Children age 3–5	0.0648	—	–0.0450	0.0062
	(0.0794)		(0.0676)	(0.1319)
Children age 6–13	–0.0490	–0.1977	–0.0015	—
	(0.0354)	(0.1409)	(0.0301)	
Children age 14–17	0.0379	—	0.0076	—
	(0.0546)		(0.0465)	
Age	0.4294	0.1981	0.2106	—
	(0.3698)	(0.3580)	(0.3148)	
Education	0.2011	—	–0.2874**	–0.2881
	(0.1694)		(0.1442)	(0.2783)
Married	–0.0395	—	0.0251	—
	(0.1034)		(0.0880)	
Years work Experience	–0.0126	—	–0.1437	—
	(0.2101)		(0.1788)	
Constant	–0.5903	–0.2172	0.1745	–0.3523*
	(0.4317)	(0.2465)	(0.3675)	(0.1869)

aStandard errors in parentheses. Sample size 269. Dependent variable scaled by 1000, net worth scaled by 500,000, ADLs, IADLs, chronic conditions, education, number of sons and daughters scaled by 10, parent's age scaled by 97, beds scaled by 81.40, Medicaid rate scaled by 94.15, non-wage income scaled by 50,000, age scaled by 60, education scaled by 10, experience scaled by 42, time and time squared scaled by 10.

[b]Standard errors based on 20 bootstrap iterations.

* $0.05 < p \leq 0.10$ ** $0.01 < p \leq 0.05$ *** $p < 0.01$

Appendix Table A.4. Additional Coefficient Estimates from Men's FIML Regressions[a]

	Nursing Home Entry	Daily Visits
Nursing home entry	—	–0.2266 (0.9852)
Non-white	–0.1985 (0.3151)	0.1806 (0.5312)
Net worth	–0.8041 (0.6537)	0.9168* (0.5037)
ADLs	–0.2462 (0.5238)	–0.2694 (0.6735)
IADLs	1.7966** (0.7215)	0.4605 (0.9594)
Chronic conditions	–0.3519 (0.5769)	1.0976 (0.6693)
Hospitalized	0.5654** (0.2524)	—
Hip	0.3378 (0.2863)	—
Stroke	0.8530 (0.7417)	—
Stroke∗ADL	0.3002 (1.0352)	—
Stroke∗IADL	–0.1914 (1.5950)	—
Incontinence	0.3058 (0.2548)	—
Age	4.1063** (2.0739)	—
Age 75–80	—	–0.4753 (0.4244)
Age 80–85	—	–0.1487 (0.4506)
Age 85+	—	0.0187 (0.6233)
Education	1.3538** (0.6803)	—
Mom frail	–0.3246 (0.2978)	—
Spouse present	–0.2885 (0.2671)	0.0637 (0.3353)
Parent < 1 mile away	—	2.5179*** (0.3922)
Parent 1–10 miles away	—	1.3941*** (0.3575)

Appendix Table A.4. Continued

	Nursing Home Entry	Daily Visits
Own home	–0.3969	0.1718
	(0.2512)	(0.3905)
Number of sons	–1.9250**	0.1265
	(0.8480)	(1.2650)
Number of daughters	0.3236	–0.9458
	(0.8989)	(1.3136)
Beds/1000 population	0.3306	—
	(0.6747)	
Medicaid Rate	–1.2114	—
	(1.0180)	
Time trend	0.1520	1.9100
	(1.6889)	(2.8088)
Time squared	–0.2734	–1.4613
	(1.3670)	(2.0876)
Adult Child Characteristics		
Non-wage income	—	0.0018
		(0.0299)
Children age 1–2	—	0.1848
		(0.6844)
Children age 3–5	—	–0.2891
		(0.6023)
Children age 6–13	—	–0.0495
		(0.2357)
Children age 14–17	—	0.0096
		(0.3200)
Age	—	0.0712
		(1.7800)
Education	—	–1.4617
		(1.1601)
Married	—	0.1303
		(0.4203)
Years work experience	—	–0.3269
		(0.9906)
Constant	–4.4285**	–2.0065
	(1.8376)	(1.8241)
Sigma1	0.9056*** (0.0490)	
Sigma12	0.3626 (0.4369)	
Sigma13	–0.8301 (0.5031)	
Sigma23	0.1663 (1.2792)	

[a]Standard errors in parentheses. Sample size 269. Dependent variable scaled by 1000, net worth scaled by 500,000, ADLs, IADLs, chronic conditions, education, number of sons and daughters scaled by 10, parent's age scaled by 97, beds scaled by 81.40, Medicaid rate scaled by 94.15, non-wage income scaled by 50,000, age scaled by 60, education scaled by 10, experience scaled by 42, time and time squared scaled by 10.

* $0.05 < p \leq 0.10$ ** $0.01 < p \leq 0.05$ *** $p < 0.01$

Appendix B

Additional Regressions for Women

Appendix Table B.1. Women's First Stage OLS and M-Score Regressions for Nursing Home Entry and Daily Visits[a]

	Nursing Home Entry		Daily Visits	
	OLS	M-Score	OLS	M-Score
Time trend	–0.2207 (0.3393)	—	–0.0078 (0.3500)	—
Time squared	0.0585 (0.2794)	—	–0.0483 (0.2882)	—
Non-white	–0.1574** (0.0639)	–0.5069 (0.3263)	0.0983 (0.0659)	–0.1391 (0.2897)
Net worth	0.0513 (0.0787)	—	0.0525 (0.0812)	—
ADLs	0.0536 (0.1122)	—	0.0210 (0.1158)	—
IADLs	0.1717 (0.1393)	–0.0658 (0.2170)	0.0641 (0.1436)	—
Chronic conditions	–0.2815*** (0.0999)	–0.0767 (0.2444)	–0.0438 (0.1030)	—
Education	0.4206*** (0.1609)	0.1499 (0.2120)	0.0667 (0.1660)	—
Mom frail	–0.0353 (0.0571)	—	0.0701 (0.0589)	–0.0131 (0.1570)
Age	1.4682*** (0.4533)	0.0596 (0.2472)	0.1240 (0.4676)	—
Hospitalized	0.0823* (0.0486)	0.3825 (0.3592)	–0.0292 (0.0502)	—
Spouse present	–0.0770 (0.0574)	–0.2386 (0.1984)	–0.0331 (0.0592)	—
Own home	–0.1560*** (0.0542)	–0.3281 (0.2316)	0.0858 (0.0559)	–0.0885 (0.1868)
Parents < 1 mile	0.0911 (0.0726)	0.2522 (0.3700)	0.5574*** (0.0749)	0.7029** (0.3363)
Parents 1–10 miles	0.1110* (0.0574)	–0.0139 (0.2041)	0.2237*** (0.0592)	–0.1467 (0.2658)
Hip	0.0432 (0.0760)	—	–0.0435 (0.0784)	—

Appendix Table B.1. Continued

	Nursing Home Entry		Daily Visits	
	OLS	**M-Score[b]**	**OLS**	**M-Score[b]**
Stroke	0.2126	–0.2028	0.0126	—
	(0.1557)	(0.3430)	(0.1606)	
Stroke∗ADL	0.4187**	0.0028	0.0424	—
	(0.1918)	(0.3029)	(0.1979)	
Stroke∗IADL	–0.6791**	–0.0205	–0.0675	—
	(0.3079)	(0.2019)	(0.3176)	
Incontinence	0.0409	—	–0.0768	–0.0323
	(0.0567)		(0.0585)	(0.1519)
# Sons	0.0453	—	–0.1776	0.1445
	(0.1622)		(0.1673)	(0.2832)
# Daughters	–0.0705	—	0.2654*	0.2953
	(0.1517)		(0.1565)	(0.2569)
Beds/1000 pop	0.6663***	0.4394	–0.1811	0.0521
	(0.1556)	(0.4340)	(0.1605)	(0.3290)
Medicaid rate	0.1353	—	–0.3888	–0.1302
	(0.2745)		(0.2832)	(0.2703)
Adult Child Characteristics				
Non-wage income	0.0424	—	–0.1587	—
	(0.1589)		(0.1639)	
Children age 1–2	–0.0108	—	0.0509	0.2505
	(0.0756)		(0.0780)	(0.2379)
Children age 3–5	–0.0048	—	0.0004	—
	(0.0590)		(0.0609)	
Children age 6–13	–0.0368	—	–0.0024	—
	(0.0347)		(0.0358)	
Children age 14–17	0.0278	—	0.0087	—
	(0.0437)		(0.0451)	
Age	–0.0191	—	–0.2294	–0.2441
	(0.2463)		(0.2540)	(0.2187)
Education	–0.0613	—	–0.0795	–0.1769
	(0.1554)		(0.1603)	(0.2750)
Married	0.0070	—	0.0394	0.2173
	(0.0600)		(0.0619)	(0.2749)
Years work experience	–0.1941	—	–0.0749	—
	(0.1270)		(0.1310)	
Constant	–1.1081***	–0.3122	0.3554	–0.3570
	(0.3644)	(0.2331)	(0.3759)	(0.2376)

[a]Standard errors in parentheses. Sample size 293. Dependent variable scaled by 1000, net worth scaled by 500,000, ADLs, IADLs, chronic conditions, education, number of sons and daughters scaled by 10, parent's age scaled by 97, beds scaled by 81.40, Medicaid rate scaled by 94.15, non-wage income scaled by 50,000, age scaled by 60, education scaled by 10, experience scaled by 42, time and time squared scaled by 10.

[b]Standard errors based on 20 bootstrap iterations.

* $0.05 < p \le 0.10$ ** $0.01 < p \le 0.05$ *** $p < 0.01$

Appendix Table B.2. Additional Coefficient Estimates From Women's FIML Regressions

	Nursing Home Entry	Daily Visits
Nursing home entry	—	0.0656 (0.5964)
Non-white	–0.8326** (0.3558)	0.2906 (0.2996)
Net worth	0.1766 (0.6090)	0.1642 (0.3732)
ADLs	–0.0855 (0.6107)	0.0660 (0.4400)
IADLs	1.0178 (0.8014)	0.2234 (0.5449)
Chronic conditions	–0.8858** (0.4321)	–0.4679 (0.5142)
Hospitalized	0.4457* (0.2532)	—
Hip	0.2363 (0.3109)	—
Stroke	1.2774** (0.6419)	—
Stroke*ADL	1.8629** (0.9268)	—
Stroke*IADL	–3.4937** (1.3541)	—
Incontinence	0.2382 (0.2507)	—
Age	5.5063*** (2.0023)	—
Aged 75 to 80	—	0.1257 (0.2857)
Aged 80 to 85	—	–0.1182 (0.3283)
Aged 85+	—	–0.0505 (0.4208)
Education	1.6334** (0.8208)	—
Mom frail	–0.0254 (0.2540)	—
Spouse present	–0.2340 (0.2786)	–0.2568 (0.2518)
Parent < 1 mile away	—	1.8557*** (0.3417)
Parent 1–10 miles away	—	0.9301*** (0.2548)

Appendix Table B.2. Continued

	Nursing Home Entry	Daily Visits
Own home	–0.6335**	0.5017*
	(0.2484)	(0.2883)
Number of sons	0.3235	–0.3268
	(0.8743)	(0.7262)
Number of daughters	–0.3030	1.0463*
	(0.8912)	(0.6303)
Beds/1000 population	2.6805***	—
	(0.7508)	
Medicaid Rate	0.3154	—
	(1.6600)	
Time trend	–0.5266	–0.0041
	(1.3165)	(0.0043)
Time squared	–0.0806	–0.2037
	(1.1514)	(1.2731)
Adult Child Characteristics		
Non-wage income	—	–2.2469
		(6.0727)
Children aged 1 to 2	—	0.2103
		(0.2842)
Children aged 3 to 5	—	0.0670
		(0.2680)
Children aged 6 to 13	—	–0.0298
		(0.1863)
Children aged 14 to 17	—	0.0682
		(0.2273)
Age	—	–0.4033
		(1.0900)
Education	—	–0.0158
		(0.7900)
Married	—	0.0920
		(0.2788)
Years work experience	—	–0.1679
		(0.5597)
Constant	–6.5746***	–1.3095
	(1.8520)	(1.2125)
sigma1	1.1787*** (0.1060)	
sigma12	0.5893*** (0.1895)	
sigma13	–0.4746** (0.2260)	
sigma23	–0.0167 (0.4175)	

[a]Standard errors in parentheses. Sample size 293. Dependent variable scaled by 1000, net worth scaled by 500,000, ADLs, IADLs, chronic conditions, education, number of sons and daughters scaled by 10, parent's age scaled by 97, beds scaled by 81.40, Medicaid rate scaled by 94.15, non-wage income scaled by 50,000, age scaled by 60, education scaled by 10, experience scaled by 42, time and time squared scaled by 10.

* $0.05 < p \leq 0.10$ ** $0.01 < p \leq 0.05$ *** $p < 0.01$

Endnotes

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1. We are implicitly assuming that the child's marginal rate of substitution between leisure and consumption is independent of parental health.

2. A maximum likelihood approach depends critically on the correctness of the assumed error term distribution. Even modest deviation from the typical parametric stochastic assumptions can lead to serious biases in coefficient estimates (Arabmazar and Schmidt 1982; Paarsch 1984; Moon 1989; Melenberg and Van Soest 1996).

3. Alternatively, Newey (1985) suggests using Powell's (1986) symmetrically trimmed least squares estimator, which depends on the more econometrically restrictive requirement of a symmetric error distribution.

4. Activities of daily living are the number of the following activities that the frail elder needed help doing: eating, getting in or out of bed, getting in or out of chairs, dressing, walking around inside the house, going outside, bathing, and using the washroom. Instrumental activities of daily living are the number of the following activities that the frail elder needed help doing: preparing meals, doing laundry, light housework, shopping, managing money, taking medication, and making phone calls.

5. It is possible that distance to parents is endogenous with respect to care giving and nursing home entry because adult children who are more likely to be care givers relocate or choose not to relocate to be closer to their parents. Past research does not reject exogeneity of residential location with respect to nursing home entry or frequency of visits, so we do not complicate our model with an equation explaining adult sons' and daughters' location choices (Stern 1995).

6. In earlier versions of the model we used an ordered probit to represent a finer distinction among levels of visits. The results indicated no information loss by aggregating visits less frequent than daily into a single category.

7. The estimated equations for nursing home and visits to parent are displayed in Appendix B.

8. For the reader's interest the men's results are tabulated in Appendix A.

9. More formally, exogeneity is rejected using a Hausman type test that compares only the joint difference of the potentially endogenous variables between the Tobit and FIML estimates. A full Hausman test examining the overall difference in coefficients does not reveal enough difference in coefficients between the Tobit and FIML labor supply models to reject exogeneity. We interpret the two Hausman tests' results as indicating economically significant but not statistically significant differences in models. Because many coefficients are statistically insignificant the overall vectors of coefficients do not appear as statistically different even though the coefficients of interest, visits and nursing home, are statistically different when treated as exogenous versus endogenous. For a discussion of economic versus statistical significance see McCloskey and Ziliak (1996).

10. Our three-equation model is a triangular system of equations wherein nursing home entry affects daily care giving and both nursing home entry and daily care giving affect labor supply. The statistically pyramidal structure is usual for simultaneous limited dependent variables models so that they do not violate *ex ante* the limits on jointly probabilistic outcomes. The two dimensions of a frail parent's health care needs are independent in the sense that there is no effect of the parent entering a nursing home on whether the daughter visits her parent daily versus less frequently (see Appendix B, Table B.2).

11. Because parent information exists only in the year of frailty our data do not permit dynamic modeling. However, we can compare the daughter's labor supply in the year the parent became frail to her labor supply in the year before frailty. The noticeable change before and after frailty for the women who visited their parent daily is a 5-percentage point reduction in the labor force participation rate rather than a change in hours worked by continuously working daughters. The observed longitudinal decline in the individual women's labor force attachment is additionally comforting because it supports the conclusions we draw from the cross-section regressions in Table 5.

12. About 28 percent of daughters in our data visit their parent daily, 32 percent visit weekly, 14 percent visit monthly, and 26 percent visit yearly or less frequently. If we apply the averages that daily visits mean 300 days per year for four hours per day, then women who visit daily spend about 1,200 hours per year with their parent. For the non-daily visit groups we apply the following estimates: 50 weekly visits at six hours per visit equals 300 hours annually, 12 monthly visits at eight hours per visit equals 96 hours annually, and zero hours annually for daughters who visit annually or less frequently. Applying the proportions in each category yields an average annual hours visiting parents among daughters who visit less frequently than daily of about 150. The difference in hours spent visiting their frail elderly parents among women who visit daily versus less frequently is then approximately the difference in their annual hours of work.

13. The ratio of the coefficient of daily visits or nursing home to the coefficient of non-wage income must be inflated by 1.75 x $50,000 to account for the scaling of non-wage income and the 75 percent inflation since the 1983 base year.

Table 1. Summary Statistics for Endogenous Variables
Parent Health Supplement – PSID Data

	Sons		Daughters	
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**
Work Hours, Year of Frailty				
Percentage zero	7.25	---	29.93	---
Mean Non-Zero	1,131.54	693.38	1,622.51	675.65
Frequency of Visits to Parents				
Daily	23.79	---	28.67	---
Nursing Home Entry	31.60	---	28.67	---
N	260		203	

Table 2. Elderly Parent Characteristics
Parent Health Supplement Data

	Sons		Daughters	
	Mean	Standard Deviation	Mean	Standard Deviation
Health Status Variables				
Activities of daily living impairments	3.36	3.19	4.06	3.23
Instrumental activities of daily living impairments	4.48	2.35	4.57	2.44
Number of chronic health conditions	3.96	2.23	4.32	2.42
Hospitalization coincident with frailty	0.496	---	0.551	---
Hip-related ailment	0.168	---	0.126	---
Incontinence	0.267	---	0.269	---
Stroke	0.305	---	0.320	---
Stroke * ADLs	1.35	2.69	1.54	2.87
Stroke * IADLs	1.56	2.68	1.79	2.84
Demographic Characteristics				
Female	0.576	---	0.514	---
Education[a]	3.30	1.72	3.08	1.59
Age	78.38	6.29	77.79	6.77
Non-white	0.191	---	0.303	---
Spouse present	0.481	---	0.481	---
Homeowner	0.622	---	0.680	---
Net worth	99,302.06	136,868.51	70,160.20	158,253.04
Number of sons	1.94	1.97	2.10	1.81
Number of daughters	1.63	1.61	2.00	1.95
Year of frailty	1,987.16	2.90	1,987.04	2.89
Policy and State Characteristics				
State Medicaid nursing home real reimbursement rate	48.50	15.51	46.49	13.92
Nursing home beds per 1000 elderly state residents	53.59	15.67	52.31	14.47
N	269		269	

[a]Education level index: 1 = grades k–5, 2 = grades 6–8, 3 = grades 9–11, 4 = high school degree, 5 = high school and nonacademic training, 6 = some college, 7 = bachelors degree, 8 = graduate training.

Table 3. Adult Child Characteristics
Parent Health Supplement Data

	Sons		Daughters	
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**
Married	0.931	---	0.707	---
Lagged non-wage income[a]	2,421.77	8,228.68	1,863.11	7,818.72
Children				
Aged 1 to 2	0.09	0.31	0.09	0.33
Aged 3 to 5	0.14	0.37	0.13	0.43
Aged 6 to 13	0.48	0.81	0.40	0.75
Aged 14 to 17	0.22	0.48	0.30	0.57
Age	46.82	8.46	45.61	8.59
Education[b]	5.34	1.80	4.76	1.71
Years of full-time work experience	22.53	9.51	11.15	8.95
Distance to Parents				
Less than 1 mile	0.141	---	0.157	---
1 to 10 miles	0.264	---	0.304	---
N	269		293	

[a]Rent, interest, and dividends.

[b]Education level index: 1 = grades k–5, 2 = grades 6–8, 3 = grades 9–11, 4 = high school degree, 5 = high school and nonacademic training, 6 = some college, 7 = bachelors degree, 8 = graduate training.

[c]1 = less than a mile, 2 = 1–10 miles, 3 = 11–100 miles, 4 = 100+ but same state, 5 = 100+ and different state.

Table 4. Alternate Specifications for Women's Labor Supply Under Exogeneity[a]

	Tobit			
	Coefficient	Marginal Effect	OLS	CLAD
Daily visits	–0.2192 (0.1494)	–0.1777	–0.1454 (0.1098)	–0.0627 (0.1986)
Nursing home entry	0.2014 (0.1471)	0.1633	0.1607 (0.1094)	0.0774 (0.1993)
Non-wage income	–0.4507 (0.4638)	–0.3654	–0.2061 (0.3215)	0.1668 (0.5158)
Children age 1–2	–0.3263 (0.2093)	–0.2645	–0.1885 (0.1519)	–0.0937 (0.2675)
Children age 3–5	–0.4165** (0.1675)	–0.3377	–0.2711** (0.1190)	–0.3631* (0.2130)
Children age 6–13	–0.1719* (0.0915)	–0.1394	–0.1496** (0.0694)	–0.2372** (0.1071)
Children age 14–17	0.0259 (0.1153)	0.0210	–0.0064 (0.0868)	0.0816 (0.1490)
Age	–3.2461*** (0.5836)	–2.6317	–2.2401*** (0.4130)	–3.0649*** (0.8112)
Education	0.7671* (0.3914)	0.6219	0.4687 (0.2894)	0.6502 (0.5353)
Married	–0.3089* (0.1581)	–0.2504	–0.2365** (0.1197)	–0.2240 (0.2086)
Years work experience	2.1225*** (0.3568)	1.7208	1.5268*** (0.2592)	2.2209*** (0.4906)
Time trend	1.9566** (0.9457)	1.5863	1.2428* (0.6705)	1.7380 (1.2964)
Time squared	–1.0600 (0.7722)	–0.8594	–0.6809 (0.5578)	–0.5957 (1.0414)
Non-white	–0.1008 (0.1600)	–0.0817	–0.0234 (0.1179)	–0.1071 (0.2172)
Constant	2.1081*** (0.6059)	—	2.0178*** (0.4332)	1.9348** (0.8087)

[a]Standard errors are in parentheses. Sample size is 293. Dependent variable scaled by 1000, non-wage income scaled by 50,000, age scaled by 60, education scaled by 10, experience scaled by 42, time and time squared scaled by 10.

* $0.05 < p \leq 0.10$ ** $0.01 < p \leq 0.05$ *** $p < 0.01$

Table 5. Alternate Specifications for Women's Labor Supply Under Endogeneity[a]

	FIML[b]			
	Coefficient	Marginal Effect	2SLS[c]	IV-CLAD[c,d]
Daily visits	–1.0502*** (0.3377)	–0.8580	–0.7256*** (0.2429)	–1.0921** (0.5406)
Nursing home entry	0.8726*** (0.3244)	0.7129	0.3423 (0.2188)	0.3291 (0.5813)
Non-wage income	–0.6605 (0.6173)	–0.5396	–0.3387 (0.3421)	–0.5238 (0.3602)
Children age 1–2	–0.2749 (0.2722)	–0.2246	–0.1634 (0.1602)	0.0835 (0.1976)
Children age 3–5	–0.4239** (0.2088)	–0.3463	–0.2756** (0.1254)	–0.3918** (0.1739)
Children age 6–13	–0.1899 (0.1258)	–0.1551	–0.1445** (0.0732)	–0.2372* (0.1352)
Children age 14–17	0.0297 (0.1350)	0.0243	–0.0227 (0.0916)	0.0905 (0.1885)
Age	–3.6058*** (0.7623)	–2.9458	–2.4015*** (0.4430)	–2.7969*** (0.4516)
Education	0.4868 (0.4820)	0.3977	0.3728 (0.3074)	0.4421 (0.3684)
Married	–0.3461 (0.2204)	–0.2827	–0.2570** (0.1264)	–0.1677 (0.1213)
Years work experience	1.9436*** (0.5035)	1.5878	1.4751*** (0.2766)	1.9630*** (0.3107)
Time trend	2.1455** (1.0517)	1.7528	1.3616* (0.7080)	2.1545** (1.0522)
Time squared	–1.1800 (0.9365)	–0.9640	–0.8168 (0.5894)	–0.9996 (0.9165)
Non-white	0.1695 (0.2173)	0.1385	0.1115 (0.1346)	–0.0151 (0.1608)
Constant	2.5004*** (0.7420)	—	2.2865*** (0.4721)	2.0920*** (0.4402)

[a]Standard errors in parentheses. Sample size 293. Dependent variable scaled by 1000, non-wage income scaled by 50,000, age scaled by 60, education scaled by 10, experience scaled by 42, time and time squared scaled by 10.

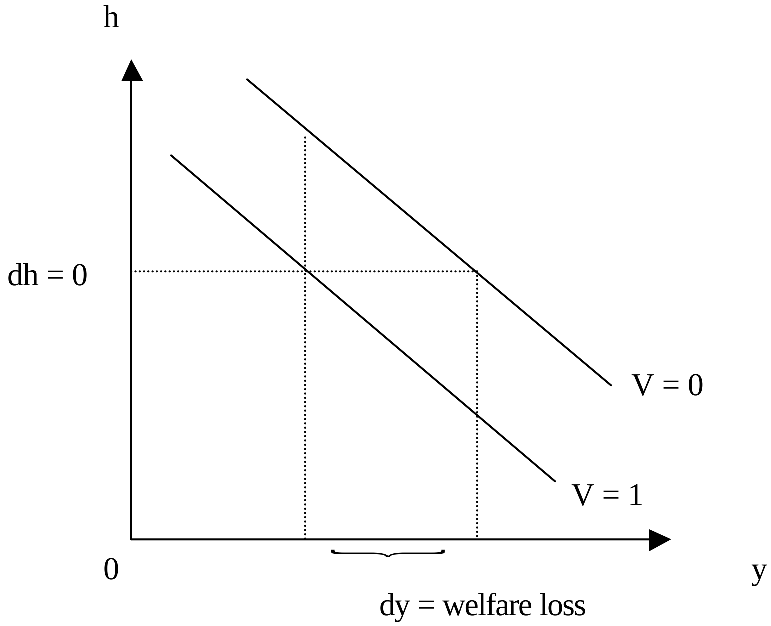
[b] Other FIML coefficient estimates displayed in Appendix Table A.4.

[c] First stage regression results displayed in Appendix Table A.3.

[d] Standard errors based on 20 bootstrap iterations.

* $0.05 < p \leq 0.10$ ** $0.01 < p \leq 0.05$ *** $p < 0.01$

Figure 1. Welfare Loss Calculation



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