

IZA DP No. 5192

**The Wage Elasticity of Informal Care Supply:  
Evidence from the Health and Retirement Study**

Olena Nizalova

September 2010

# **The Wage Elasticity of Informal Care Supply: Evidence from the Health and Retirement Study**

**Olena Nizalova**

*Kyiv Economics Institute,  
Kyiv School of Economics and IZA*

Discussion Paper No. 5192  
September 2010

IZA

P.O. Box 7240  
53072 Bonn  
Germany

Phone: +49-228-3894-0  
Fax: +49-228-3894-180  
E-mail: [iza@iza.org](mailto:iza@iza.org)

Any opinions expressed here are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but the institute itself takes no institutional policy positions.

The Institute for the Study of Labor (IZA) in Bonn is a local and virtual international research center and a place of communication between science, politics and business. IZA is an independent nonprofit organization supported by Deutsche Post Foundation. The center is associated with the University of Bonn and offers a stimulating research environment through its international network, workshops and conferences, data service, project support, research visits and doctoral program. IZA engages in (i) original and internationally competitive research in all fields of labor economics, (ii) development of policy concepts, and (iii) dissemination of research results and concepts to the interested public.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

## ABSTRACT

### **The Wage Elasticity of Informal Care Supply: Evidence from the Health and Retirement Study\***

This paper focuses on the relationship between wages and supply of informal care to elderly parents. Unlike most of the previous research estimating wage elasticities of informal care supply, this study employs instrumental variable technique to account for the fact that the wage rate is likely to be correlated with omitted variables. Based on the data from the 1998 wave of the Health and Retirement Study, the results show that the wage elasticity of informal care supply is negative and larger in magnitude than has been found previously. The lower bound of this elasticity is estimated to be -1.8 for males and -3.6 for females. Additional findings suggest that the wage elasticity of informal care supply differs by the type of care provided to elderly parents, and that it is larger in magnitude among individuals with siblings and those with independently living parents. The analysis also indicates that the reductions in the informal care constitute about 18% of the labor supply response for men and about 56% of the labor supply response for women, which are not compensated by monetary transfers.

JEL Classification: J22, J18, J14

Keywords: wage elasticity, informal care supply, labor supply, elderly care,  
family obligations

Corresponding author:

Olena Nizalova  
Kyiv School of Economics  
13 Yakira Str, Suite 320  
Kyiv, 04119  
Ukraine  
E-mail: [nizalova@eerc.kiev.ua](mailto:nizalova@eerc.kiev.ua)

---

\* The author gratefully acknowledges Steven Haider, Jeff Biddle, John Strauss, and John Goddeeris for their helpful comments throughout the process of working on that project, and important comments from the anonymous referees and Christian Dustmann, the Editor of the Journal of Population Economics. The author is also greatly indebted to Michael Nolte from the ISR Data Enclave for making possible the revision of this paper.

# 1 Introduction

For the past two decades the policy debate on issues related to the aging population has been growing at unprecedented rates throughout the world. On the one hand, policy measures suggested in the debate include removal of the disincentives for labor force participation for near elderly (CBO 2004, U.S. DHHS 1997, Apfel 2004). This would effectively raise the wage rate faced by the targeted group, as in the case of the elimination of the Social Security earnings test for those older than 65 in the United States (Friedberg 2000). On the other hand, the role of informal caregiving is emphasized as a means to “keep many individuals at home who would otherwise require expensive institutional care” (U.S. DHHS 1997, p.6). Policies targeting these two objectives may turn out to conflict with each other: higher wages may decrease hours devoted to informal care for elderly parents, while policies encouraging informal care may lead to fewer working hours. Research on the effects of the Social Security earnings test mostly focuses on labor supply and claiming behavior of the affected group (Haider and Loughran 2005; Baker and Benjamin 1999; Burtless and Moffitt 1984; Friedberg 2000; Gruber and Orszag 1999) with little attention paid to the potential interaction between incentives for paid employment and caregiving choices. This interaction may have adverse implications for the well-being of the oldest old, given that the prevalence of caregiving is highest among individuals in their late mid-life.<sup>1</sup>

Central to the analysis of this interaction is the concept of the wage elasticity. The labor supply literature suggests a positive wage elasticity of labor supply (smaller for males, larger for females). Therefore, if the wage elasticity of informal care supply is close to zero (as has been found in earlier studies), higher wages would lead to more labor supplied with negligible effects on the provision of informal care. In this case one might hope that benefits from increased labor supply will not be offset along other dimensions. If, on the contrary, the wage elasticity of informal care supply is relatively large and negative, one should be more cautious when evaluating the effects of fiscal policies on labor supply among individuals in their late mid-life. A substantial negative wage elasticity of informal care supply would mean that along with increasing labor supply near elderly would cut back on the hours of informal care they provide to their elderly parents. This may potentially lead to more people turning to the government in their quest for help with covering formal long-term care costs.

Previous studies that have examined the effect of wages on transfers to elderly parents have emphasized the substitution between time and monetary modes of informal care (Sloan et al. 2002; Zissimopoulos 2001; Ioannides and Kan 1999; Sloan et al. 1997; Couch et

---

<sup>1</sup>McGarry (2003) cites that according to the Commonwealth Fund’s (1999) report, the fraction of women providing care is highest among the 45-64 age group [near elderly]: 13 percent compared to 10 percent for women of 30-44 years old and 7 percent of women 65 years old or older.

al. 1999). The estimated effect of wages on informal care hours is negative (as theory predicts), but very small in magnitude and usually not significant statistically. At the same time the estimated wage effect on gross money transfers to elderly parents is positive and quite significant both statistically and economically. However, these studies have been limited in their ability to address the issue of possible bias in the estimates of the wage elasticities due to omitted variables concerns. For example, failure to properly control for productivity differences or personality traits such as responsibility and respect to seniors may lead to an upward bias in the estimates of the wage elasticity of informal care supply: more productive/responsible people would be supplying more informal care and would also have higher wages in the labor market.

The goal of this paper is to study the wage elasticity of informal care supply, directly addressing the issues of omitted variables in the time allocation and monetary transfer equations. Informal care supply is defined as annual time spent helping elderly parents with basic personal needs as well as household chores, errands, and transportation. This paper uses a unique opportunity of access to the restricted geographic identifiers for the Health and Retirement Study respondents to instrument hourly wages with the industry structure in the state of residence allowing for differential impact by education.<sup>2</sup>

The main finding of the paper suggests that the wage elasticity of informal care supply is negative and substantially larger in magnitude than previously estimated. Due to the weakness of the instruments there is still a significant remaining bias in the estimates of the wage elasticity. However, since the direction of the bias is the same as in the OLS, the obtained estimates can be treated as lower bounds of the true elasticities. For example, according to the current estimates a 10 percent increase in wages translates into an 18 percent decrease in average informal care provided by males and 36 percent decrease in average informal care provided by females. Additional findings include the following: (i) the wage elasticity of informal care supply is more negative for people who have at least one sibling and those who have no parent living with them and/or in a nursing home; (ii) the wage elasticity of help with personal needs is smaller in magnitude than the wage elasticity of time spent helping parents with chores, errands, transportation, etc.; (iii) estimates of the wage elasticity of net monetary transfers do not support the hypothesis that individuals replace time transfers to parents with monetary transfers as their wages go up.

The paper is organized in the following way. Section 2 presents some background information, followed by the econometric specification in Section 3. Data is described in Section

---

<sup>2</sup>Initial access to the restricted data have been provided through the project under the supervision of David Neumark and Elizabeth Powers. The author is thankful to the ISR Data Enclave and Steven Haider for their help with the continued access to the data.

4. Section 5 presents the empirical findings and a discussion of some extensions to the main analysis of informal care supply.

## 2 Background

Thus far, studies of informal care supply to elderly parents have been mostly descriptive even though this area is receiving growing attention in various social science disciplines. In economics a considerable body of research has been developed on the motivation behind intergenerational transfers (mainly financial) and some on residential decisions, while sociologists, for instance, have focused on identifying the determinants of the incidence and intensity of informal care supply with paying little attention to economic variables (Schkokkaert 2006). Several more recent works are devoted to the study of the relationship between formal and informal care. Van Houtven and Norton (2004) find that informal care reduces home health care use and delay nursing home entry, while Viitanen (2007) shows that increase in higher government expenditures on formal care reduce the probability of informal caregiving outside the household. Other studies are also supportive of the fact that informal and formal care are substitutes (Bolin et al. 2007).

A few papers that consider the effect of changes in care giver's wages on time transfers to elderly parents study the trade-off between time and money dimensions of help using data from the Health and Retirement Study, the Panel Study of Income Dynamics, and the National Long-Term Care Survey of Informal Caregivers (Sloan et al. 2002; Zissimopoulos 2001; Ioannides and Kan 1999; Sloan et al. 1997; Couch et al. 1999). The results from these studies suggest that the effect of wages on informal care is not significant, either economically or statistically, while the wage impact on gross monetary transfers from adult children to their parents is positive and significant. The estimates of the wage elasticity of informal care supply range from -0.78 to 0.07 (Table 1). However these estimates may be subject to an omitted variable bias. An upward bias from omitted variables may explain small magnitudes of the wage elasticities estimated earlier. For example, some people may be more productive in everything they do, which is difficult to control for with a conventional set of variables available to researchers. Therefore, these people would provide more care, but also would be rewarded in the market with higher wages. As a result, the estimated wage effect in such a case would be upward biased, i.e. less negative.

In contrast to the scarcity of research on the wage elasticity of informal care supply, there is a large literature that has been devoted to the study of the wage elasticity of labor supply. There exist several generations of research in this area and they are extensively reviewed by Pencavel (1986, 1998, 2002), Killingsworth and Heckman (1986), Mroz (1987), and Blundell

and MaCurdy (1999) in an attempt to document the variation in the estimates found and determine the sources of these differences. The overall conclusion from this literature is that the wage elasticity of labor supply is positive and is larger for females than for males, although converging over time (Schwabish 2002; Heim 2007).

### 3 Econometric Specification

#### *Estimation Strategy and Specification*

The theoretical framework underlying the empirical analysis is based on the simple one-period model of time allocation that involves two individuals: the care recipient and the care giver (Sloan et al. 2002). Care recipient refers to an elderly parent and care giver to his/her adult child. This model starts with the idea that the caregiver maximizes her own utility that depends on her own consumption goods, leisure, and utility of the care recipient which in turn depends on consumption goods and care. The maximization is subject to the production of care, the time constraint and the standard budget constraints, with a possibility of monetary transfers between the parties. Care can be purchased in the market or produced using the caregiver's time. According to this framework, the allocation decisions of the caregiver as to the time for work and caregiving, monetary transfer, as well as purchased care will depend on the vector of prices (caregiver's wage, price of formal care), non-labor income, and socio-economic characteristics of the caregiver and care recipient. Unfortunately, the data used in the empirical analysis do not provide any information on market-purchased help by care recipients or prices they face, thus reducing the system to three equations<sup>3</sup>:

$$t_{gi}^* = \alpha_g \log w_i + X_i \beta_g + u_{gi} \quad (1)$$

$$t_{gi} = \max(0, t_{gi}^*)$$

$$t_{wi} = \alpha_w \log w_i + X_i \beta_w + u_{wi} \quad (2)$$

$$D_i = \alpha_D \log w_i + X_i \beta_D + u_{Di} \quad (3)$$

---

<sup>3</sup>Monetary transfers incorporate flows of money in both directions but time transfer in the model flows only from the care giver to the care recipient for two reasons. First of all, the model is developed to describe the relationship between a care giver and a care recipient. The latter, being in need of care from other people, is unable of producing that care for him/herself, and therefore unable to provide any care for others. Secondly, the empirical evidence suggests that the prevalence and magnitude of time flow from elderly parents to adult children is quite low. Figure A1 in Appendix shows that it is virtually zero after the age 80. On the contrary, as the description of the data will show later, financial transfers are likely to flow in both directions, no matter how old the involved parties are.

where  $t_{gi}$  is annual hours of informal care for elderly parents,  $t_{wi}$  = annual working hours,  $D_i$  = annual net money transfer to elderly parents,  $w_i$  = individual's hourly wage rate, and  $X_i$  is a vector of controls for individual  $i$ , discussed later.

The wage effect on informal care supply is estimated using the Tobit model, as in most of the studies on informal care supply, to incorporate corner solutions into the estimation. A linear-log specification is chosen for the labor supply and money transfer equations.<sup>4</sup> All three equations are estimated separately for men and women. Since the model has three equations with identical regressors, generalized least squares for the system of linear equations produces as efficient estimates as the ordinary least squares equation-by-equation (Greene 2000, 616). However, a complication arises due to the fact that not all of the equations in the system are linear. Bhattacharya (2004) shows that in the case of the binary dependent variable, the joint estimation produces more efficient estimates. No study investigates the case of the limited dependent variable that follows the Tobit model. So it is assumed that in general the estimation equation-by-equation of the model with two linear and one Tobit equations would be less efficient, but still consistent, as is the case with the system of linear equations.

### ***Econometric Issues with the Wage Effect Estimation***

Some of the factors that enter Equations 1-3 are not available in the data. For example, information on some of the important determinants of the informal care supply, such as the price of formal care as well as unobserved personality traits related to productivity in caregiving and willingness to help others (responsibility, respect for seniors, etc.) is usually not available to researchers. Lack of this information is likely to lead to the problems associated with omitted variables. The estimates of the wage elasticity of informal care supply would not be biased if the assumption of zero correlation between wages and omitted variables were plausible, and the equation was linear. However, in the current setting this is not true. For example, the price of formal care is likely to be higher for people living in high-wage areas, and failure to control for this would result in an upward biased estimate of the wage effect on informal caregiving time. Similarly, the productivity in caregiving may be positively correlated with the productivity on the job leading to an upward bias in the wage effect estimate. This upward bias can explain the close to zero estimates of the wage effect on informal care supply in the earlier studies.

The omitted variable problem in the caregiving analysis is similar to that found in estimating standard labor supply elasticities. Over the last few decades a number of attempts have been undertaken to use different instrumental variables in the labor supply setting. Pen-

---

<sup>4</sup>Even though the distribution of net monetary transfers has most of its mass on zero, the OLS still provides best linear prediction and allows for consistent estimates of parameters around mean.



cavel (1986) mentions sets of instruments used in the early literature which have since been disqualified (Mroz, 1987). These include such variables as own education, experience, and the reported hourly wage rate used to instrument the wage rate calculated from earnings and hours. Somewhat controversial variables are education of parents and their socio-economic status, lagged values of the wage rate, urban residence indicator, and polynomials in age and education. Sets of aggregated information such as unemployment rates and industry structure in the region of residence, cohort average schooling, other group level variables, and polynomials in regional and time trends have been shown to be better instruments (Pencavel 2002; Senesky 2003; Bacolod 2007), as they have no impact on the labor supply but through wages. However, since these instruments are aggregate level variables, they are not very strong predictors of wages, raising the issue of weak instruments.

This study offers a novel set of both aggregate and individual level instruments for wages. This set is inspired by Borjas and Ramey (1995), who find differential impact of international trade on workers by skill level. These instruments include state unemployment rate and state industry structure described by the percentages of the working population employed in each of the services, government, and three manufacturing sectors – trade-impacted concentrated industries, competitive industries, and other durables industries<sup>5</sup> and interactions of these aggregate variables with the education level of respondents. The assumption behind this choice of instruments is that they reflect only the labor demand conditions and are not related to the choice of hours spent on various activities (labor, caregiving) directly or through omitted variables. Regional dummies are included to control for such factors as formal care opportunities and prices<sup>6</sup>, and further tests are performed to check for the validity of the chosen set of instruments.

---

<sup>5</sup>Trade-impacted concentrated industries include: Stone, Clay and Glass Products; Primary Metal Industries; Industrial Machinery and Equipment; Motor Vehicles and Equipment; Other Transportation Equipment. Trade-impacted competitive industries include Apparel and Other Textile Product Industries. Other durables industries include the rest of the manufacturing sector: Lumber and Wood Products; Furniture and Fixtures; Fabricated Metal Products; Electronic and Other Electric Equipment; Instruments and Related Products; Miscellaneous Manufacturing; and Ordinance.

<sup>6</sup>Inclusion of the variable reflecting price of formal care at the state level, such as average wages of the personnel has not change the estimates of the wage elasticity considerably while having virtually no explanatory power on their own. This may suggest that these measures are poor proxies for the variation in the prices at the individual level. Description of this exercise is presented in the Appendix.

## 4 Data and Descriptive Analysis

The main analysis in this paper is implemented using the Health and Retirement Study (HRS) data from the 1998 wave.<sup>7</sup> The Health and Retirement Study is a national longitudinal survey of people born in 1947 and earlier providing a rich source of information on the lives of older Americans, including their health and economic status.

The analysis focuses on a cross-section of working individuals<sup>8</sup> who can potentially provide time to their parents or parents-in-law (both are referred to as “parents” throughout the paper). In the present study parents are treated as a group, similar to Ioannides and Kan (2000). Year 1998 has been chosen as the year that allows the largest sample size of individuals with living parents possible among all the HRS waves.

Focusing on only working individuals may raise the issue of selectivity bias. However, in the labor supply context Mroz (1987) shows that even for the sample of married women, the population for which the selectivity issue has always been considered important, selection does not have a significant impact on the estimates of the wage elasticity of labor supply as long as labor market experience is not treated as an exogenous determinant of wages (i.e., as an instrument). In the context of transfers, especially informal care, the selectivity issue may be different if caregiving responsibilities draw people out of the labor force or into retirement. The first concern seem unlikely given the focus of the study on the population of near elderly, who themselves are approaching old age with the need to contribute to their own retirement funds and plan for their own care expenses. However, the literature is silent on this issue. The second concern seems much more likely, but the literature does not provide conclusive evidence on the impact of informal care responsibilities on retirement decisions. Some studies in sociology and gerontology do show that caregiving women are more likely to quit employment than non-caregiving (Dentinger and Clarkberg 2002; Pavalko and Henderson 2006), while others suggest no effect (Pienta 2003; Johnson and Favreault 2001; Coile 2004). The only direct test of the impact of caregiving responsibilities for elderly parents is done by Kazi (2006) who shows that the potential parent care needs do not accelerate exit into retirement.

### *Dependent Variables*

The dependent variables used in the main analysis are annual working hours, annual hours spent helping parents with basic needs and household chores, and net annual monetary transfer to parents (gross transfer to parents minus gross transfer from parents). Annual

---

<sup>7</sup>The HRS is sponsored by the National Institute of Aging (grant number NIA U01AG 009740) and is conducted by the University of Michigan.

<sup>8</sup>Workers include those who report positive working hours and do not report full retirement in 1998.

working time is the product of usual weekly hours of work and number of weeks worked across all jobs.

The questions concerning intergenerational transfers are asked as follows:

*Now about help to and from parents...*

1. *Not counting any shared housing or shared food, did you give financial help to your parents or parents-in-law amounting to \$500 or more [since last interview, in the last two years]?*

*How about another kind of help:*

2. *Did you spend a total of 100 or more hours [since last interview, in the last two years] helping your (deceased) [parents] with basic personal activities like dressing, eating, and bathing?*
3. *Did you spend a total of 100 or more hours [since last interview, in the last two years] helping your (deceased) [parents] with other things such as household chores, errands, transportation, etc.?*

If the answer is “yes” to these questions, then the respondent is asked the amount of the transfer provided. Overall, the effective annual time spent helping parents is defined here as the sum of the time spent helping parents with basic personal needs and time spent helping parents with household chores. Although the question is asked so that the dependent variable should be left-censored at 50 hours a year, in practice, time use smaller than that is reported as well.<sup>9</sup> Thus, in the current analysis the lower limit on time use is set to zero.

### ***Explanatory Variables***

The variable of interest - hourly wage rate - is taken directly if reported on an hourly basis. Otherwise, it is constructed by dividing earnings from the main job over a certain time period (year, month, two weeks, week) by the total reported working hours in the main job over that period.<sup>10</sup>

The set of individual controls in all specifications include the following: age, age squared, education, education squared, current non-wage income defined as capital income, household wealth, marital status, non-white, Hispanics, region dummies (Blundell and MaCurdy, 1999), number of young children (0-6 years old), number of 6-18 year-old children (Mroz, 1987), and number of siblings by gender, own and in-laws. The last variables aim to control for other

---

<sup>9</sup>A considerable number of individuals reported time in caregiving smaller than 50 hours (112 out of 387 cases with positive care hours among males and 68 out of 495 cases among females).

<sup>10</sup>50% of males and 56% of females report being paid hourly.

possible time demands and availability of substitutes. Mulligan (1995) suggests the inclusion of health measures since disutility from work may increase as people age. Therefore, health measures may become significant determinants of labor supply, as well as of informal care supply, for older workers.

In addition to the individual characteristics, all of the specifications in the main analysis include characteristics of parents. These characteristics refer to the set of all living parents and include the number of surviving parents (maximum four), the ratio of the number of mothers to the number of living parents, the age of the oldest parent, the indicators if at least one of the parents (i) is single, (ii) has memory related disease, (iii) is a homeowner, and (iv) is identified by the respondent as being financially worse off or better off than the respondent. The indicator of whether there is at least one parent with the memory related disease is used as a proxy for the need of care, which seems to be difficult to misreport. The other related questions in the HRS ask whether the parent needs care, or whether the parent can be left alone for at least one hour. It seems that these questions are more subjective than the one chosen for the analysis: if a respondent is providing a significant number of hours of care, (s)he is much more likely to report that the parent needs care and/or cannot be left alone for at least one hour. Similarly, the one who does not want to provide care seem to be more likely to respond that the parent does not need care and can be left alone for a long period of time.

### ***Sample Description***

The sample is limited to working, not self-employed, age-eligible individuals who have at least one parent or parent-in-law alive in 1998. Individuals retired in 1998 are excluded from the study. The resulting sample consists of 1434 males and 1356 females who have complete data on all of the variables of interest. See Appendix Table A1 for the sample construction details.

Table 2 presents a description of the sample. All financial variables are in 2002 dollars and non-labor income is in thousands of dollars. As can be seen from Panel A, the mean annual working hours for male workers is on average 400 hours higher than for females (2290 hours vs. 1897 hours). Unconditional (on caregiving status) caregiving hours average at 44 hours per year for males and 91 hours per year for females (2% and 5% of the average annual working time respectively). The difference widens to about 100 hours between males and females when conditioning on actual caregiving status (163 vs. 250 hours). Consideration by the type of caregiving suggests that the difference between men and women involved in caregiving is greater in time devoted to help with personal needs than in time devoted to

help with chores, transportation, errands, etc.<sup>11</sup> Net money transfer is negative indicating that money flows into the care givers' households from their parents. Descriptive statistics for the explanatory variables is presented in Panel B of the same Table.

## 5 Empirical Results and Discussion

### *Wage Elasticity Estimates*

Table 3 shows the estimates of the wage impact on labor supply, informal care, and monetary transfers from both OLS/Tobit and instrumental variable regressions.<sup>12</sup> As could be seen the effect of wages on the informal care supply is negative and it is increasing in magnitude after instrumenting. The magnitude of the wage effect on informal care supply is smaller for men than it is for women, and it is not statistically significant for men. The wage effect on labor supply is positive in every case both for males and females and increases in magnitude considerably after instrumenting. The analysis of the net monetary transfers between adult children and elderly parents does not provide evidence for the substitution between time and monetary transfers as wages get higher. One of the potential explanations may be the possibility that the measure of the net monetary transfer over a certain short period of time does not allow for that substitution effect to take place. For example, what if the decrease in the informal care provided today is balanced with the decrease in the end-of-life transfer from parents? Indeed, Brown (2006) finds that parents on average bequeathe more to children who are currently providing informal care or who are expected to become care givers in the future.

The last panel of Table 3 provides first-stage statistics common to all regressions while the p-values from the Hansen overidentification tests are reported for each outcome measure separately. As could be seen, the latter test produces very high p-values, confirming the validity of the used instruments. Likewise, the hypothesis of underidentification is rejected at less than 1 percent level of significance. However, the comparison of the first stage F-statistics with the critical values reported in Stock and Yogo (2004) points to the problem of weak instruments even if 30 percent relative bias in the same direction as the OLS bias is accepted. Stock and Yogo (2004) do not report critical values for higher than 30 percent relative bias, but it could be extrapolated from Table 1 in their work (p.39) that for the 50 percent relative bias the first stage F-statistics would be sufficient to pass the weak instruments test. This

---

<sup>11</sup>This fact may simply reflect the higher life expectancy for women and preferences for the same-sex helper with the basic needs.

<sup>12</sup>With regard to the instrumental variable estimation, almost all estimated parameters, except for the wage effects, are relatively consistent across specifications in terms of statistical significance and sign. Full sets of estimates are reported in Appendix Tables A2 through A4.

means that the set of the instruments used in the analysis is quite weak resolving only 50 percent of the omitted variable bias in the OLS estimates. Alternatively, this means that the value of the estimate of the wage elasticity of informal care supply is far from the true one, and can only be treated as a lower bound of a more negative elasticity.

The estimates of the wage elasticities evaluated at the sample means are provided in Table 4. The estimates from the OLS and Tobit regressions show negative but close to zero wage elasticities of informal care supply. Compared to them, IV procedure produces much larger estimates: -1.8 for males and -3.6 for females. The wage elasticity of labor supply is also considerably larger in magnitude after instrumenting.

It is instructive to think about the magnitudes of the estimated elasticities: a 10% increase in wages (2.1 for men and 1.5 for women in 2002 dollars) would lead to an average decrease by 18% for men and 36% for women in unconditional hours of care provided. That would translate into 8 fewer hours of care provided by men and 33 fewer hours of care provided by women per year. The same increase in wages, with the labor supply elasticity of 0.19 (men) and 0.31 (women), implies 44 hours more work per annum for men and 59 for women. This comparison suggests that the wage elasticity of care supply is far from being trivial. On the contrary, in absolute terms it makes up about 18% of the labor supply response for men and about 56% of the labor supply response for women. However, the evaluation of the combined effect of fiscal incentives and encouragement for informal care requires further investigation

Since the focus of this study is on the informal care that adult children provide to their elderly parents, the rest of this section will consider some important extensions in turns: impact of the availability of substitutes and parents' living arrangements.

### ***Availability of Substitutes***

While the analysis above focuses on the total time devoted to parents, the detailed information in the data also allows studying the wage effects on the care supply disaggregated by the type of activities. It is reasonable to expect the help with household chores to be more elastic: it may be less burdensome and not as urgent as personal care; hence, it is easier to postpone the task or to find a substitute. For example, the frequency of household chores or money management can be easier to reduce in the face of increasing wage rates compared to the tasks of bathing, dressing, and feeding the elderly parents. Indeed, even though for males there is very little difference between the time for personal needs and that for chores, for women it is clear that the time spent helping parents with household chores has a more pronounced negative relationship with wages.

Rows (2)-(3) in Table 5 provide information for the comparison of the wage elasticities of informal care supply by different types of caregiving activities not conditioning on the actual

caregiving status. As can be seen, the estimated wage elasticity of help with household chores is generally larger than that of the help with basic personal needs, and the difference is greater for females.

Row (4) in Table 5 shows that individuals with siblings (the majority of the sample) are more responsive to changes in the wage rates, with the estimates of the wage elasticities being considerably larger than in the benchmark case in row (1).

To summarize, these findings suggest that the wage elasticity of informal care supply depends on the availability and easiness of substitution. The easier it is to find a substitute for a certain caregiving task (either because the task itself is not unpleasant, or because a care giver has more siblings to rely on) the higher the wage elasticity is.

### ***Parents' Living Arrangements***

Current analysis does not account for the differences in living arrangements of elderly parents. It includes parents living independently, with the respondent or other relatives, or in nursing home. At the same time this potentially may have considerable impact on the results. On the one hand, the amount of care provided may depend on how far the parent lives from the child, suggesting living arrangement as another control in the model. On the other hand, parents' living arrangements can be considered as part of the informal care supply decisions: when the need for more care arises, parents may relocate closer to the child, or start coresiding together. Earlier literature tried to circumvent this problem by excluding pairs with coresident parents and parents in nursing homes. Table 5 shows the results for the samples of individuals excluding individuals with at least one parent (i) coresiding with them, (ii) in nursing home, (iii) either coresiding or in nursing home. Although, the estimated elasticities change slightly, and in some cases the estimated effects become statistically insignificant, they are still quite close to the ones obtained from the basic analysis. Thus, the estimates obtained earlier are fairly robust to the differences in the living arrangements of elderly parents.

## **6 Conclusion**

This paper extends the existing literature on informal caregiving by addressing the issue of omitted variable bias in the estimates of the wage elasticity of informal care supply. Existence of this bias would suggest that the previous estimates may be too small. Using the state level unemployment rate and industry structure and their interactions with education as instruments for wages, this study finds that the elasticity of informal care supply with respect to wages is negative and large in magnitude. Although the problem of weak instruments suggests a significant remaining bias, the estimates of the wage elasticity of informal care

supply can be treated as lower bounds, drawing attention to the presence of considerable in magnitude negative impact of wages on informal care for elderly.

As in the case of labor supply, the supply of informal care by females tends to be more elastic than that by males. Furthermore, informal care supply is more elastic for individuals who have siblings and independently living parents, and is more elastic when considering time spent helping parents with household chores, errands, transportation, etc., suggesting that the availability of the substitutes and the ease of substitution matters a lot for the magnitude of the informal care supply response to wages. However, the analysis does not support the hypothesis of substitution from time towards monetary transfers to elderly parents as wages get higher.

To conclude, this paper shows that the fiscal incentives which would effectively increase wages of near elderly could bring more hours of labor supplied. However, this increase will be accompanied by a decrease in the number of hours of informal care provided to the elderly. The question remains of whether the benefits from increased labor supply would outweigh the costs associated with lower levels of informal care. And the answer depends on many other estimates - average tax rates, prices of formal care, likelihood that the elderly would seek government support to cover the formal care costs, and the consequences to those who would decide not to seek any care - which definitely requires further research.



## Reference

- Apfel, Kenneth. 2004. US Aging Policy at a Crossroads: Major Choices Ahead. *Paper Prepared for The International Symposium on the Challenges of the New Societies: Implications for Current Social Policies; Valencia, Spain*.  
Accessed at <http://www.utexas.edu/lbj/faculty/apfel/valencia.pdf> on 11/8/2004.
- Bacolod, Marigee. 2007. Do Alternative Opportunities Matter? The Role of Female Labor Markets in the Decline of Teacher Quality, 1960-1990. *Review of Economics and Statistics* 89(4): 737-751.
- Baker, Michael and Dwayne Benjamin. 1999. How Do Retirement Tests Affect the Labour Supply of Older Men? *Journal of Public Economics* 71(1): 27-52.
- Bhattacharya, Debopam. 2004. Seemingly Unrelated Regressions with Identical Regressors: A Note. *Economics Letters* 85(2): 247-255.
- Blundell, Richard and MaCurdy, Thomas. 1999. Labor Supply: A Review of Alternative Approaches. In *Handbook of Labor Economics* Volume 3, ed. O. Ashenfelter and D.Card, 1559-1695. Elsevier-North Holland.
- Bolin, K., B. Lindgren, and P. Lundborg. 2007. Informal and Formal Care Among Single-Living Elderly In Europe. *Tinbergen Institute Discussion Paper TI 2007-031/3*
- Borjas, George and Valerie Ramey. 1995. Foreign Competition, Market Power, and Wage Inequality. *Quarterly Journal of Economics* v110, n4: 1075-1110.
- Brown, Meta. 2006. Informal Care and the Division of End-of-Life Transfers. *Journal of Human Resources* 41(1): 191-219.
- Bureau of Labor Statistics.2006-2007. Occupational Outlook Handbook.  
Accessed at <http://www.bls.gov/oco> on February 1, 2006
- Burtless, Gary and Robert A. Moffitt. 1984. The Effect of Social Security Benefits on the Labor Supply of the Aged. In *Retirement and Economic Behavior*, ed. H. Aaron and G. Burtless. Washington: The Brookings Institution.
- CBO (Congressional Budget Office). 2004. Retirement Age and the Need for Saving. May, 12.  
Accessed at <http://www.cbo.gov/showdoc.cfm?index=5419&sequence=0> on 11/8/2004.
- Coile, Courtney C. 2004. Health Shocks and Couples' Labor Supply Decisions. *NBER Working Paper No. 10810*.
- Couch, Kenneth, Mary Daly, and Douglas Wolf. 1999. Time? Money? Both? The Allocation of Resources to Older Parents. *Demography* 36(3): 219-232.
- Dentinger, Emma and Martin E. Clarkberg. 2002. Informal Caregiving and Retirement Timing Among Men and Women: Gender and Caregiving Relationships in Late Midlife. *Journal of Family Issues* 23(7):857-879.
- Friedberg, Leora. 2000. The Labor Supply Effects of the Social Security Earnings Test. *The Review of Economics and Statistics* 82(1): 46-63.

- Greene, W. 2000. *Econometric Analysis*. 4th edition. Upper Saddle River, New Jersey: Prentice-Hall, Inc.
- Gruber, Jonathan and Peter Orszag. 1999. What to do About the Social Security Earnings Test. *Center for Retirement Research, Boston College*.
- Haider, Steven J. and David Loughran. 2008. The Effect of the Social Security Earnings Test on Male Labor Supply: New Evidence from Survey and Administrative Data. *Journal of Human Resources* 43(1): 57-87.
- Health and Retirement Study, (HRS 1998 Core) public use dataset. Produced and distributed by the University of Michigan with funding from the National Institute on Aging (grant number NIA U01AG009740). Ann Arbor, MI, (1998).
- Heim, Bradley T. 2007. The Incredible Shrinking Elasticities: Married Female Labor Supply, 1978-2002. *Journal of Human Resources* 42(4): 881-918.
- Ioannides, Yannis and Kambon Kan. 1999. The Nature of Two-Directional Intergenerational Transfers of Money and Time: An Empirical Analysis. In *Economics of Reciprocity, Giving and Altruism*, 314-335, ed. Jean Mercier Ythier, Serge-Christophe Kolm and Louis-Andre Gerard-Varet. Palgrave Macmillan.
- Johnson, Richard W. and Melissa Favreault. 2001. Retiring Together or Working Alone: The Impact of Spousal Employment and Disability on Retirement Decisions. *Center for Retirement Research Working Paper No. 2001-01*.
- Kazi, Paula. 2006. Timing of Retirement and Family Obligations *Ph.D. diss.* Michigan State University.
- Killingsworth, Mark and James Heckman. 1986. Female Labor Supply: A Survey. In *Handbook of Labor Economics* Volume 1, 103-204, ed. O. Ashenfelter and R. Layard. Elsevier-North Holland.
- McGarry, Kathleen. 2003. Does Caregiving Affect Work? Evidence based on Prior Labor Force Experience. *Paper prepared for JCER-NBER Conference in Nikko, Japan*.
- Mroz, Thomas. 1987. The Sensitivity of an Empirical Model of Married Women's Hours of Work to Economic and Statistical Assumptions. *Econometrica* 55(4): 765-99.
- Mulligan, Casey. 1995. The Intertemporal Substitution of Work - What Does the Evidence Say? *University of Chicago - Population Research Center No. 95-11*.
- Pavalko, Eliza K. and Kathryn A. Henderson. 2006. Combining Care Work and Paid Work: Do Workplace Policies Make a Difference? *Research on Aging* 28(3):359-374.
- Pencavel, John. 1986. Labor Supply of Men: A Survey. In *Handbook of Labor Economics* Volume 1, 3-102, ed. O. Ashenfelter and R. Layard. Elsevier-North Holland.
- Pencavel, John. 1998. The Market Work Behavior and Wages of Women: 1975-94. *Journal of Human Resources* v33, n4: 771-804.
- Pencavel, John. 2002. A Cohort Analysis of the Association between Work Hours and Wages among Men. *Journal of Human Resources* 37(2): 251-74.
- Pienta, Amy M. 2003. Partners in Marriage: An Analysis of Husbands' and Wives' Retirement

- ment Behavior. *Journal of Applied Gerontology* 22(3):340-358.
- Schokkaert, Erik. 2006. The Empirical Analysis of Transfer Motives. In *Handbook of the Economics of Giving, Altruism and Reciprocity* Volume 1, ed. S.-Ch. Kolm and J.M. Ythier, 127-181. Elsevier-North Holland.
- Schwabish, Jonathan. 2002. Male and Female Wage Elasticities: An exploration of convergence. *Unpublished manuscript*.  
 Accessed at [http://www-cpr.maxwell.syr.edu/seminar/fall02/Schwabish\\_converge.pdf](http://www-cpr.maxwell.syr.edu/seminar/fall02/Schwabish_converge.pdf) on 10/19/2004.
- Senesky, Sarah. 2003. Testing the Intertemporal Labor Supply Model: Are Jobs Important? *Labor Economics* 12(6): 749-772.
- Sloan Frank A., Gabriel Picone, and Thomas J. Hoerger. 1997. The Supply of Children's Time to Disabled Elderly Parents. *Economic Inquiry* 35: 295-308.
- Sloan, Frank, Harold Zhang, and Jingshu Wang. 2002. Upstream Intergenerational Transfers. *Southern Economic Journal* 69(2): 363-80.
- Stock, James H. and Motohiro Yogo. 2004. Testing for Weak Instruments in Linear IV Regression. Manuscript.  
*Unpublished manuscript*.  
 Accessed at [http://ksghome.harvard.edu/~JStock/ams/websupp/rfa\\_7.pdf](http://ksghome.harvard.edu/~JStock/ams/websupp/rfa_7.pdf) on 08/18/2009.
- Van Houtven, Courtney and Edward C. Norton. 2004. Informal Care and Health Care Use of Older Adults. *Journal of Health Economics* 23(6): 1159-1180.
- Viitanen, Tarja K.. 2007. Informal and Formal Care in Europe. *IZA Discussion Paper* No. 2648.
- U.S.DHHS (U.S. Department of Health and Human Services). 1997. Active Aging: A Shift in the Paradigm. May.  
 Accessed at <http://aspe.hhs.gov/daltcp/reports/actaging.htm> on 11/8/2004.
- Zissimopoulos, Julie. 2001. Resource Transfers to the Elderly: Do Adult Children Substitute Financial Transfers for Time Transfers? *RAND Working Paper 01-05*.

Table 1: Estimates of the Wage Elasticities of Care Supply from Previous Research

| Couch et al. (1999), 1988 PSID                         |                    |                 |            |             |
|--|--------------------|-----------------|------------|-------------|
| Caregivers, Tobit                                      |                    |                 |            |             |
|  | Married couples    | Single          |            |             |
| male   | -0.22*             | -0.69+          |            |             |
| female   | -0.16              | -0.58**         |            |             |
| Zissimopoulos (2001), 1994 HRS                         |                    |                 |            |             |
| Care Recipients, Tobit                                 |                    |                 |            |             |
|  |                    | Has sibling     | No sibling | Spouse wage |
| from any child   | -0.05*             |                 |            |             |
| from male child  |                    | 0.07            | -0.07      | 0.07        |
| from female child                                      |                    | -0.05           | 0.16       | -0.02       |
| Sloan et al. (2002), 1992 HRS                          |                    |                 |            |             |
| Caregivers, hurdle in logs                             |                    |                 |            |             |
|  | Probit coefficient | OLS coefficient |            |             |
| Care   | 0.18 (0.14)        | -0.11 (0.13)    |            |             |
| Chores   | -0.10 (0.09)       | 0.05 (0.06)     |            |             |
| Ioannides and Kann (1999), 1988 PSID                   |                    |                 |            |             |
| Caregiving Households, Tobit                           |                    |                 |            |             |
| Husband wage   |                    | -0.02*          |            |             |
| Wife wage  |                    | -0.02+          |            |             |
| Sloan et al. (1997), 1989 NLTCs of Informal Caregivers |                    |                 |            |             |
| Care Recipients, linear OLS corrected for selectivity  |                    |                 |            |             |
|  | Mean Wage          | Wage Elasticity |            |             |
|  | 5                  | -0.26           |            |             |
|  | 10                 | -0.52           |            |             |
|  | 15                 | -0.78           |            |             |

Note:

1. Standard errors of the wage elasticities have not been presented in the reviewed studies and so signs near the estimates indicate the statistical significance of the wage effects, not the significance of the wage elasticities.
2. \*\* - significant at 1% level, \* - significant at 5%, + - significant at 10%.

Table 2: Descriptive Statistics

|                                    | Males   |           | Females |           |
|------------------------------------|---------|-----------|---------|-----------|
| Sample Size                        | 1434    |           | 1356    |           |
| A. Dependent Variables             |         |           |         |           |
| Annual working hours               | 2290.15 | (660.29)  | 1897.29 | (653.51)  |
| Annual care hours, unconditional   | 44.04   | (162.20)  | 91.13   | (312.69)  |
| Annual care hours, conditional     | 163.18  | (279.61)  | 250.00  | (478.32)  |
| Prevalence of caregiving           | 0.27    |           | 0.36    |           |
| Annual personal care hours, uncond | 16.81   | (105.78)  | 40.31   | (235.42)  |
| Annual personal care hours, cond   | 213.27  | (317.65)  | 325.87  | (597.28)  |
| Annual chores hours, uncond        | 27.23   | (91.35)   | 50.81   | (160.23)  |
| Annual chores care hours, cond     | 110.94  | (157.33)  | 156.12  | (250.05)  |
| Net annual money transfer          | -190.79 | (2489.68) | -110.55 | (2333.33) |
| B. Explanatory Variables           |         |           |         |           |
| Hourly Wage                        | 20.77   | (12.55)   | 14.59   | (8.73)    |
| Non-labor Income (capital income)  | 12.41   | (227.12)  | 6.55    | (17.11)   |
| Total Wealth                       | 237.76  | (402.96)  | 254.07  | (703.86)  |
| Age                                | 57.11   | (4.40)    | 56.21   | (4.17)    |
| Education                          | 13.10   | (3.07)    | 13.08   | (2.52)    |
| If non-white                       | 0.14    |           | 0.18    |           |
| If hispanic                        | 0.09    |           | 0.06    |           |
| If married                         | 0.88    |           | 0.72    |           |
| If in poor health                  |         |           |         |           |
| Number of children < 6 years old   | 0.04    | (0.25)    | 0.04    | (0.23)    |
| Number of children 6-18 years old  | 0.30    | (0.70)    | 0.18    | (0.53)    |
| Number of own sisters              | 0.28    | (0.89)    | 0.29    | (0.93)    |
| Number of own brothers             | 0.24    | (0.83)    | 0.27    | (0.79)    |
| Number of sisters-in-law           | 0.40    | (1.09)    | 0.23    | (0.82)    |
| Number of brothers-in-law          | 0.36    | (0.98)    | 0.20    | (0.75)    |
| Number of parents                  | 1.64    | (0.80)    | 1.50    | (0.70)    |
| Share of mothers                   | 0.74    | (0.34)    | 0.74    | (0.35)    |
| Oldest parent's age                | 82.05   | (6.48)    | 83.08   | (6.12)    |
| If at least one parent is          |         |           |         |           |
| single                             | 0.97    |           | 0.96    |           |
| with memory disease                | 0.17    |           | 0.17    |           |
| homeowner                          | 0.73    |           | 0.71    |           |
| poorer                             | 0.48    |           | 0.43    |           |
| richer                             | 0.37    |           | 0.38    |           |

Note: Numbers in the table are sample averages and numbers in parentheses are standard deviations.

Table 3: Wage Effect Estimates

|                                      | Males                           |                                   | Females                           |                                       |
|--------------------------------------|---------------------------------|-----------------------------------|-----------------------------------|---------------------------------------|
|                                      | Tobit/OLS<br>(1)                | IV-Tobit/2SLS<br>(2)              | Tobit/OLS<br>(3)                  | IV-Tobit/2SLS<br>(4)                  |
| Observations                         | 1434                            | 1434                              | 1356                              | 1356                                  |
| <b>Annual Care Hours</b>             |                                 |                                   |                                   |                                       |
|                                      | <b>-26.71</b><br><b>(26.64)</b> | <b>-310.92</b><br><b>(194.74)</b> | <b>-55.88</b><br><b>(44.72)</b>   | <b>-920.66*</b><br><b>(426.85)</b>    |
| Uncensored obs                       | 387                             | 387                               | 495                               | 495                                   |
| Chi-Square                           | 76.23**                         | 66.13**                           | 94.78**                           | 70.99**                               |
| Observed $P(y > 0)$                  |                                 | 0.2699                            |                                   | 0.3950                                |
| Pred. $P(y > 0 x)$                   |                                 | 0.2619                            |                                   | 0.3549                                |
| <b>Annual Working Hours</b>          |                                 |                                   |                                   |                                       |
|                                      | <b>39.72</b><br><b>(44.67)</b>  | <b>432.90+</b><br><b>(243.00)</b> | <b>275.27**</b><br><b>(45.60)</b> | <b>587.40+</b><br><b>(336.17)</b>     |
| R-square/F-stat                      | 0.11                            | 9.19                              | 0.13                              | 4.03                                  |
| Hansen J-test                        |                                 | p-val=0.7311                      |                                   | p-val=0.4037                          |
| <b>Net Money Transfer</b>            |                                 |                                   |                                   |                                       |
|                                      | <b>57.20</b><br><b>(117.82)</b> | <b>571.62</b><br><b>(845.36)</b>  | <b>175.86</b><br><b>(145.25)</b>  | <b>-2,288.26+</b><br><b>(1270.68)</b> |
| R-Square/F-stat                      | 0.05                            | 2.28                              | 0.04                              | 1.61                                  |
| Hansen J-test                        |                                 | p-val=0.5423                      |                                   | p-val=0.2876                          |
| <b>Common First-stage Statistics</b> |                                 |                                   |                                   |                                       |
| 30% rel.bias critical value          |                                 | 4.80                              |                                   | 4.80                                  |
| First stage F-stat                   |                                 | 3.10                              |                                   | 2.19                                  |
| First stage partial R sq             |                                 | 0.0219                            |                                   | 0.0133                                |
| Ho: underidentification              |                                 | p-val=0.0016                      |                                   | p-val=0.0094                          |

Notes:

1. Standard errors in parenthesis.
2. \*\* - significant at 1% level, \* - significant at 5%, + - significant at 10%.
3. Every estimate is from the regression with the full set of individual and parental controls described in the methodology.
4. Tables with full set of estimates are reported in the Appendix (Tables A2-A4).

Table 4: Estimates of the Wage Elasticities

|                      | Males            |                      | Females          |                      |
|----------------------|------------------|----------------------|------------------|----------------------|
|                      | Tobit/OLS<br>(1) | IV-Tobit/2SLS<br>(2) | Tobit/OLS<br>(3) | IV-Tobit/2SLS<br>(4) |
| Informal Care Supply | -0.1588          | -1.8490              | -0.2176          | -3.5855*             |
| Labor Supply         | 0.0173           | 0.1890+              | 0.1451**         | 0.3093+              |
| Monetary Transfer    | 0.2998           | 2.9961               | 1.5908           | -19.8506+            |

Notes:

1. Signs near the estimates indicate the statistical significance of the wage effects.
2. See also Notes to Table 4.

Table 5: Extensions: Estimates of the Wage Elasticities of Care Supply

|   | Males |         |          | Females |         |          |
|---|-------|---------|----------|---------|---------|----------|
|   | N     | Tobit   | IV-Tobit | N       | Tobit   | IV-Tobit |
| Total Care Supply                       | 1434  | -0.1588 | -1.8490  | 1356    | -0.2176 | -3.5855* |
| Help with Basic Needs                   | 1434  | -0.2095 | -1.5340  | 1356    | -0.2341 | -2.0686  |
| Other Caregiving                        | 1434  | -0.0502 | -2.1639* | 1356    | -0.1160 | -3.4429* |
| Excluding Those W/O Siblings            | 1331  | -0.1565 | -2.4766+ | 1242    | -0.2793 | -4.9724* |
| No parents coresidents                  | 1372  | -0.0455 | -1.3248  | 1271    | -0.2122 | -4.0012* |
| No parents in nursing home              | 1250  | -0.2003 | -2.2922+ | 1168    | -0.1580 | -3.2185* |
| No parents coresidents/ in nursing home | 1191  | -0.0794 | -1.6730  | 1086    | -0.1518 | -3.6737* |

See notes to Table 4.



## APPENDIX

Table A1. Sample Selection Criteria

|   | Males |        | Females |        |
|---|-------|--------|---------|--------|
| Initial Sample Interviewed in 1998              | 9669  |        | 13212   |        |
| If non-missing state of residence               | 8704  | 90.02% | 12139   | 91.88% |
| If Age Eligible                                 | 6566  | 67.91% | 8151    | 61.69% |
| Potential Caregivers                            | 3305  | 34.18% | 3318    | 25.11% |
| If not retired in 1998                          | 2425  | 25.08% | 2748    | 20.80% |
| If working and $0 < \text{wage reported} < 100$ | 1817  | 18.79% | 1617    | 12.24% |
| If $0 < \text{annual working hours} < 5200$     | 1773  | 18.34% | 1568    | 11.87% |
| If non-missing respondent's characteristics     | 1769  | 18.30% | 1554    | 11.76% |
| If parents' info is non-missing                 | 1765  | 18.25% | 1546    | 11.70% |
| If non-self employed                            | 1434  | 14.83% | 1356    | 10.26% |

Figure 1: Time Transfer to Adult Children By Age and Gender

Table A2. Estimation Results: Labor Suply

|                                   | Males               |                     | Females              |                      |
|-----------------------------------|---------------------|---------------------|----------------------|----------------------|
|                                   | (1)                 | (2)                 | (3)                  | (4)                  |
| Annual Working Hours              | OLS                 | TOLS                | OLS                  | TOLS                 |
| <b>Individual characteristics</b> |                     |                     |                      |                      |
| Hourly Wage                       | 39.72<br>(44.67)    | 432.90+<br>(243.00) | 275.27**<br>(45.60)  | 587.40+<br>(336.17)  |
| Age                               | 263.23**<br>(74.92) | 212.99**<br>(79.69) | 196.86*<br>(78.30)   | 176.78*<br>(83.15)   |
| Age Sq                            | -2.55**<br>(0.64)   | -2.06**<br>(0.69)   | -1.88**<br>(0.68)    | -1.66*<br>(0.74)     |
| Education                         | 37.99<br>(25.27)    | 55.56+<br>(29.32)   | 53.56<br>(38.45)     | 81.41+<br>(47.26)    |
| Education Sq                      | -0.91<br>(1.11)     | -2.83+<br>(1.68)    | -2.45<br>(1.55)      | -4.75+<br>(2.84)     |
| Non-labor Income                  | -0.01<br>(0.03)     | -0.03<br>(0.04)     | -1.42<br>(1.20)      | -2.16<br>(1.46)      |
| Total wealth                      | 0.13*<br>(0.06)     | 0.03<br>(0.09)      | 0.02<br>(0.02)       | 0.02<br>(0.02)       |
| If non-white                      | 70.27<br>(51.29)    | 110.54+<br>(60.95)  | -41.89<br>(44.99)    | -47.60<br>(46.37)    |
| If hispanic                       | 18.49<br>(65.71)    | 91.74<br>(82.40)    | -18.28<br>(77.01)    | 10.46<br>(84.00)     |
| If married                        | 87.39<br>(60.54)    | 57.66<br>(63.34)    | -180.03**<br>(47.83) | -155.16**<br>(57.03) |
| If in poor health                 | -22.04<br>(44.75)   | -29.60<br>(46.16)   | -88.00+<br>(51.59)   | -68.70<br>(54.19)    |
| Children younger than 6           | -7.18<br>(60.69)    | 0.81<br>(63.71)     | 19.47<br>(65.64)     | 44.90<br>(82.83)     |
| Children 6-18 years old           | 8.32<br>(26.39)     | 3.51<br>(28.17)     | -21.35<br>(31.01)    | -13.10<br>(31.85)    |
| Number of own sisters             | -7.25<br>(24.30)    | 4.76<br>(26.50)     | -35.85<br>(26.91)    | -40.32<br>(26.85)    |
| Number of sisters-in-law          | 15.62<br>(21.72)    | 18.48<br>(20.66)    | 32.84<br>(23.11)     | 29.36<br>(23.11)     |
| Number of own brothers            | 6.99<br>(22.15)     | 0.30<br>(24.19)     | 33.15<br>(25.22)     | 34.55<br>(25.54)     |
| Number of brothers-in-law         | -6.37<br>(23.29)    | -4.32<br>(24.10)    | -69.49*<br>(27.22)   | -65.47*<br>(26.77)   |

Table A2. Estimation Results: Labor Suply (Cont.)

|                                     | Males                 |                       | Females             |                    |
|-------------------------------------|-----------------------|-----------------------|---------------------|--------------------|
|                                     | (1)                   | (2)                   | (3)                 | (4)                |
| Annual Working Hours                | OLS                   | TSLS                  | OLS                 | TSLS               |
| <b>Parental characteristics</b>     |                       |                       |                     |                    |
| Number of parents                   | -19.45<br>(28.93)     | -19.07<br>(29.81)     | 58.09+<br>(32.13)   | 58.33+<br>(32.41)  |
| Share of mothers                    | -40.36<br>(54.66)     | -11.55<br>(58.58)     | 18.25<br>(50.12)    | 23.25<br>(50.74)   |
| Oldest parent's age                 | 2.59<br>(3.01)        | 2.99<br>(3.24)        | -12.06**<br>(3.36)  | -13.77**<br>(3.89) |
| If at least one parent is<br>single | -320.42**<br>(122.06) | -348.01**<br>(132.17) | 234.42**<br>(87.69) | 226.93*<br>(91.14) |
| with memory disease                 | -78.12+<br>(45.62)    | -97.42*<br>(47.99)    | 20.71<br>(48.99)    | 28.38<br>(50.73)   |
| homeowner                           | 17.79<br>(40.34)      | 24.69<br>(41.82)      | (34.08)<br>(39.64)  | (52.60)<br>(44.49) |
| poorer                              | -78.17*<br>(35.89)    | -106.70*<br>(41.67)   | -22.81<br>(37.22)   | -48.69<br>(46.59)  |
| richer                              | -49.51<br>(39.57)     | -22.43<br>(43.20)     | -23.04<br>(41.32)   | -5.18<br>(45.15)   |
| Observations                        | 1434                  | 1434                  | 1356                | 1356               |
| R-square/F-stat                     | 0.11                  | 9.19                  | 0.13                | 4.03               |

Table A3. Estimation Results: Informal Care Suply

|                                   | Males               |                     | Females              |                      |
|-----------------------------------|---------------------|---------------------|----------------------|----------------------|
|                                   | (1)<br>Tobit        | (2)<br>IV-Tobit     | (3)<br>Tobit         | (4)<br>IV-Tobit      |
| Annual Care Hours                 |                     |                     |                      |                      |
| <b>Individual characteristics</b> |                     |                     |                      |                      |
| Hourly Wage                       | -26.71<br>(26.64)   | -310.92<br>(194.74) | -55.88<br>(44.72)    | -920.66*<br>(426.85) |
| Age                               | 17.93<br>(57.81)    | 54.40<br>(64.94)    | 72.13<br>(90.18)     | 127.19<br>(106.35)   |
| Age Sq                            | (0.18)<br>(0.49)    | (0.54)<br>(0.57)    | (0.64)<br>(0.78)     | (1.24)<br>(0.93)     |
| Education                         | 28.29<br>(23.09)    | 15.49<br>(25.22)    | -76.45+<br>(40.47)   | -155.37**<br>(60.21) |
| Education Sq                      | -1.37<br>(0.95)     | 0.01<br>(1.34)      | 2.85+<br>(1.63)      | 9.29*<br>(3.65)      |
| Non-labor Income                  | -0.29<br>(0.89)     | -0.20<br>(0.89)     | -1.68<br>(1.23)      | 0.39<br>(1.72)       |
| Total wealth                      | 0.04<br>(0.04)      | 0.11+<br>(0.06)     | 0.02<br>(0.03)       | 0.03<br>(0.03)       |
| If non-white                      | -26.93<br>(40.38)   | -56.47<br>(46.64)   | -50.03<br>(55.14)    | -34.64<br>(62.78)    |
| If hispanic                       | -57.16<br>(54.79)   | -108.51<br>(66.60)  | 44.58<br>(90.29)     | -37.99<br>(110.46)   |
| If married                        | -68.21<br>(42.42)   | -46.23<br>(46.42)   | -141.54**<br>(51.24) | -208.92**<br>(67.72) |
| If in poor health                 | -12.70<br>(38.27)   | -6.82<br>(39.96)    | 41.56<br>(57.54)     | -10.37<br>(70.18)    |
| Children younger than 6           | -102.85+<br>(59.88) | -106.80+<br>(61.78) | -124.70<br>(96.03)   | -192.31+<br>(112.94) |
| Children 6-18 years old           | -9.80<br>(19.91)    | -6.30<br>(20.84)    | 28.94<br>(38.38)     | 6.18<br>(44.96)      |
| Number of own sisters             | 0.39<br>(20.18)     | -8.15<br>(21.79)    | -99.83**<br>(37.58)  | -84.61*<br>(40.64)   |
| Number of sisters-in-law          | 10.62<br>(16.75)    | 8.64<br>(17.46)     | 69.07*<br>(33.29)    | 77.43*<br>(38.18)    |
| Number of own brothers            | 5.27<br>(20.19)     | 9.43<br>(21.30)     | -23.55<br>(38.89)    | (26.85)<br>(42.49)   |
| Number of brothers-in-law         | -0.55<br>(18.47)    | -2.19<br>(19.23)    | -37.77<br>(36.61)    | -48.52<br>(41.86)    |

Table A3. Estimation Results: Informal Care Suply (Cont.)

|                                     | Males              |                    | Females             |                     |
|-------------------------------------|--------------------|--------------------|---------------------|---------------------|
|                                     | (1)                | (2)                | (3)                 | (4)                 |
| Annual Care Hours                   | Tobit              | IV-Tobit           | Tobit               | IV-Tobit            |
| <b>Parental characteristics</b>     |                    |                    |                     |                     |
| Number of parents                   | 71.20**<br>(21.42) | 70.80**<br>(22.32) | 76.58*<br>(35.23)   | 73.47+<br>(40.10)   |
| Share of mothers                    | 34.85<br>(41.83)   | 14.00<br>(45.58)   | 174.99**<br>(62.07) | 157.20*<br>(69.83)  |
| Oldest parent's age                 | 6.31**<br>(2.32)   | 5.98*<br>(2.42)    | 13.31**<br>(3.75)   | 17.94**<br>(4.86)   |
| If at least one parent is<br>single | 178.41*<br>(83.52) | 194.61*<br>(87.54) | -79.32<br>(102.63)  | -56.50<br>(118.82)  |
| with memory disease                 | 74.11*<br>(33.58)  | 87.91*<br>(36.40)  | 85.85+<br>(50.92)   | 63.24<br>(59.27)    |
| homeowner                           | 51.39<br>(32.38)   | 45.35<br>(33.81)   | 86.35+<br>(47.51)   | 135.94*<br>(59.38)  |
| poorer                              | 36.35<br>(28.64)   | 56.76+<br>(32.93)  | 45.98<br>(44.41)    | 118.63+<br>(62.02)  |
| richer                              | -3.62<br>(30.12)   | -22.90<br>(34.04)  | -54.95<br>(46.41)   | -100.64+<br>(57.69) |
| Observations                        | 1434               | 1434               | 1356                | 1356                |
| Uncensored observations             | 387                | 387                | 495                 | 495                 |
| Chi-Square                          | 76.23**            | 66.13**            | 94.78**             | 70.99**             |
| Observed $P(y > 0)$                 |                    | 0.2699             |                     | 0.3950              |
| Pred. $P(y > 0 x)$                  |                    | 0.2619             |                     | 0.3549              |

Table A4. Estimation Results: Net Monetary Transfer

|                                   | Males                 |                       | Females              |                         |
|-----------------------------------|-----------------------|-----------------------|----------------------|-------------------------|
|                                   | (1)                   | (2)                   | (3)                  | (4)                     |
| Net Money Transfer                | OLS                   | TOLS                  | OLS                  | TOLS                    |
| <b>Individual characteristics</b> |                       |                       |                      |                         |
| Hourly Wage                       | 57.20<br>(117.82)     | 571.62<br>(845.36)    | 175.86<br>(145.25)   | -2,288.26+<br>(1270.68) |
| Age                               | 133.87<br>(243.79)    | 68.13<br>(252.92)     | 726.41+<br>(380.14)  | 884.92*<br>(439.26)     |
| Age Sq                            | (1.16)<br>(1.99)      | (0.52)<br>(2.14)      | -6.09+<br>(3.25)     | -7.81*<br>(3.84)        |
| Education                         | 42.42<br>(79.01)      | 65.42<br>(81.89)      | 58.21<br>(105.80)    | -161.70<br>(175.42)     |
| Education Sq                      | -2.76<br>(4.26)       | -5.27<br>(5.44)       | -4.18<br>(5.04)      | 14.02<br>(11.25)        |
| Non-labor Income                  | -0.15<br>(0.12)       | -0.18<br>(0.14)       | -6.81+<br>(3.56)     | -0.93<br>(3.95)         |
| Total wealth                      | (0.33)<br>(0.21)      | (0.47)<br>(0.34)      | (0.01)<br>(0.06)     | 0.01<br>(0.06)          |
| If non-white                      | 397.05**<br>(147.66)  | 449.73**<br>(166.45)  | 38.13<br>(86.58)     | 83.24<br>(121.21)       |
| If hispanic                       | 247.29+<br>(129.81)   | 343.13+<br>(208.06)   | -15.45<br>(223.83)   | -242.33<br>(274.40)     |
| If married                        | -317.70**<br>(118.72) | -356.60**<br>(134.77) | -250.43+<br>(146.78) | -446.74*<br>(221.63)    |
| If in poor health                 | -28.39<br>(160.96)    | -38.28<br>(165.67)    | -9.13<br>(115.23)    | -161.43<br>(171.47)     |
| Children younger than 6           | 286.27**<br>(106.63)  | 296.73**<br>(108.71)  | 73.60<br>(86.45)     | -127.18<br>(243.38)     |
| Children 6-18 years old           | -387.18*<br>(173.70)  | -393.47*<br>(171.18)  | 99.76<br>(73.58)     | 34.59<br>(97.79)        |
| Number of own sisters             | 54.93<br>(43.17)      | 70.64<br>(46.82)      | 34.65<br>(32.55)     | 69.98<br>(64.51)        |
| Number of sisters-in-law          | 52.60<br>(46.69)      | 56.35<br>(46.77)      | 74.12<br>(54.31)     | 101.56<br>(62.89)       |
| Number of own brothers            | 41.63<br>(41.21)      | 32.88<br>(43.38)      | 15.08<br>(31.87)     | 4.07<br>(59.98)         |
| Number of brothers-in-law         | 19.59<br>(44.20)      | 22.27<br>(43.94)      | -6.38<br>(45.18)     | -38.08<br>(67.78)       |

Table A4. Estimation Results: Net Monetary Transfer (Cont.)

|                                     | Males                 |                      | Females               |                       |
|-------------------------------------|-----------------------|----------------------|-----------------------|-----------------------|
|                                     | (1)<br>OLS            | (2)<br>TSLS          | (3)<br>OLS            | (4)<br>TSLS           |
| Net Money Transfer                  |                       |                      |                       |                       |
| <b>Parental characteristics</b>     |                       |                      |                       |                       |
| Number of parents                   | 33.96<br>(88.08)      | 34.46<br>(87.93)     | 76.21<br>(151.94)     | 74.32<br>(159.45)     |
| Share of mothers                    | -113.92<br>(150.60)   | -76.22<br>(156.31)   | -112.73<br>(137.12)   | -152.13<br>(159.83)   |
| Oldest parent's age                 | 3.65<br>(12.95)       | 4.19<br>(12.77)      | 1.84<br>(10.00)       | 15.34<br>(14.92)      |
| If at least one parent is<br>single | 428.34<br>(660.85)    | 392.23<br>(644.23)   | 674.56<br>(786.16)    | 733.67<br>(816.12)    |
| with memory disease                 | 26.40<br>(142.03)     | 1.15<br>(152.55)     | 131.39<br>(184.37)    | 70.88<br>(194.04)     |
| homeowner                           | (33.68)<br>(104.84)   | (24.65)<br>(106.53)  | 45.33<br>(101.48)     | 191.51<br>(168.50)    |
| poorer                              | 380.29**<br>(125.81)  | 342.97*<br>(138.26)  | 370.92**<br>(137.68)  | 575.22**<br>(203.11)  |
| richer                              | -414.69**<br>(143.43) | -379.26*<br>(173.41) | -502.91**<br>(136.58) | -643.97**<br>(182.55) |
| Observations                        | 1434                  | 1434                 | 1356                  | 1356                  |
| R-Square/F-stat                     | 0.05                  | 2.28                 | 0.04                  | 1.61                  |

### *Price of Formal Care*

Formal care in the theoretical model described in the paper refers to the time or services of other people that can be purchased from outside the parent-child dyad. Although no information on the formal care prices is available from the data, state level proxy variable can be used to get an idea of its importance. One of the possible candidates would be the mean wage of the personal home care aides.<sup>13</sup> The duties of workers in this occupation very closely correspond to the list of activities mentioned in the HRS questions from which the informal care variable is constructed.

Table A5 reports selected coefficients from the regressions similar to those in the main analysis without and with instrumenting. As could be seen inclusion of the proxy for the price of personal home care in the form of the mean wage of personal home care aides in the state of residence does not have much impact on the estimated wage effect for males and leads to a decrease in the magnitude of the estimate for females. In addition, the estimated coefficient for the proxy is quite small with very large standard errors.

This analysis, however, has some drawbacks that may explain these results. First, the state average is assigned to the respondent based on his/her own state of residence, since the information on the parents' state of residence is not available. Also, the state average wage maybe a poor proxy for the price of paid home care that the individuals face. There exists a vast array of possibilities to choose from. Some people may turn to companies specializing in elderly care, others may hire a nurse or a maid to assist them in everyday life, or pay certain amount of money to their relatives to provide occasional services. Yet another possibility available for poor elderly would be to have Medicare paid personal home care services which are prescribed by the doctor. This implies existence of a wide range of formal care prices within the same state.

To circumvent the problem related to the state of residence of the parents and test whether the state average wage of personal care workers is a good proxy for the price that individuals face an analysis of its own effect on the demand for paid home care has been implemented using HRS respondents as paid care recipients. The right hand side variable in this analysis is the number of hours of paid personal home care per month that an HRS respondent gets. A set of controls is chosen so as to get more similarity with the main analysis in the current paper, accounting for the fact that the respondents are now care recipients, not care givers. Results in Table A6 show that in spite of the fact that the own

---

<sup>13</sup> "Personal and home care aides also called homemakers, caregivers, companions, and personal attendants provide housekeeping and routine personal care services. They clean clients' houses, do laundry, and change bed linens. Aides may plan meals (including special diets), shop for food, and cook. Aides also may help clients get out of bed, bathe, dress, and groom. Some accompany clients to doctors' appointments or on other errands" (BLS, 2006-2007).



Table A5. Effect of Price of Paid Home Care

| Annual Care Hours        | Tobit             |                     | IV-Tobit             |                      |
|--------------------------|-------------------|---------------------|----------------------|----------------------|
|                          | (1)               | (2)                 | (3)                  | (4)                  |
| <b>Males</b>             |                   |                     |                      |                      |
| Log Hourly Wage          | -26.71<br>(26.64) | -26.76<br>(26.65)   | -310.92<br>(194.74)  | -324.82+<br>(195.15) |
| Log Paid Home Care Price |                   | -46.05<br>(179.03)  |                      | -74.70<br>(188.76)   |
| <b>Females</b>           |                   |                     |                      |                      |
| Log Hourly Wage          | -55.88<br>(44.72) | -53.79<br>(44.93)   | -920.66*<br>(426.85) | -618.72<br>(408.28)  |
| Log Paid Home Care Price |                   | -131.95<br>(281.99) |                      | 152.16<br>(365.90)   |

price effect is negative (as would be expected), the estimated standard errors are quite large making the estimates not significant statistically. This test clearly indicates that even if the information on the parental state of residence was available, the state average wage would be a poor proxy for the price of formal care.

Table A6. Estimating Own Price of Paid Home Care Effects

|                             | Males               | Females              |
|-----------------------------|---------------------|----------------------|
| Paid Personal and Home Care | (1)                 | (2)                  |
| Log Paid Home Care Price    | -227.73<br>(176.79) | -108.69<br>(140.61)  |
| Non-labor Income            | 0.11+<br>(0.06)     | 0.06<br>(0.12)       |
| Total wealth                | 0.000005<br>(0.00)  | 0.000003<br>(0.00)   |
| Age                         | -33.38*<br>(13.38)  | -21.42*<br>(8.91)    |
| Age Sq                      | 0.29**<br>(0.09)    | 0.22**<br>(0.06)     |
| Education                   | -36.95**<br>(10.90) | -30.96**<br>(9.06)   |
| Education Sq                | 1.27*<br>(0.56)     | 1.46**<br>(0.46)     |
| If non-white                | 29.8<br>(31.87)     | 72.16**<br>(21.81)   |
| If hispanic                 | -2.16<br>(47.97)    | 10.13<br>(34.99)     |
| If married                  | -75.83*<br>(29.88)  | -70.36**<br>(22.85)  |
| Children younger than 6     | 56.06<br>(49.90)    | 0.57<br>(44.14)      |
| Children 6-18 years old     | -35.74<br>-31.63    | 24.12<br>-16.98      |
| If poor health              | 205.61**<br>(30.95) | 256.05**<br>(22.11)  |
| Number of own sisters       | 0.68<br>(11.70)     | 1.56<br>(7.08)       |
| Number of sisters-in-law    | -1.99<br>(12.67)    | -5.54<br>(18.12)     |
| Number of own brothers      | -10.69<br>(13.45)   | -20.94*<br>(9.16)    |
| Number of brothers-in-law   | -15.4<br>(15.72)    | -22.54<br>(21.99)    |
| Number of parents           | -18.05<br>(26.72)   | -103.74**<br>(31.87) |
| Observations                | 8533                | 11968                |
| Uncensored observations     | 126                 | 369                  |
| Chi square                  | 295.92              | 784.32               |