

The Trade-Off between Hours of Paid Employment and Time Assistance to Elderly Parents at Midlife

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Abstract

Although the family has traditionally been the primary caregiver for the frail elderly, the rising labor force participation rates of married women may interfere with their historical caregiving responsibilities. This paper explores time transfers to elderly parents and their impact on labor supply for persons at midlife. We estimate simultaneous panel data models of annual hours of paid work and the provision of time assistance to parents for a sample of men and women ages 53 to 65 in the Health and Retirement Study. Our results indicate that time help to parents substantially reduces labor supply for both women and men.

The family has traditionally been an important provider of care to the frail elderly. For example, 57 percent of primary caregivers for impaired persons age 70 and older are either the spouses or adult children of the care recipients, and adult children account for 42 percent of all caregivers for unmarried elderly recipients (McGarry, 1998). However, ongoing demographic and socioeconomic trends threaten to weaken the family's role as primary caregiver to the elderly. Declining mortality rates have greatly increased the number of elderly in the population in recent years. Despite declining 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.¹ 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. In addition, increasing numbers of women at midlife, who have historically been the primary caregivers for the frail elderly (Stone and Kemper, 1990; Dwyer and Coward, 1991), are participating in the labor force (Blau, 1998). Between 1982 and 1989, the proportion of primary caregivers working full-time increased from 15.8 percent to 19.3 percent (Boaz, 1996). Women's increased work responsibilities may be incompatible with their caregiving responsibilities. To assess the extent to which these trends may increase burdens on families, especially as retirement approaches, this paper examines the relationship between labor supply at midlife and time transfers to elderly parents.

Although there has been much recent concern about the growth in the cost of institutionalized long-term care, the costs to the family of caring for the frail elderly in the community may also be quite high, particularly if caregiving responsibilities lead to reduced work hours. In fact, Arno, Levine, and Memmott (1999) placed the value of time devoted to informal caregiving in 1997 at \$196 billion. A number of public policy initiatives have recently been introduced or proposed to help families that provide care to their frail members. The

¹ The prevalence of disability among the elderly in the U.S. declined from 24.9 percent in 1982 to 21.3 percent in 1994 (Manton, Corder, and Stallard, 1997). During the same period, the number of persons ages 65 and older increased from 26.8 million to 33.2 million (U.S. Bureau of the Census, 1999), implying that the number of elderly persons with disabilities increased from 6.7 million in 1982 to 7.1 million in 1994.

Family and Medical Leave Act of 1993 requires employers to provide up to 12 weeks of unpaid leave to workers who need time off to care for family members. The Clinton administration proposed in its FY 2001 budget a \$3,000 tax credit for persons with functional limitations who incur long-term care expenses or for the family members who care for them. In addition, the administration also proposed new programs to provide respite care and other support services for caregivers. The administration also proposed that states be permitted to provide Medicaid services to frail elderly persons who choose to live in the community instead of nursing homes. The Taxpayer Refund and Relief Act of 1999, which was passed by Congress but vetoed by President Clinton, would provide additional personal tax exemptions for taxpayers who live with their frail parents. The Omnibus Long-Term Care Act of 1999 (H.R. 2691), introduced in Congress in August, would also provide Medicare benefits and Social Security credits to workers who leave their jobs to care for frail relatives. Other recent proposals include plans that would subsidize the cost of formal home care.

To evaluate these initiatives, we need better information on the process by which families provide care to the elderly and how they allocate time between the provision of informal care and paid work. In this paper we used panel data from the Health and Retirement Study (HRS) to examine the relationship between labor supply and time transfers to parents. Employing full-information maximum likelihood techniques, we estimated simultaneous equation panel data models of annual hours of paid work and the provision of time assistance to parents for a sample of men and women ages 53 to 65. We found that after accounting for the endogeneity of time assistance, time help to parents substantially reduced labor supply for both women and men.

BACKGROUND

The available evidence on the relationship between caregiving and labor supply is mixed. Whereas some researchers have concluded that hours of paid work reduce hours of time assistance or that hours of time assistance reduce hours of work, others have been unable to find statistically significant relationships between caregiving and labor supply. Most bivariate comparisons of hours of work and time assistance have found that they are negatively related. In

early work, Muurinen (1986) reported that caregivers suffered income losses because their caregiving responsibilities often forced them to withdraw from the labor force or to reduce their work hours. Brody and Schoonover (1986) found that working daughters of disabled elderly widows provided less personal care and help with cooking than nonworking daughters (but that the shortfall was made up by purchased help). More recently, Boaz (1996) reported that primary caregivers who worked full-time in 1989 provided less time assistance than primary caregivers who did not work at all (19.9 hours per week vs. 41.8 hours). Soldo and Hill (1995), examining data from the first wave of the HRS, found that work hours and hours of time help were negatively correlated. Stone and Short (1990) found that some adult children caring for their parents were forced to rearrange their work schedules to accommodate their caregiving responsibilities, but that their caregiving duties did not appear to affect the probability of employment.

Results of more sophisticated multivariate analyses have been less consistent, however, and appear to depend on the ways in which the analytic samples were constructed and on the choices of estimating techniques. For example, one study using data from the National Survey of Families and Households (NSFH) found that the provision of care to parents had no significant effect on the labor supply of men or women when the caregiving indicator entered the hours of work equation directly (Ettner, 1996). However, when instrumenting for care, the study found that providing non-coresidential care to elderly parents reduced the number of hours of paid work for women but not for men, while coresiding with frail elderly parents had large negative but insignificant effects on work hours for both men and women. Using cross-sectional data from the Survey of Income and Program Participation (SIPP), Ettner (1995) found when not instrumenting for caregiving that the provision of more than 10 hours per week of parental assistance and coresidence with a disabled parent both significantly reduced hours of work; when instrumenting for caregiving, only coresidence had a significant effect. Panel data from the National Longitudinal Survey of Mature Women indicate that women who start providing care to disabled family members report significantly fewer hours of paid employment than women who

never provided care (Pavalko and Artis, 1997). Doty, Jackson, and Crown (1998), who used data from the 1989 National Long Term Care Survey (NLTC) and its companion Informal Caregivers Survey, found that paid employment by female primary caregivers significantly reduced the hours of care they provided. However, virtually the entire shortfall was made up by secondary caregivers, including paid helpers, who increased their time assistance when the primary caregiver worked. Total hours of assistance provided by all parties to the care recipient fell with hours of paid work only when the female primary caregiver worked more than 17 hours per week.

Other researchers have concluded that the provision of care to frail parents does not significantly reduce hours of paid work. For example, a study based on the NSFH found that caring for either elderly parents or parents-in-law had a negative but insignificant effect on the work hours of married women (Wolf and Soldo, 1994). Using data from the NLTC, Stern (1995) also found that the effect of hours of paid work on the receipt of informal care from children was insignificant when he employed instrumental variable techniques but significant when he did not instrument. Another study, which treated the level of informal care as an exogenous variable, found that caring for spouses encouraged women to retire from the labor force, but that parental care had no effect on labor force withdrawals (Dentinger and Clarkberg, 1999). Pezzin and Schone (1999) estimated a simultaneous, multiequation, endogenous switching model of informal care, parent-daughter coresidence, and female labor supply based on data from the 1986–1987 matched Hebrew Rehabilitation Center for the Aged (HRCA) Survey of the Elderly in Massachusetts and HRCA-NBER Child Survey. They found that the correlation between informal care and labor force participation was negative but small and concluded that the trade-offs between labor supply and parental caregiving decisions were modest for adult daughters.

Important data limitations affect the conclusions that can be drawn from each of these studies. The NLTC surveyed frail elders and their caregivers, making it an inappropriate dataset to investigate the process that leads certain family members to provide care and others to

provide no care. Selection issues, then, may bias Doty, Jackson, and Crown's finding about the relationship between employment and hours of assistance provided by primary female caregivers, because the behavior of employed persons who act as primary caregivers may not be typical of most workers. The NLTCS also provides little information on the human capital of caregivers, limiting its usefulness for studies of labor supply. The NSFH is also problematic, because the definition of caregiving in the survey is quite vague. Respondents were only asked if they helped "take care" of a parent at some point during the past 12 months, and there is no information about the intensity of care provided nor whether coresident elderly received any care from the respondent. The findings of Pezzin and Schone were based on only 424 parent-daughter pairs, and the capacity to generalize their findings is limited because their data were from a single state. In addition, except for Pavalko and Artis (who did not address the endogeneity of caregiving), none of the studies cited above used longitudinal data, so they could not control for unobserved individual heterogeneity in caregiving and labor supply. Our contribution to the literature is that we jointly model time transfers and labor supply over time using recent longitudinal data on a large, nationally representative sample of persons at midlife with elderly parents.

THEORETICAL MODEL OF LABOR SUPPLY AND CAREGIVING

Our investigation of labor supply and caregiving is based on the standard economic assumption that individuals are rational utility-maximizers (see, e.g., Becker, 1991). We assume that individuals allocate their time between paid employment and the care of elderly parents in a way that maximizes their utility subject to a budget constraint.² In order to focus on the key elements of our study, we assume that individuals value only the consumption of physical goods, leisure, and the well-being of their elderly parents. The well-being of parents, in turn, is assumed to be a function of their health, the amount of assistance they receive from their child, and the amount of assistance they receive from other sources. In this model, all decisions are made by altruistic adult children; parents are treated as passive recipients of their child's care.

² In our discussion of the our model, we are using a broad definition of caregiving, that encompasses both personal care assistance and help with chores and errands.

We assume that the utility function U of the adult child is defined by equation (1):

$$U = u(c) + v(T - h_w - h_k) + x(\gamma, h_k, h_o), \quad (1)$$

where c is the consumption level of the child, T is the total number of hours available to the child, h_w is the number of hours devoted to paid employment by the child, h_k is the number of hours devoted to parental care by the child, $T - h_w - h_k$ is the amount of leisure consumed by the child, γ is the health of the parent, h_o is the number of hours of parental care provided by other sources, and u , v , and x are concave functions with strictly positive first partial derivatives and negative second partial derivatives. The function x signifies the level of utility that children derive from the well-being of their parents. We are assuming, for simplicity, that the child's utility is separable in consumption, leisure, and parental well-being, which implies that leisure is a normal good (so that individuals devote more time to leisure activities as their income rises). Children allocate their time between paid employment, the care of elderly parents, and leisure by maximizing (1) subject to constraints (2) and (3):

$$c \leq wh_w + A \quad (2)$$

and

$$T \geq h_w + h_k, \quad (3)$$

where w is the wage earned by the child and A is the level of nonlabor income for the child. Constraint (2) ensures that consumption does not exceed the financial resources of the child, while constraint (3) ensures that the number of hours devoted to paid work and caregiving does not exceed the total available time.

Under the assumption that (2) is binding and (3) is not binding, so that individuals fully utilize their available resources and enjoy at least some leisure, the model predicts that workers allocate their time so that the marginal rate of substitution of leisure for consumption is equal to the wage rate. The standard labor supply model, in which individuals allocate their time only between paid employment and leisure, leads to the same prediction: Individuals work in the formal labor market up to the point at which the value of an additional hour of paid work (the hourly wage w times the marginal utility of consumption $u'(c)$) equals the value of an additional hour of leisure (the marginal utility of leisure $v'(\cdot)$). However, unlike the standard model, the

expanded model of labor supply and caregiving developed here also predicts that individuals allocate their time so that the marginal utility of leisure is equal to the marginal utility of caregiving ($\partial x/\partial h_k$ or x_2). Because of the assumption of diminishing returns, the equilibrium conditions predict that shocks that increase the marginal utility of caregiving will induce individuals to increase the amount of care they provide and decrease the number of hours of both leisure and paid employment.

In order to derive testable hypotheses from this model, the first-order conditions and the binding constraint (2) are completely differentiated. Some comparative statics from the model are presented in equations (4) – (11) below, where D , the determinant of the bordered Hessian, is less than zero (satisfying a necessary condition for maximization):

$$\frac{\partial h_w}{\partial A} = \frac{1}{|D|} w u''(c) [v''(\cdot) + x_{22}] < 0 \quad (4)$$

$$\frac{\partial h_k}{\partial A} = -\frac{1}{|D|} w u''(c) v''(\cdot) > 0 \quad (5)$$

$$\frac{\partial h_w}{\partial \gamma} = -\frac{1}{|D|} x_{21} v''(\cdot) \quad (6)$$

$$\frac{\partial h_k}{\partial \gamma} = \frac{1}{|D|} x_{21} [v''(\cdot) + w^2 u''(c)] \quad (7)$$

$$\frac{\partial h_w}{\partial h_o} = -\frac{1}{|D|} x_{23} v''(\cdot) \quad (8)$$

$$\frac{\partial h_k}{\partial h_o} = \frac{1}{|D|} x_{23} [v''(\cdot) + w^2 u''(c)] \quad (9)$$

$$\frac{\partial h_w}{\partial T} = -\frac{1}{|D|} v''(\cdot) x_{22} > 0 \quad (10)$$

$$\frac{\partial h_k}{\partial T} = -\frac{1}{|D|} w^2 u''(c) v''(\cdot) > 0 \quad (11)$$

Predicted Effect of Time Transfers on Labor Supply

These derivatives and the first-order conditions of the model lead to a number of testable hypotheses. For example, the model predicts that adult children will reduce their labor supply when they increase the number of hours they spend caring for their parents. The predicted negative relationship between changes in labor supply and changes in caregiving follows from the budget constraint that limits total available time and from the first-order conditions, which stipulate that time is efficiently allocated when the marginal utilities of time devoted to paid labor, caregiving, and leisure are equal. Changes in the family's circumstances that affect the marginal utility of time devoted to any of these activities will affect the allocation of time to all activities. For example, shocks that increase the marginal utility of caregiving will induce

individuals to increase the amount of care they provide and decrease the number of hours of both leisure and paid employment, in order to restore the equilibrium conditions.

Predicted Effect of Nonlabor Income on Time Transfers

The model also implies that as their nonlabor income rises, adult children will reduce their hours of paid work but increase their hours of caregiving. Since the second derivatives of the functions u , v , and x are all negative by assumption and $|D|$ is negative, equation (4) is negative and equation (5) is positive. As nonwage income rises, individuals are able to increase their level of consumption without increasing hours of work, leading to a reduction in the marginal utility of consumption, because of diminishing returns. To maintain the equilibrium condition between the marginal utility of hours of work and the marginal utility of hours of caregiving, the number of hours of work falls and the number of hours of caregiving rises. Equations (4) and (5) indicate that the decrease in hours worked exceeds the increase in caregiving by the absolute value of $(1/|D|)wu''(c)x_{22}$, so that leisure also rises as nonlabor income rises. In other words, the model predicts that rising income leads individuals to increase their consumption of both physical goods and leisure and to devote additional time to improving the well-being of their parents. However, the relatively simple model outlined here, which focuses on the allocation of time, does not consider the role of financial transfers between family members. Rising income may not lead to additional hours of caregiving if adult children elect to transfer additional money to their elderly parents instead of providing additional care.

Predicted Effect of Parental Health on Time Transfers

Under reasonable assumptions, the model predicts that adult children with especially frail parents will devote more time to the care of their elderly parents and less time to paid employment than children whose parents are in better health. The effect of parental health on informal caregiving and labor supply hinges on the sign of the derivative $x_{21} (\partial^2 x / \partial h_k \partial \gamma)$, as indicated by equations (6) and (7). If x_{21} is negative, that is, if parental health and caregiving are substitutes in the parental welfare function so that the deteriorating health of the parent increases the incremental positive effect of caregiving on parental well-being and hence on the child's

utility, then equations (6) and (7) predict that children will spend additional hours caring for their parents and fewer hours working in the labor market as the health of their parents declines. In contrast, if x_{21} is positive, so that parental health and caregiving are complements and additional hours of caregiving are more effective when parents are in good health, then declining parental health will lead to less caregiving and more hours of paid work. We believe that the more plausible assumption is that the incremental effect of personal assistance on parental well-being increases as the health of the parent declines, implying that x_{21} is negative and that children devote more time to caregiving as parental health declines.

Predicted Effect of Adult Siblings and Parental Finances on Time Transfers

Another implication of the model is that, under reasonable assumptions, adult children will devote less time to their elderly parents and more time to paid employment when alternative sources of assistance, such as adult siblings and formal care, are available to the parents. As indicated by equations (8) and (9), the effects of alternative sources of parental care (h_o) on informal caregiving and labor supply depend on the impact of h_o on the incremental effect of caregiving by adult children on parental well-being (x_{23}). When x_{23} is negative, implying that other sources of care substitute for the care provided by adult children, the model predicts that the level of care provided by adult children will fall as other sources of care increase. When x_{23} is positive and other sources of care complement the care provided by children, the level of care from children is predicted to rise as care from other sources increases. Again, it seems more plausible to us that care from children can substitute for other types of personal care assistance, rather than complementing them. Under the assumption of substitutability, the model predicts that adult children with many adult siblings will provide less care to elderly parents (and spend more time at work) than adult children with few or no adult siblings. Because the nature of time transfers may depend upon the gender of the provider, so that assistance from siblings of the same gender may be closer substitutes than assistance from siblings of the opposite gender, the amount of care provided may be more closely related to the number of siblings of the same gender than to the total number of siblings overall. The model also predicts that adult children

will provide less care and work more as the wealth and income of the parents increase, since financial resources may enable parents to purchase formal care assistance.

Predicted Effect of Young Children and Other Time Demands on Time Transfers

Finally, the model predicts that the presence of young children and other time demands will reduce the amount of care adult children provide to their elderly parents. In our framework, increased time demands on adult children enter the model as reductions in the amount of time T available for paid work, leisure, or caregiving. As indicated by equation (11), a decrease in T reduces the number of hours devoted to caregiving. Demands on the time of adult children that may reduce T include childrearing responsibilities, the presence of a spouse in poor health who may require personal care assistance, and frail in-laws who may require assistance. In addition, adult children may have limited available time because they may be in poor health themselves. Thus, the model predicts that the presence of young children, the poor health of a spouse, the poor health of in-laws, and the adult child's own poor health will all decrease the amount of time devoted to the care of elderly parents. The model also predicts that other time demands will decrease labor supply, as indicated by equation (10).

DATA AND MEASURES

To test the hypotheses described above, we examined data from the second and third waves of the HRS. Designed and fielded by the Institute for Social Research at the University of Michigan, the HRS provides rich longitudinal information on labor supply, family structure, intergenerational transfers, health, income, and assets for a large sample of Americans at midlife. Since it follows over time a large sample of individuals, many of whom have elderly parents, it is particularly well suited for the study of labor supply and parental caregiving.

The HRS consists of data collected from personal interviews with a nationally representative sample of noninstitutionalized individuals born between 1931 and 1941 and their spouses. Baseline interviews were completed for 12,654 individuals in 7,702 households in 1992. When married couples were interviewed, only the financially knowledgeable spouse was questioned about income, assets, pensions, and health insurance coverage, and only the spouse

more knowledgeable about family issues was questioned about family structure, social networks, and social support.³ Blacks, Hispanics, and Florida residents were sampled at twice their rate in the general population. Respondents are being reinterviewed every two years. Information was collected from 11,602 respondents at wave 2, conducted in 1994, and from 10,971 respondents at wave 3, conducted in 1996. We restricted our sample to nonproxy age-eligible respondents (ages 53 to 63 in 1994) with at least one living parent, since only persons with living parents are “at risk” of providing care to their parents.⁴ Only 43 percent of HRS respondents had a living parent at wave 2. After eliminating cases with missing data, our sample included 1,747 women and 1,380 men at wave 2 and 1,010 women and 796 men at wave 3.

Labor Supply

At each wave of interviews, HRS respondents were asked whether they were currently working for pay. Respondents who were working were then asked about the number of hours per week they usually worked on their main job and the number of hours per week they usually spent at any other paid work, such as a second job or military reserves. They were also asked the number of weeks they usually work per year (including paid vacations) and the number of weeks of paid vacation they receive. We measured labor supply as total annual work hours, computed by multiplying usual number of hours worked per week by number of weeks worked per year (net of paid vacations), for all jobs.

Time Assistance to Parents

Information was collected from all single respondents and from “family-knowledgeable” spouses among married couples about the amount of care they provided to their parents and, if married, the amount of care their spouses provided to the spouses’ parents. (Married respondents were also asked about care provided by themselves and their spouses to parents-in-law.) In wave 2, respondents were asked whether they or their spouses spent a total of 50 or more hours in the past 12 months helping their parents “with basic personal activities like dressing, eating, and

³ In the baseline interviews, only the wife was questioned about family matters.

⁴ We considered only biological parents, not stepparents. Very few HRS respondents reported having living stepparents, however.

bathing.” Respondents who reported providing care were then asked who was helped (mother, father, both parents, stepparents, etc.), and how many hours of care were provided to each recipient by the respondent and by the spouse. In addition, respondents were asked whether they or their spouses spent a total of 50 or more hours in the past 12 months helping their parents “with other things such as household chores, errands, transportation, etc.”⁵ Respondents who reported providing this type of care were then asked who was helped and how many hours of care were provided to each recipient. Respondents who were unable to estimate the precise number of hours of help were asked whether they provided more than 100 hours of help in the past 12 months. Similar questions were asked in wave 3, except that the initial hours threshold was raised from 50 to 100 hours. Consequently, in wave 3 we cannot identify respondents who provided more than 50 but less than 100 hours of help to their parents.

In our models, we measured time assistance by the provision of at least 100 hours of personal care assistance or 100 hours of help with chores and errands to parents during the past 12 months. We did not use estimates of the precise number of hours of time assistance in our models because response rates were quite low for these questions. We also did not examine the amount of assistance provided to parents-in-law.

Other Respondent Characteristics

The HRS also includes detailed information on a number of respondent characteristics that are likely to be important determinants of labor supply and time transfers to parents. Information was collected on the respondent’s age, race, education, country of birth, current marital status, health, income (broken down by source), own children, siblings, and parents-in-law. We measured education by a series of binary variables, indicating whether the respondent never attended high school, attended high school but did not complete it, completed four years of high school, attended some college but fewer than four years, and completed four or more years of college. We measured health by the respondent’s self-assessment of their current health status

⁵ Questions about help with chores were not asked in the baseline interviews of the HRS, which is why we did not use the first wave of data in our study.

(excellent, very good, good, fair, or poor), which has been shown in many studies to be a reliable indicator of health problems and mortality (Greiner, Snowdon, and Greiner, 1996; Idler, Kasl, and Lemke, 1990). We measured nonwage income as the sum of income from rent, dividends, interest, trust funds, royalties, alimony, and child support, expressed in constant 1993 dollars. Because of concerns about possible endogeneity, we lagged nonwage income from the previous wave.

We also created measures of family responsibilities and resources. We computed the number of own children ages 15 and younger, ages 16 to 22, and ages 22 and younger. We constructed an indicator of spousal poor health, defined as having a spouse who had at least some difficulty performing an activity of daily living.⁶ We also created an indicator of whether the respondent had a parent-in-law who required assistance with basic personal activities. Finally, we measured the number of brothers and sisters for each respondent at each wave.

Parental Characteristics

Available parental characteristics in the HRS that we examined include vital status, age, marital status, home ownership, financial situation, and health.⁷ We measured parental health by two dichotomous variables, indicating whether either parent (if both were alive) needed help with basic personal activities such as dressing, eating, or bathing, and whether either parent could not be left alone for one hour or more. The financial situation of the parent was measured by two dichotomous variables, indicating whether the finances of the parent were better than the respondent's, and whether parental finances were worse than the respondent's. Parental age was measured by the age of the older parent when both were alive. For very few respondents (45

⁶ Activities of daily living include walking across a room, getting in and out of bed, bathing, eating, and dressing without help.

⁷ HRS respondents were also asked about the living arrangements of their parents. Since decisions about nursing home entry and coresidence may be made jointly with decisions about caregiving, living arrangements are clearly endogenous to the caregiving decision. However, the statistical techniques we are using would become intractable if we attempted to estimate jointly caregiving, labor supply, and living arrangements over time. Thus, we did not include measures of living arrangements in our model. Our failure to model living arrangements will probably not jeopardize our findings, since the observed variation in time assistance does not appear to be only a function of living arrangements. For example, in our preliminary bivariate comparisons we found that respondents with institutionalized parents were somewhat more likely, not less likely, to provide personal care assistance than those with parents living in the community.

women and 31 men at wave 2), both parents were alive but not married to each other. In these cases, the variables for home ownership, financial situation, and marital status indicated whether either parent owned a home, had better or worse finances than the respondent, or was married. All parental characteristics were reported by the respondent, who was either the adult child or the child's spouse.

STATISTICAL METHODS

Our empirical investigation of the relationship between labor supply and caregiving is complicated by the presence in the model of endogenous variables, limited dependent variables, and multiple observations on some, but not all, individuals. As described in the conceptual framework, the number of hours devoted to paid employment and informal care provision are mutually endogenous, since both are choice variables for the adult child. Under the assumption of exogeneity, ordinary least squares (OLS) will understate the effect of caregiving on labor supply due to simultaneous equations bias. The degree of understatement of the true impact of caregiving on labor supply is positively related to the ratio of the error variance in the labor supply equation to the error variance in the caregiving equation. Consequently, a simple OLS approach to labor supply that includes informal care on the right hand side of the equation would generally underestimate the true effect of caregiving on labor supply.

In addition to simultaneity bias, estimation is complicated by the presence of limited dependent variables: Labor supply is censored at zero, while informal care is expressed as a binary variable. Estimation procedures that do not correctly account for the underlying latent distribution of each variable may be seriously biased, because in essence they introduce an artificial mass at the censoring point (zero in our case) that does not reflect the underlying propensity to work (Tobin, 1958). Restricting the sample to employed individuals who provide informal care would introduce sample selection bias (Heckman, 1979), because individuals who devote time to paid work and caregiving are likely to differ in unobservable ways from individuals who do not work or provide care.

The innovation of our estimation procedure is our ability to take advantage of the panel nature of the HRS data. Panel data allow us to control for the influence of unobserved idiosyncratic person-level factors that affect both labor supply and informal caregiving, which cannot be controlled in the types of cross-sectional models that have dominated the literature to date. For example, adult children who are especially devoted to their family (an unobserved, time-invariant attribute) might tend to work fewer hours and provide more hours of parental care than children with relatively weak family attachments. Others who are particularly industrious might tend to devote more hours to both caregiving and paid employment than adult children who are less diligent. Because characteristics such as family devotion and diligence cannot be directly observed in our data, the caregiving measure would be correlated with the error term in the labor supply equation and cross-sectional estimation would incorrectly attribute part of the effect of the error term to the informal care variable. As a result, cross-sectional estimates of the relationship between work hours and informal care are likely to be biased, although the direction of the bias is not clear a priori.

Cross-sectional models allow for a relatively straightforward treatment of censored endogenous variables (Newey, 1987; Vella, 1993), and panel data models with simultaneous continuous endogenous variables have been well studied (Krishnakumar, 1992). However, simultaneous panel data models with censored endogenous variables have only been examined in special cases, although they are currently receiving much attention in the econometrics literature (Kyriazidou, 1997; Vella and Verbeek, 1996; Wooldridge, 1995). Our panel data model with censored endogenous variables is estimable with standard full-information maximum likelihood techniques because we have a very short panel, with only two time periods.

We posit the following mixed latent-observed simultaneous panel data model of annual hours of paid work (*Work*) and any informal care provision (*Care*):

$$Work_{it}^* = \gamma_{11} Care_{it} + \beta_1' x_{1it} + \alpha_{1i} + \varepsilon_{1it} \quad (12)$$

$$Care_{it}^* = \beta_2' x_{2it} + \alpha_{2i} + \varepsilon_{2it}, \quad (13)$$

where t indexes the time period and i indexes individuals. Our general model allows for unbalanced panel data for individuals, as represented by the individual-specific maximum number of time periods, T_i . The endogenous variables are censored such that

$$Work_{it} = 1(Work_{it}^* > 0)Work_{it}^* \quad (14)$$

$$Care_{it} = 1(Care_{it}^* > 0) , \quad (15)$$

where $1(\cdot)$ is the indicator function, which equals unity if the condition in parentheses is true and zero otherwise. Thus, any nonpositive values of the latent dependent variables are mapped into zero, corresponding to persons who do not work or do not provide informal care. Positive values of the latent variables are fully observed for work hours and set the informal care indicator variable to unity. The mixed latent-observed nature of the model raises issues of logical consistency. Following Maddala (1983), it can be shown that the triangular inclusion criteria specified in equations (12) and (13) for the endogenous observed right-hand-side variables is logically consistent. Our choice of a mixed latent-observed model is motivated by Blundell and Smith (1994), who argue that in many circumstances models based incorrectly on standard latent structures will overcorrect for simultaneous equations bias.

The disturbance terms can be decomposed into random i.i.d. individual effects, α_{ji} , that are time invariant, and random individual-specific time effects, ϵ_{jit} , for $j = 1, 2$. Following Baltagi (1981) and Cornwell et al. (1992), we allow the time-invariant individual effects to be correlated with one another across equations and individual-specific time effects to be contemporaneously correlated, but we do not allow the time-invariant individual effects to be correlated with the individual-specific time effects. We also rule out serial dependence in the time effects. In our two equation system then, $(\alpha_{1i}, \alpha_{2i})' \sim N(0, \Sigma_{\alpha})$ for all $i = 1$ to N , and $(\epsilon_{1it}, \epsilon_{2it})' \sim N(0, \Sigma_{\epsilon})$ for all $i = 1$ to N and all $t = 1$ to T_i . Thus, the correlation structure for each individual across the two equations over all time periods is represented by the following $2T_i \times 2T_i$ matrix:

$$\Omega_i = \Sigma_{\alpha} \otimes \mathbf{1} \cdot \mathbf{1}' + \Sigma_{\epsilon} \otimes I_{T_i}, \quad (16)$$

where \mathbf{I}_T is the T -dimensional identity matrix, $\mathbf{1}$ is a T -vector of ones, and \otimes is the Kronecker product operator. Given that equation (13) is a binary model, identification requires the imposition of the normalization, $\text{Var}(\alpha_{2i} + \varepsilon_{2it}) = 1$. Given normality of the error terms the contribution to the log likelihood function for person i is

$$\ln L_i(\gamma, \beta, \Sigma_\alpha, \Sigma_\varepsilon | X_i) = -T \ln(2\pi) - \frac{1}{2} \ln |\Omega_i| - \frac{1}{2} (y_i^* - Y_i \gamma - X_i \beta)' \Omega_i^{-1} (y_i^* - Y_i \gamma - X_i \beta), \quad (17)$$

where y_i^* signifies vectors of the endogenous variables in equations (12) and (13), ordered such that $(y_{1i1}^*, \dots, y_{1iT_i}^*, y_{2i1}^*, \dots, y_{2iT_i}^*)$, and Y_i represents the matrix of the relevant censored endogenous regressors. We assume that the γ matrix embodies the restrictions implied by equations (12) and (13), namely that the endogenous informal care variable is included in the work equation and no endogenous variables are included in the informal care equation. The matrix β is comprised of the individual β_j coefficient vectors contained in (12) and (13).

A final complication in our estimation procedure is the need to account for adult children whose parents die between periods (wave 2 and wave 3 of the HRS). We would not want to include in our estimation respondents without living parents who are not “at risk” of providing transfers to their parents. Among respondents with at least one parent alive at wave 2, 33 percent of women and 29 percent of men had no living parents by wave 3. In the case of adult children whose parents die between the two interviews, the covariance matrix in (16) reduces to $\Omega_i = \Sigma_\alpha + \Sigma_\varepsilon$. Random effects models generally allow for the inclusion of cases for which only one period of data are observed, though as a practical matter there must be a sufficient number of multiperiod observations in order to separately identify the terms of Σ_α and Σ_ε (Hsiao, 1986). Given that approximately two-thirds of the adult children had at least one parent alive in both waves 2 and 3, we did not anticipate problems estimating the model.

We estimated the model using full-information maximum likelihood (FIML) techniques. Censoring in the endogenous variables complicates estimation. In our two-equation model the covariance matrix for each individual in equation (14) is at most 4×4 , which implies that in the most computationally demanding case—when the adult child works in neither time period—a

four-dimensional multivariate normal integral must be computed. The FIML estimation was implemented in GAUSS. The model was estimated separately for men and women, because we expected to find strong gender differences in labor supply and caregiving.

The exogenous regressors in both the labor supply and time assistance equations included a number of characteristics of the adult child, including demographics (age, age squared, race, marital status, foreign birth), education, health, lagged nonwage income, the presence of a frail parent, the presence of a frail parent-in-law, and the number of children ages 15 or younger and ages 16 to 22. Education affects the potential wage one can earn in the labor market, in turn influencing hours of work, and may also affect underlying attitudes towards providing parental care (perhaps in part because college-educated children implicitly repay their parents for past tuition costs by providing additional care). As described in our theoretical model, poor health and the presence of a frail spouse or parent-in-law are likely to reduce both the probability that one provides time help to parents and the number of hours of paid work, whereas nonwage income is likely to increase time help but reduce hours of paid work. The presence of young children, who themselves require care, may reduce available time for paid work or for parental care. Tuition expenses may lead to increased hours of paid work for those with children ages 16 to 22 who may be currently attending college or planning to attend in the near future. To achieve convergence of our estimates, we had to combine the children variables in the time assistance equation into a single variable indicating the number of children younger than 22, although we were able to estimate separately the effects of children ages 15 or younger and ages 16 to 22 in the labor supply equation. Both equations included a time dummy to control for differences over time in labor supply and the provision of time assistance.

The time help equation also included a number of regressors that were excluded from the labor supply equation. These regressors consisted of variables intended to reflect the needs of the parent (age and health) and the availability of alternative sources of care for the parent (the number of adult brothers and sisters of the respondent, parental marital status, the financial situation of the parents, and parental home ownership, which is a proxy for parental wealth and

the ability to purchase formal home care). Because the type of time help provided by adult children may be gender specific, we expected that for men an additional brother would reduce help more than an additional sister, and for women an additional sister would reduce help more than an additional brother. An indicator for whether the mother was alive was also included in the time help equation because previous studies have shown that children are more likely to care for their mothers than their fathers (Spitze and Logan, 1989).

RESULTS

Tables 1 and 2 report the percentage of women and men who provided time assistance to their parents in wave 2 (in 1994), by employment status and other respondent and parental characteristics.⁸ Daggers denote statistically significant differences ($p < .05$) between workers and nonworkers with given characteristics in the probability of providing time assistance, as indicated by t-tests. Asterisks indicate whether the probability of providing time assistance differed significantly ($p < .05$) by other personal characteristics for workers and nonworkers combined, as determined by F-tests.

Fully 26 percent of the women in our sample spent at least 100 hours in the past 12 months assisting their parents with personal care activities or with chores or errands. Women whose parents were in poor health were significantly more likely to provide help than those with parents in better health. For example, assistance was provided by 35 percent of women with parents who needed help with basic personal activities and by 32 percent of women with parents who could not be left alone for as long as one hour. However, it is noteworthy that help was not restricted to extremely frail parents. Among women whose parents did not require help with personal care, more than one-fifth spent time helping them. Women with sisters were significantly less likely to provide help than women without sisters. The probability of providing help did not vary significantly by the presence of brothers, however, perhaps because men and women tend to provide different types of help to their parents, so that only same-sex siblings are close substitutes. Never-married women were much more likely to help their parents, with

⁸ These estimates were weighted to reflect the oversampling of blacks, Hispanics, and Florida residents in the HRS.

almost 40 percent of them providing help, but differences in help by marital status were not statistically significant because very few women in our sample never married. There were no significant differences in the incidence of caregiving among women by race, age, or self-reported health status.

Although a larger proportion of women who were not employed provided assistance to their parents than women who were employed, the difference was not large or statistically significant. Fully 60 percent of women ages 53 to 63 with at least one living parent were working for pay at wave 2, and 26 percent of them provided time help to their parents. Among nonworkers, 27 percent of women provided time help to their parents. However, we did find that labor force participation rates were substantially lower among particular groups of women who were more likely to provide care than among other groups who were less likely to provide care, suggesting that trade-offs between work and time assistance may become evident once we control for other factors affecting labor supply and caregiving. For example, only 48 percent of women with parents who could not be left alone worked for pay.

Men were much less likely than women to provide time assistance to their parents, as reported in table 2. Only 15 percent of men helped their parents with basic personal activities or with errands and chores. The proportion helping their parents was significantly higher among men older than age 55, among men who were not married, and among men whose parents needed assistance with basic personal care. In contrast to women, men who worked for pay were significantly less likely to provide help to their parents than men who were not working. Only 14 percent of working men helped their parents, compared with 20 percent of men who were not working. Significant trade-offs between paid employment and time assistance to elderly parents were also evident within certain subgroups of men. For example, nonworkers were significantly more likely than workers to help their parents among white men, men ages 53 to 55, men who reported poor health, men without children under age 16, men with living sisters or brothers, and men whose parents did not need help with basic personal activities.

Table 3 reports the incidence of time assistance to parents at both wave 2 and wave 3 of the HRS, for respondents who were interviewed at both waves. Although only 26 percent of women with a living parent at wave 2 reported providing time help during the 12 months preceding the wave 2 interview, 36 percent of women reported helping at either wave. The percentage of women who helped at either wave was even larger when the sample was restricted to women with at least one living parent at both waves. For women with parents alive at both waves, 40 percent reported helping their parents with basic personal activities or with errands and chores at one or both of the waves, and 17 percent reported providing help at both waves. When parents were alive at both waves, women were more likely to transition from not helping at wave 2 to helping at wave 3 than to change in the opposite direction; only 8 percent of women helped at wave 2 but not at wave 3, whereas 15 percent of women did not help at wave 2 but helped at wave 3. The pattern was reversed when the sample included all women with parents alive at wave 2, regardless of their vital status at wave 3. Because help ceases once parents die, 15 percent of women provided help at wave 2 but not at wave 3, but only 10 percent provided help at wave 3 but not at wave 2. In other words, among all women ages 53 to 63 in 1994 with living parents, women were more likely to help their parents in 1994 than to help them two years later, but among those with surviving parents in 1996, help was more common in 1996 than in 1994.

Although they were less likely to help than women, men exhibited similar patterns of time assistance to elderly parents, as reported in the bottom half of table 3. Among men with living parents at wave 2, 24 percent provided time help at either wave 2 or wave 3, and 6 percent provided help at both waves. Men were more than half again as likely to report helping their parents at either interview than they were to report helping at any given interview.

Estimates from Simultaneous Models of Labor Supply and Time Help

Table 4 reports estimates from our two-period, simultaneous tobit-probit model of annual hours of paid work and the provision of time assistance to parents. Standard errors are reported in parentheses, and marginal effects are reported in brackets. Asterisks denote statistically

significant coefficients. Means and standard deviations for the variables in our model are presented in the appendix table.

Determinants of Time Help

Turning first to the determinants of the provision of time help to parents by adult children, we found that variables reflecting parental needs, such as parental poor health and the lack of alternative sources of social support, were generally strong predictors of assistance. Both men and women whose parents required personal care assistance, for example, were significantly more likely to provide help than those whose parents were in better health. However, controlling for parental need for personal care assistance, having a parent who could not be left alone for one hour did not increase the likelihood of providing time assistance, although it may increase the amount of help that caregivers provide. Middle-aged children were significantly less likely to help when their parents were married, probably because the spouse generally acts as the caregiver when available to provide care. The probability that women would help their elderly parents fell significantly as the number of siblings increased. As in the bivariate comparisons, the negative relationship between the likelihood of providing care and the number of siblings was stronger for sisters than for brothers, perhaps because the type of help that adult children provide to their elderly parents tends to be gender specific, so that for women sisters are better substitutes than brothers. For men, only the number of brothers, not the number of sisters, reduced the probability of helping, consistent with this notion that same-sex siblings are better substitutes than opposite-sex siblings. The impact of brothers on the probability that men provide help to their parents was only marginally significant, however. Both women and men were significantly more likely to provide help when the mother was alive than when only the father was alive, consistent with other studies that children are more likely to care for mothers than fathers (Spitze and Logan, 1989).⁹

⁹ Our models controlled for parental marital status and thus the presence of both parents. As a result, the coefficient on the indicator for a living mother does not reflect the impact of the number of living parents on the probability of helping.

We found little evidence that the financial condition of parents affected the provision of time help from adult children. Women were not less likely to help their parents when their parents owned their homes or when their parents' financial condition was better than their own. Men were actually more likely to provide help when their parents owned their homes, perhaps because men tend to provide help with household maintenance and repairs, which are generally more pressing for homeowners than renters.¹⁰ Men were less likely to provide time help when their parents' financial condition was better than their own, but they were also less likely to help when their parents' finances were worse than their own, which is inconsistent with our theory that children provide care when their parents cannot afford alternative sources of assistance. In sum, these results suggest that formal home care that can be purchased in the marketplace is not an attractive substitute for the more personal care that can be provided by family members. They also suggest that housing wealth may not be easily liquidated for the purchase of personal care assistance.

Competing demands on respondents' time generally did not reduce the likelihood that they provided time assistance to their parents. For women, the number of children ages 22 or younger significantly increased the probability of helping, as did the presence of a husband who needed personal care assistance (relative to having a husband who did not need care). One possible explanation for this counter-intuitive result is that the caregiving demands faced by women with young children and frail husbands may prevent them from participating in the labor market, leaving them with more time to care for their parents. The presence of a frail parent-in-law did not significantly affect the likelihood that women helped their parents. For men, neither the number of children nor the presence of frail parents-in-law or frail wives significantly changed the odds that they provided time assistance to their parents.

A number of demographic factors also influenced the provision of time assistance to elderly parents. The probability of time help fell with age for women at midlife but increased

¹⁰ This finding could also be interpreted as support for the exchange motive of intergenerational transfers, in that men are more likely to help their parents when their parents own homes that could be inherited by the caregivers.

with age for men at midlife. Both women and men who did not complete high school were significantly less likely to help than college graduates, and married men and women were much less likely than those not currently married to care for their parents. Women in fair or poor health were less likely to help their parents, but we found no clear relationship for men between health and the provision of time help. Those born outside the U.S. were substantially less likely to provide time help than native-born Americans, probably because the parents of many foreign-born Americans did not live in the U.S. We found no racial differences in the likelihood of providing care.

Determinants of Hours of Paid Work

The impact of the provision of time help to parents on labor supply is the key result from our study. When jointly estimating the provision of time help and labor supply, we found that help to parents had large and significant effects for both men and women on hours of work. Our estimates indicated that the provision of at least 100 hours of time assistance to parents in the past 12 months, either as help with basic personal activities or as help with chores or errands, reduced annual labor supply for women by 459 hours. The estimated effect was almost identical for men, who reduced paid employment by 462 hours per year when they provided time help to their parents. With the exception of own poor health, time help to parents had substantially larger effects on hours of paid employment than any other variable in our models.

A number of other factors in our models also had similar effects on the number of hours of paid employment at midlife for women and men. Women and (especially) men worked fewer hours as their health declined. For example, we found that men who reported being in poor health worked about 1210 fewer hours than men who reported excellent health, holding other factors constant. After about age 52.4 for women and age 53.6 for men, hours of paid employment fell with age. We also found that black women and men worked significantly fewer hours than whites. Neither the number of children nor the presence of a frail spouse affected work hours for men or women.

Other factors in our models affected the number of hours of paid employment differently for women than for men. Women who did not attend college worked significantly fewer hours than college graduates. For men, however, we did not find any significant educational differences in hours of paid work. Married women worked significantly fewer hours than women who were not married, whereas married men worked more hours than men who were not married. Nonwage income significantly reduced hours of work for women but not men. Contrary to the predictions of our theoretical model that competing time demands would reduce labor supply, we found that the presence of a frail parent-in-law significantly increased paid work hours for women. One possible explanation for this finding is that longer work hours provide women with a socially acceptable reason for not having to care for their frail in-laws.

CONCLUSIONS

The findings from our study suggest that devoting time to the informal care of elderly parents may be incompatible with full-time paid employment at midlife. We found that when women or men ages 53 to 65 spend 100 or more hours per year helping their parents, either with basic personal activities or with errands and chores, they reduce their labor supply by about 460 hours per year. In other words, women who devote an average of two or more hours per week helping their parents work about 43 percent fewer hours than women overall. For men, devoting two or more hours per week to help for parents reduces hours of paid work by about 28 percent. Although additional research is needed to determine whether these reductions in labor supply come about through early retirement or reduced hours of work per week, our results suggest that family responsibilities may be an important obstacle for efforts to reduce Social Security costs by encouraging workers to delay retirement.

Our estimates of the impact of parental care on female labor supply are well within the broad range of estimates from other studies that have examined trade-offs between caregiving and paid employment. For example, several studies have found no significant relationship between the provision of parental care and female labor supply, concluding that women are able to care for their frail parents without substantially reducing their work responsibilities (Stern,

1995; Wolf and Soldo, 1994). Other studies, by contrast, have found quite large trade-offs between the competing demands of paid work and elder care. Using instrumental variable techniques on NSFH data, Ettner (1996) found that providing at least some care for non-coresident frail parents reduces hours of paid work for women by as much as 13 hours per week, or about 650 hours per year. Using SIPP data, Ettner (1995) found that coresiding with a frail parent significantly reduces paid employment by almost 1900 hours per year. She also found in the SIPP that caring for a non-coresident frail parent reduced work hours for women by about 540 hours per year, but the estimated effects of non-coresident care were insignificant. Although our estimates are somewhat smaller than those from the two Ettner studies, our study reaches the same basic conclusion as those studies. Despite numerous differences in our research methods – including the examination of different sources of data, our use of longitudinal data to control for unobserved individual heterogeneity in the caregiving and labor supply decisions, our use of econometric techniques that allowed for correlation in the error terms in the caregiving and labor supply equations, and Ettner’s distinction between coresident and non-coresident care – Ettner and we both conclude that the cost to women of caring for their frail parents is high, with many women forced to curtail sharply their hours of paid employment when they provide time assistance to their elderly parents.

Unlike previous studies, we found that time transfers to elderly parents substantially reduce hours of paid work for men as well as women. Most other studies have considered the effects of parental care for women only, because women assume most of the family caregiving responsibilities. Although we did find that women are indeed about 75 percent more likely than men to spend time helping their parents, a substantial minority of middle-aged men do provide assistance. We found that 15 percent of men ages 53 to 63 with living parents spent 100 or more hours in the previous 12 months helping their parents, and about 26 percent of men with living parents provided that level of assistance at some point during a three-year period. When men at midlife do devote time to their parents, our results indicate that they reduce their labor supply about as much as women do, either by retiring early or by limiting the number of hours they

work. More research is needed to understand better how family responsibilities affect labor supply decisions for men approaching retirement age.

Our estimates provide some support for our theoretical model of time assistance and labor supply, based on the assumption that individuals are rational, utility-maximizing altruists who value the well-being of their elderly parents. We found, for example, that adult children are more likely to help their parents when their parents are in poor health, consistent with the predictions of our model under the assumption that health and caregiving are substitutes in the parental welfare function. We also found evidence that children are more likely to help when their parents lacked alternative sources of social support, such as a spouse or other adult children, as our model predicted. However, the financial condition of parents does not appear to be a strong predictor of the likelihood that children provide help, perhaps because home care purchased in the marketplace is not a close substitute for more personal care from family members. Nonwage income reduces hours of paid employment for women, as predicted, but contrary to our expectations it does not appear to decrease hours of work for men or increase the likelihood of care for women or men. Perhaps adult children offer their parents additional financial assistance, not time assistance, when their nonwage income rises. Competing time demands do not appear to deter adult children from helping their parents, which is somewhat surprising. In short, the provision of care appears to be determined primarily by the needs of the parent, while the ease with which children can fulfill those needs plays only a secondary role.

At present few persons at midlife spend substantial amounts of time helping their elderly parents in any given year. We found that about one in four women and almost one in six men ages 53 to 63 in 1994 with living parents helped their parents during a 12-month period, but only 43 percent of persons in this age range had living parents. In other words, only about 11 percent of women and 6 percent of men at midlife devoted more than 100 hours per year to assisting their parents in 1994. However, for those who do provide informal care the costs are high. The loss of 459 annual work hours for women translates on average into about \$7,800 in lost wages per year in 1994 dollars. Those who cutback their labor supply to care for frail family members also

lose retirement savings because they accumulate fewer credits toward future Social Security and private pension benefits. Others may lose health insurance benefits if they drop out of the labor force before they become eligible for Medicare benefits.

Most of the concerns raised about the high cost of caring for the frail elderly have focused on the costs of formal care. For example, policymakers have voiced alarm that about one-fifth of all Medicaid payments covers nursing home costs for the elderly (Health Care Financing Administration, 1997), and they worry about the impact of these costs on state Medicaid budgets. Observers of Medicare have raised concerns that payments for home health care have increased almost 37 percent per year from 1989 to 1994, more than three times faster than the rest of the Medicare program (Moon, 1996). As highlighted by our results, however, the financial costs incurred by families who provide informal care to the frail elderly are also high. Pressures on families will likely mount in the near future as falling mortality rates continue to increase the number of persons with very old parents and women continue to play more important roles in the labor market.

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Table 1. Time Assistance from Women to their Parents, by Work Status and Other Characteristics^a

	Percentage of sample	Percentage who work	Percentage Who Provide Time Help ^b		
			All	Workers	Nonworkers
All	100.0	60.0	26.0	25.5	26.6
Age					
53 - 55	44.3	69.0	23.8	23.1	25.5
56 - 59	33.4	60.0	27.1	28.1	25.5
60 - 63	22.3	42.0	28.7	28.2	29.1
Race					
Black	9.0	58.9	23.3	21.5	25.8
Hispanic	5.5	48.7	24.4	23.7	25.0
White and other	85.4	60.8	26.4	26.1	26.9
Marital Status					
Currently married	66.7	58.0	24.9	24.9	24.9
Divorced or separated	18.0	68.2	24.8	24.9	24.6
Widowed	11.9	57.9	30.2	28.4	32.6
Never married	3.4	62.3	39.7	32.5	51.6
Education					
Did not finish high school	20.5	41.1	24.1*	25.2	23.3
High school graduate	40.2	59.6	29.6	29.3	30.1
Some college	22.1	69.5	19.8	18.9	22.0
College graduate	17.2	71.2	27.7	26.8	29.8
Health					
Excellent	21.8	69.6	24.0	24.0	24.1
Very good	33.0	67.4	25.6	22.8	31.2
Good	26.5	62.3	28.2	29.9	25.6
Fair	12.5	40.8	26.6	25.2	27.5
Poor	6.2	15.3	24.6	42.1	21.5
Own children under age 16					
Yes	3.3	54.3	18.0	15.7	20.8
No	96.7	60.2	26.3	25.9	26.9
Any living sisters					
Yes	68.4	58.8	22.3*	21.2	24.0
No	31.6	62.6	33.9	34.4	33.1
Any living brothers					
Yes	70.3	58.8	24.6	23.2	26.5
No	29.7	62.8	29.4	30.7	27.2
Parent needs helps with care					
Yes	26.2	51.0	35.3*	33.8	36.9
No	73.8	63.2	22.7	23.2	21.8
Parent cannot be left alone					
Yes	13.7	48.3	31.9*	28.5	35.0
No	86.3	61.8	25.1	25.2	24.9
Parent's financial situation					
Better than respondent	30.1	61.8	22.2*	23.0	20.9
Worse than respondent	38.3	59.8	29.0	27.8	30.8

Notes: a. The sample includes 1747 women from the second wave of the HRS, ages 53-63 in 1994, with at least one living parent. Estimates are weighted to reflect the oversampling of blacks, Hispanics, and Florida residents in the HRS. There are no significant differences ($p < 0.05$) between workers and nonworkers in the probability of providing time help. Significant differences ($p < 0.05$) in the probability of providing time help by other personal characteristics for workers and nonworkers combined are denoted by *.

b. Includes only time assistance of at least 100 hours in the past 12 months.

Table 2. Time Assistance from Men to their Parents, by Work Status and Other Characteristics^a

	Percentage of sample	Percentage who work	Percentage Who Provide Time Help ^b		
			All	Workers	Nonworkers
All	100.0	76.3	15.0	13.6†	19.6
Age					
53 - 55	44.0	81.4	10.8*	9.0†	18.4
56 - 59	35.2	76.0	18.2	16.6	23.3
60 - 63	20.8	66.0	18.6	19.7	16.6
Race					
Black	7.1	56.0	16.3	15.7	17.1
Hispanic	6.4	64.1	13.5	15.0	10.8
White and other	86.5	78.9	15.0	13.4†	21.2
Marital Status					
Currently married	80.9	79.7	12.0*	11.9	12.5
Divorced or separated	12.7	63.6	26.7	21.0	36.8
Widowed	1.8	49.8	18.7	12.7	24.8
Never married	4.5	61.1	33.9	31.4	37.9
Education					
Did not finish high school	19.2	62.5	10.3	8.4	13.5
High school graduate	32.3	74.6	17.1	15.5	21.6
Some college	21.4	80.1	17.5	15.2	26.7
College graduate	27.1	85.1	14.0	13.1	18.9
Health					
Excellent	22.4	88.8	13.7	13.5	15.6
Very good	32.9	86.6	13.5	12.7	18.4
Good	27.2	76.5	17.3	15.3	23.7
Fair	12.1	50.4	15.3	14.6	15.9
Poor	5.5	19.0	18.0	0.0†	22.2
Own children under age 16					
Yes	9.8	83.0	10.9	12.0	5.9
No	90.2	75.6	15.5	13.8†	20.7
Any living sisters					
Yes	50.5	74.6	14.2	11.8†	21.4
No	49.5	78.0	15.8	15.4	17.5
Any living brothers					
Yes	50.5	76.4	13.0	10.9†	20.0
No	49.5	76.2	17.1	16.4	19.3
Parent needs helps with care					
Yes	25.1	71.9	19.7*	19.2	21.0
No	74.9	77.8	13.5	11.9†	19.0
Parent cannot be left alone					
Yes	15.6	68.6	18.0	15.0	24.4
No	84.4	77.7	14.5	13.4	18.4
Parent financial situation					
Better than child	29.0	75.8	13.3	13.1	14.0
Worse than child	43.1	79.5	13.9	13.4	16.0

Notes: a. The sample includes 1380 men, ages 53-63 in 1994, with at least one living parent, from the second wave of the HRS. Estimates are weighted to reflect the oversampling of blacks, Hispanics, and Florida residents in the HRS. Significant differences ($p < 0.05$) between workers and nonworkers in the probability of providing time help are denoted by †, and significant differences in the probability of providing time help by other personal characteristics for workers and nonworkers combined are denoted by *.

b. Includes only time assistance of at least 100 hours in the past 12 months.

Table 3. Percentage Distribution of Women and Men who Provide Time Assistance to Parents at Waves 2 and 3^a

Provided time assistance at Wave 2^b	Provided time assistance at Wave 3^b					
	Respondents with at least one parent alive at Wave 2			Respondents with at least one parent alive at both waves		
	Yes	No	Total	Yes	No	Total
Women						
Yes	11.2	14.9	26.1	16.7	7.8	24.5
No	10.2	63.7	73.9	15.3	60.2	75.5
Total	21.5	78.5	100.0	32.0	68.0	100.0
N			1524			1010
Men						
Yes	6.4	8.7	15.1	8.9	5.8	14.6
No	8.4	76.4	84.9	11.7	73.7	85.4
Total	14.8	85.2	100.0	20.6	79.4	100.0
N			1114			796

Notes:

- a. The sample is restricted to respondents who were interviewed at both waves 2 and 3 of the HRS. Estimates are weighted to reflect the oversampling of blacks, Hispanics, and Florida residents in the HRS.
- b. Includes only time assistance of at least 100 hours in the past 12 months.

Table 4
Two-Period, Simultaneous Tobit-Probit, Full Information Maximum Likelihood Estimates
of Labor Supply and Time Assistance to Parents^a

	<u>Women</u>		<u>Men</u>	
	Any Time Assistance	Annual Hours of Paid Work	Any Time Assistance	Annual Hours of Paid Work
Any time assistance to parents	...	-747.6*** (54.9) [-459.0]	...	-608.9*** (80.4) [-461.7]
Age	-0.038*** (0.008) [-0.012]	828.9*** (205.6) [508.9]	0.028*** (0.011) [0.006]	803.4*** (193.0) [609.1]
Age squared	...	-7.9*** (1.8) [-4.9]	...	-7.5*** (1.7) [-5.7]
Race				
Black	-0.014 (0.069) [-0.004]	-120.2** (61.2) [-73.8]	0.002 (0.093) [0.0004]	-289.6*** (56.3) [-219.6]
Hispanic	0.159 (0.103) [0.051]	-41.5 (95.6) [-25.5]	-0.079 (0.152) [-0.016]	-39.7 (90.6) [-30.1]
[Reference: White or other]	...	...	...	...
Foreign born	-0.467*** (0.102) [-0.147]	-91.2 (86.7) [-56.0]	-0.472*** (0.167) [-0.095]	149.4* (84.9) [113.3]
Currently married	-0.603*** (0.055) [-0.189]	-551.6*** (46.9) [-338.7]	-0.847*** (0.068) [-0.171]	173.9*** (53.1) [131.8]
Education				
Did not attend high school	-0.696*** (0.120) [-0.218]	-694.2*** (97.7) [-426.2]	-0.330** (0.129) [-0.066]	-7.1 (78.0) [-5.4]
Attended high school, but did not graduate	-0.406*** (0.086) [-0.127]	-473.7*** (75.2) [-290.8]	-0.348*** (0.117) [-0.070]	-74.4 (76.3) [-56.4]
High school graduate	-0.047 (0.070) [-0.015]	-246.0*** (60.1) [-151.0]	-0.011 (0.074) [-0.002]	-29.1 (53.1) [-22.1]
Attended fewer than four years of college	-0.207*** (0.078) [-0.065]	-78.5 (65.9) [-48.2]	0.035 (0.083) [0.007]	39.0 (59.0) [29.6]
[Reference: College grad]	...	...	...	...

(Continued)

Table 4 (continued)

	<u>Women</u>		<u>Men</u>	
	Any Time Assistance	Annual Hours of Paid Work	Any Time Assistance	Annual Hours of Paid Work
Health status				
[Reference: Excellent]	...	...	...	...
Very good	0.028 (0.068) [0.009]	-9.0 (57.3) [-5.6]	0.013 (0.071) [0.003]	-64.4 (47.8) [-48.8]
Good	0.068 (0.071) [0.021]	-87.0 (59.0) [-53.4]	0.228*** (0.080) [0.046]	-236.9*** (53.6) [-179.6]
Fair	-0.230*** (0.082) [-0.072]	-710.9*** (73.9) [-436.5]	0.272*** (0.093) [0.055]	-823.6*** (60.6) [-624.4]
Poor	-0.776*** (0.105) [-0.243]	-1562.7*** (109.9) [-959.4]	-0.077 (0.132) [-0.014]	-1596.2*** (81.9) [-1210.2]
Lagged nonwage income^b	0.002 (0.002) [0.001]	-7.9*** (2.0) [-4.9]	-0.0002 (0.002) [-0.00004]	0.7 (0.7) [0.5]
Number of own children				
Ages 15 and younger	...	-21.5 (74.8) [-13.2]	...	12.9 (40.5) [9.8]
Ages 16-22	...	-0.276 (0.424) [-0.169]	...	27.1 (28.6) [20.6]
Ages 22 and younger	0.086** (0.040) [0.027]	...	-0.035 (0.034) [-0.007]	...
Spouse has some difficulty with activities of daily living	0.253** (0.104) [0.079]	111.8 (89.7) [68.6]	-0.052 (0.117) [-0.010]	-20.7 (73.4) [-15.7]
Parent-in-law needs personal care assistance	0.143 (0.099) [0.045]	195.6** (76.6) [120.1]	0.134 (0.088) [0.027]	-48.9 (63.2) [-37.1]
Number of brothers	-0.059*** (0.016) [-0.019]	...	-0.039* (0.023) [-0.008]	...
Number of sisters	-0.112*** (0.015) [-0.035]	...	0.001 (0.021) [0.0001]	...

(Continued)

Table 4 (continued)

	<u>Women</u>		<u>Men</u>	
	Any Time Assistance	Annual Hours of Paid Work	Any Time Assistance	Annual Hours of Paid Work
Parental characteristics				
Age of older parent	0.692* (0.375) [0.217]	...	-0.037 (0.468) [-0.008]	...
Parent needs personal care assistance	0.191*** (0.057) [0.060]	...	0.439*** (0.064) [0.088]	...
Parent cannot be left alone	-0.007 (0.067) [-0.002]	...	-0.034 (0.075) [-0.007]	...
Mother is alive	0.209*** (0.062) [0.065]	...	0.382*** (0.091) [0.077]	...
Parents are married	-0.164*** (0.057) [-0.051]	...	-0.477*** (0.074) [-0.096]	...
Parent owns a home	-0.056 (0.048) [-0.017]	...	0.136** (0.057) [0.028]	...
Finances of parent are better than respondent's	0.028 (0.056) [0.009]	...	-0.150** (0.068) [-0.030]	...
Finances of parent are worse than respondent's	0.038 (0.051) [0.012]	...	-0.126** (0.061) [-0.025]	...
Wave 3 (1996) indicator	0.886*** (0.067) [0.278]	211.0*** (54.1) [129.5]	0.091** (0.045) [0.018]	-84.1** (36.5) [-63.8]
Constant	2.307*** (0.506)	-19913*** (5952)	-1.962*** (0.618)	-19209*** (5567)
Variance component of individual effects for labor supply ($\sigma_{\alpha 1}$)	1.226*** (0.097)		0.143*** (0.037)	
Variance component of individual effects for time transfers ($\sigma_{\alpha 2}$)	0.634*** (0.051)		0.135*** (0.043)	
Covariance of individual effects for labor supply and time transfers ($\sigma_{\alpha 12}$)	0.581*** (0.042)		0.009 (0.025)	
Variance component for time effects ($\sigma_{\epsilon 1}$)	0.601*** (0.077)		0.602*** (0.040)	
Covariance of time effects for labor supply and time transfers ($\sigma_{\epsilon 12}$)	0.088** (0.037)		0.494*** (0.028)	

Notes: a. Standard errors are in parentheses and marginal effects (computed at the means) are in brackets. The sample includes 3757 observations on women and 2176 observations on men from the 1994 and 1996 waves of the HRS. Time assistance to parents is defined as the provision of at least 100 hours of personal care assistance or help with chores or errands in the previous 12 months.

b. Nonwage income is lagged from the previous interview and measured in thousands of constant 1993 dollars.

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

Appendix Table: Means of Variables Included in Models^a

	<u>Women</u>		<u>Men</u>	
	Wave 2	Wave 3	Wave 2	Wave 3
Annual hours of paid work	1107 (1081)	1011 (1056)	1738 (1153)	1621 (1183)
Any time assistance to parents^b	0.256	0.310	0.148	0.187
Age	56.5 (3.1)	58.3 (3.1)	56.6 (3.0)	58.4 (3.0)
Age squared	3198 (355)	3406 (361)	3218 (348)	3418 (349)
Race				
Black	0.159	0.161	0.117	0.119
Hispanic	0.086	0.080	0.075	0.059
White or other	0.754	0.756	0.809	0.822
Foreign born	0.081	0.080	0.083	0.079
Currently married	0.685	0.606	0.846	0.802
Education				
Did not attend high school	0.081	0.074	0.106	0.084
Some high school	0.151	0.146	0.110	0.087
High school graduate	0.394	0.390	0.325	0.334
Some college	0.215	0.218	0.204	0.201
Four or more years of college	0.160	0.171	0.255	0.294
Health				
Excellent	0.199	0.194	0.215	0.224
Very Good	0.314	0.335	0.325	0.349
Good	0.279	0.275	0.273	0.255
Fair	0.139	0.143	0.128	0.136
Poor	0.069	0.053	0.059	0.036
Lagged nonwage income^c	3787 (12408)	3644 (23190)	4469 (20637)	3507 (16925)
Number of own children				
Ages 15 and younger	0.051 (0.309)	0.027 (0.240)	0.148 (0.474)	0.099 (0.371)
Ages 16–22	0.241 (0.542)	0.159 (0.438)	0.403 (0.729)	0.304 (0.609)
Ages 22 and younger	0.292 (0.670)	0.186 (0.543)	0.551 (0.935)	0.403 (0.770)
Spouse has some difficulty with activities of daily living	0.057	0.048	0.054	0.041

(Continued)

Appendix Table (Continued)

	<u>Women</u>		<u>Men</u>	
	Wave 2	Wave 3	Wave 2	Wave 3
Parent-in-law needs personal care assistance	0.071	0.058	0.094	0.074
Number of brothers	1.426 (1.433)	1.395 (1.388)	0.980 (1.350)	1.021 (1.407)
Number of sisters	1.566 (1.648)	1.544 (1.597)	1.040 (1.470)	1.021 (1.392)
Parental characteristics				
Age of older parent	82.1 (5.6)	83.2 (5.4)	82.0 (5.7)	83.3 (5.4)
Parent needs personal care assistance	0.267	0.269	0.256	0.270
Parent cannot be left alone	0.143	0.150	0.155	0.158
Mother is alive	0.871	0.884	0.871	0.853
Parents are married	0.231	0.208	0.258	0.221
Parent owns a home	0.611	0.592	0.638	0.657
Finances of parent are better than respondent's	0.291	0.302	0.287	0.279
Finances of parent are worse than respondent's	0.375	0.410	0.425	0.447
Number of observations	1747	1010	1380	796

Notes:

- a. Standard deviations are in parentheses.
- b. Time assistance to parents is defined as the provision of at least 100 hours of personal care assistance or help with chores or errands in the previous 12 months.
- c. Nonwage income is lagged from the previous interview and measured in thousands of constant 1993 dollars.