Parental Care and Self-reported Health of Married Women: Evidence from Urban China

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Abstract: Informal care is the primary elderly-support pattern in China, and women have taken the main responsibility of caregiving. A sharp decline in government support for care provision and the fast population aging have increased the care burden on the women in the family. With the data derived from China Health and Nutrition Survey (CHNS) in 2000, 2004, and 2006 and ordered-probit model, we try to examine the relation between hours of parental care and self-reported health of married women in urban China. Our results show that married women would report much worse health if hours caring for parent-in-law increase, with the probability of "Excellent" and "Good" health reduced, and the probability of "Fair" and "Poor' health increased. It is possibly concluded that traditional patrilineal familial norms still play a role in shaping intra-household allocation in urban China as hour burden of caregiving for parent-in-law would significantly strengthen married women's mental stress whereas taking care of own parents not. We should pay more attention to the negative impact of increasing parental care burden on the emotional and physical health and wellbeing of married women. In order to improve the health of the elderly and women and gender equality, changes should be made to China's existing eldercare policies, especially establishment of formal and inform support system to

the women caregivers. In addition, with comparing the results between assumption of exogeneity and the 2SLS estimation, there is good evidence to assume that the endogeneity of parental care with respect to women's self-reported health should be small in recent urban China.

Key Words: population aging; parental care; married women; self-reported health; urban China

INTRODUCTION

In China, according to official statistics, the proportion of the Chinese population aged 65 years and above rose from 4.9 percent in 1982 to 8.87 percent in 2010. [1] Dramatic increase of old people leads to doubling growth of eldercare needs, and the growth of old people with disabilities would also greatly enhance the needs of eldercare. [2] In Chinese society that inherited the traditional family support for elders, the support for old people is still based on informal care. As a country with a Confucian culture heritage, family members and adult children, primarily women, are the principal caregivers for frail elders in China (Zhan and Montgomery, 2003). Data from the 2006 Chinese Aged Population Survey shows that 83 percent of old people with disability in the urban area were taken care of by family members including spouses, adult children, and relatives. According to the survey, although sons' and sons-in-laws' involvement in caregiving activities was substantial, daughters and daughters-in-law accounted for the majority share of informal care work.[3] In the past three decades China has experienced the transition from a planned economy to a market economy. Economic restructuring brought about the rapid growth of wages, but the government and enterprises reduced the caregiving of children and old people significantly due to public sector restructuring. Meanwhile, the population transition strengthened the burden of women's family caregiving responsibility which would lead to the stress in terms of income, time and mental health influencing their health level and life quality.

Early studies on gerontology mainly focused on the caregiving availability of the old people, and then the research on "pressure of caregivers" and "burden of caregivers" investigated the impact of care responsibility on caregivers. A number of literatures analyzed the challenges that caregivers confronted including financial, emotional, physical and familial aspects (Stone et al., 1987; Brody, 1981; Stephens, 1997; Zarit et al., 1980). The two main research fields had formed: care responsibility and labor supply, as well as the welfare of the caregivers.

Since the 1970s, academia especially gerontology started to pay more attention on the well-being of the caregivers. A lot of research suggested that caregiving to the frail or disabled elderly lead to negative physical, emotional and social consequences (Fengler and Goodrich, 1979). Female take much more responsibility than male (Brody,1981; Horowitz,1985; Lang and Brody, 1983; England and Folbre, 1999; Fast, 1999; Stoller, 1983). The results of previous studies showed that eldercare responsibility is closely related to pressure, burden and lower quality of life (Marks, 1998; Miller, 1989; Penning, 1998; Seltzer and Li, 1996; Strawbridge et al., 1997). Some researchers suggested that the emotional and physical stress derived from caregiving would result in health deterioration of the caregivers and family members (George and Gwyther, 1986; Snyder and Keefe, 1985; Hirshorn, 1991). Compared with non-caregivers, the family caregivers who report much more tension have the worse health status (Whitlatch et al., 1997). The long-term stress of caregiving would influence the health of the caregivers including self-reported health, health symptom, illness and medical utilization. [4] Other researchers found that family time allocation will affect the health status of women, and time of child care and housework increasing will result in health level declining (Wolfe and Robert, 1983; Bird, 1991). MacDonald et al. (2005) found that women's greater hours of unpaid work contribute to women experiencing more stress than men.

Previous studies can reach a consensus: the negative impact of caregiving include physical and emotional stress which has the opposite effect on health status. The role of the caregivers is very important, and they also take the considerable pressure. With the continuous progress of this cognition, researchers started to engage in new research fields which examined how to support family caregivers in a better and much more effective way. The research of Jones and Vetter (1984) showed that the support received by caregivers was so limited that they were more vulnerable to pain and mental illness. Zarit et al. (1980) found the "stress" would reduce if the family members and friends frequently visited the caregivers. Fengler and Goodrich (1979) found that for the wife who was the caregiver, children, relatives and friends usually was their major source of social support. The second source of support is the formal social service system. Many spouses of old people with disability were supported by formal caregivers with assistance and help (Shanas, 1979).

The research on informal care for the old people in China has just started. In recent years, some researchers start to focus on the pressure of the adult children caregivers

in the process of caring for the parents. Du (2000) pointed out that it is difficult for female adult children to get adequate rest and time to participate in cultural and relaxation as they take most of care responsibility of their parents. Male and female caregivers have suffered certain differences in the economy, time and emotional stress (Tang, 2006; 2008). Little has been known that how eldercare influences the adult children especially married women, although there are some researches concentrated on the issue of "burden of caregivers" in China. The purpose of this paper is to investigate the hours of eldercare and self-reported health of married women who take care of the old parents, then put forward the suggestions on eldercare issues and social support to caregivers to deal with the population trend.

The paper tries to answer the following research questions: Does the hours of parental care have the effect on self-reported health of married women? Is there any difference between the effect of caring for parents and in-law on self-reported health of married women? Four sections follow this introduction. Section Ⅱ and Ⅲdiscuss the empirical methodology and data respectively. Section Ⅳ summarize the results of the estimation of parental care on self-reported health of married women. Conclusions including the implications for policy are presented in section Ⅴ.

METHOD

We introduce the "informal parental care"---hours caring for own parents and hours caring for parent-in-law--- as one of the relative factors to the women's self-reported health. We suppose that other things being equal, married women who take care of parents have much worse health status if they spend greater hours on parental care. Our study uses the multi-regression analysis to examine the effect of hours of parental care on the self-reported health of married women.

In our multi-regression equation, we use *HoursP* and *HoursL* to stand for informal parental care. *HoursP* and *HourL* mean "Hours caring for own parents" and "Hours caring for parent-in-law" respectively. *Health* stands for the self-reported health which is a categorical variable, 1 for "health is excellent", 2 for "good", 3 for "fair", and 4 for "poor". Then *Health* could be the function of *HoursP* and *HoursL* and the a vector of covariate control variables, X, which include the variables reflecting personal characteristics of the women, and characteristics of the household in which she resides, and characteristics of the diary day.

$$Health = \gamma HoursP + \varphi HoursL + \delta X + u \qquad (1)$$

where the Greek letters are unknown parameters and u is the error term. The structural parameters of γ, φ are the primary interest of the present empirical investigation. The variables in X are common determinants of the self-reported health, such as education and age (and its squared term) of the woman and her husband, the age distribution of their children, unearned income, household total assets, local average wages for paid caregivers and female and male workers, and year dummy and provincial dummy variables.

The equation (1) is estimated by ordered probit model as the self-reported health is an ordered categorical variable. Firstly, we estimate the regression coefficients of *HoursP*, *HoursL* and other independent variables. We suppose that y stands for the ordered response value on $\{0,1,2,\cdots,J\}$. The ordered probit model of y (the independent variable x being the condition) could be deduced from model of latent variable model. [5] Suppose that latent variable y^* is determined by the following formula:

$$y^* = x\beta + e \qquad e|x \sim Normal(0,1) \qquad (2)$$

$$\alpha_1 < \alpha_2 < \cdots < \alpha_J$$

which stand for unknown threshold values. Meanwhile we define the following formula,

$$y = 0, \quad if \quad y^* \le \alpha_1$$
$$y = 1, \quad if \quad \alpha_1 < y^* \le \alpha_2$$
$$\vdots \qquad\qquad \vdots$$
$$y = J, \quad if \quad y^* > \alpha_J$$

Then each response probability could be calculated:

$$P(y=0|x) = P(y^* \le \alpha_1|x) = P(x\beta + e \le \alpha_1|x) = \Phi(\alpha_1 - x\beta)$$
$$P(y=1|x) = P(\alpha_1 < y^* \le \alpha_2|x) = \Phi(\alpha_2 - x\beta) - \Phi(\alpha_1 - x\beta)$$
$$\vdots$$
$$P(y=J-1|x) = P(\alpha_{J-1} < y^* \le \alpha_J|x) = \Phi(\alpha_J - x\beta) - \Phi(\alpha_{J-1} - x\beta)$$
$$P(y=J|x) = P(y^* > \alpha_J|x) = 1 - \Phi(\alpha_J - x\beta)$$

The method of maximum likelihood could be used to estimate α, β. In terms of latent variable model, the log likelihood value is,

$$\log L = \sum_{i=1}^{n}\sum_{j=1}^{J} d_{ij} \log[\Phi(\alpha_j - x_i\beta) - \Phi(\alpha_{j-1} - x_i\beta)] \qquad (3)$$

where $d_{ij} = 1$, if $y_i = j$, otherwise $d_{ij} = 0$.

There would be some limitation if only β is involved in our study. In most cases, we are not interested on $E(y^* | x) = x\beta$ as y^* is the latent variable. On the other way round, we pay more attention on the response probability, namely $P(y = j | x)$. For the ordered probit model, it is the the marginal effect of x on the probability. Namely,

$$\frac{\partial P_0(x)}{\partial x_k} = -\beta_k \phi(\alpha_1 - x\beta)$$
$$\frac{\partial P_J(x)}{\partial x_k} = \beta_k \phi(\alpha_J - x\beta)$$
$$\frac{\partial P_j(x)}{\partial x_k} = \beta_k [\phi(\alpha_{j-1} - x\beta) - \phi(\alpha_j - x\beta)], 0 < j < J$$

In this study, based on the regression coefficients of calculating equation (1), we then estimate the marginal effect of informal parental care on the self-reported health.

Econometric Issues

As stated above, we assume that with other things being equal, the married women who take the responsibility of family caregiving would report much worse health status. A major empirical issue with this model is the potential endogeneity of hours caring for parents which may come from the reverse effect of self-reported heath on the hours caring for parents. Those married women who reported better health status are more likely to provide eldercare, otherwise not. Moreover, the potential endogeneity may also derive from the effect of unobservable factors. In the research on informal care and labor supply, Ettner (1995, 1996) and Wolf and Soldo (1994) carried out adjustments for the potential endogeneity of caregiving in their investigation. In the following analysis, we take into account both possibilities concerning the endogeneity of informal parental care and test for the presence of reversal causality bias. In our study, we suppose that the endogeneity of hours caring for parents is mainly from reversal causality as married women who reported “poor” health are less likely to take the responsibility to parental caregiving.

We first assume that *HoursP* and *HoursL* are exogenously determined and estimate equations (1) with an ordered probit model. We then relax this assumption and estimate the health equations by the two-stage instrumental variables (IV) procedure.

Following Ettner's identification strategy in the research on informal eldercare and labor market participation, the instrumental variables for *HoursP and HoursL* include proxy variables for the care needs of parents and parents-in-law and the availability of other family members to share caregiving responsibilities. These variables are valid IVs given that they influence the numbers of hours caring for parents but have no direct effect on self-reported health after other covariates are controlled for. We first estimate an OLS equation for *HoursP* and *HoursL* using all of the exogenous variables in the system as regressors. We then apply ordered probit model with the predicted value of *HoursP* and *HoursL* from linear regression as independent variables. The two-stage IV estimates of the structural parental care effects are consistent, but they are inefficient if parental care is exogenously determined. Hence, we test the endogeneity of parental care using the Hausman test procedure.

We then have the following hypothesis that parental care is negatively related to the self-reported health of married women, more hours taking care of parents, the worse self-reported health of married women. It is possibly different between the effects of caring for parents and parent-in-law on the self-reported health.

Data

The dataset used in this study is derived from the China Health and Nutrition Survey (CHNS). [6] The survey was carried out for the years 1989, 1991, 1993, 1997, 2000, 2004, and 2006. Each survey covers about 3800 households and 14,000 individuals in both urban and rural areas from nine provinces, namely, Heilongjiang, Liaoning, Shandong, Henan, Jiangsu, Hubei, Hunan, Guizhou, and Guangxi. The survey provides rich socioeconomic information on individuals, households and communities in the sample.

We use data on demographics, health status, and caregiving activities to analyze caregiving to the old parents and the status of married women's self-reported health in the available years of 2000, 2004 and 2006. [7] We restrict our analysis to married women aged between 35 and 51 years old in urban areas. Adult children aged 35 or older are more likely to provide care to an old relative than those in the younger age group. The upper age limit is imposed due to the fact that the variables for parental care needs and care patterns are derived from the Survey of Ever-Married Women Under Age 52—a supplementary survey of the CHNS, and hence, they are available only for those younger than 52. Although the data include a panel of individuals, they

are analyzed as repeated cross-sections to avoid biases related to attrition and cohort as the panel ages over time. [8] After omitting observations with missing information, we have a sample of 820 observations for analysis.

Measurements

Dependent variables and independent variables

The variable "self-reported health" is selected to be the dependent variable in our paper mainly because self-reported health is the general index which reflects the subjective and objective health. In the survey of each year, the adults aged 14 and above have been asked about their current health status. The question is, "Right now, how would you describe your health compared to that of other people your age?" We define the dependent variable "self-reported health" in terms of the answer of this item. 1, 2, 3, 4 stands for "excellent", "good", "fair" and "poor" health status separately. Based on the question "During the past week, how much time did you spend taking care of your mother (father/mother-in-law/father-in-law)?" we get the variable "Hours caring for parents" and "Hours caring for parent-in-law".

Instrumental variables

The survey for ever-married women aged under 52 years asks the respondent the following questions: (1) if each of her mother, father, mother-in-law and father-in-law is alive; (2) if each of the four parents needs to be taken care of; (3) how many brothers and sisters do you and your husband have. Four dummy variables are derived from question (1) to measure the survival status of each parent. And from question (2) another four dummy variables are derived to measure the care needs of each of the four parents. The former variables provide information on whether any parent may be able to share the caregiving responsibility with the daughter or the daughter-in-law. Four variables are derived from question (3) to measure the numbers of the siblings of both of the wife and husband. These four variables reveal whether any brothers or sisters of the couple may be able to share the caregiving responsibility with the married woman. The two sets of dummy variables for parental care needs and family caregiving resources, as well as the numbers of brothers and sisters of the couple serve as instruments for the *HoursP* and *HoursL* in equations (1) [9]

Exogenous variables

Most measures for the exogenous variables in X are clear. Education is measured by years of schooling. The age distribution of children is described using numbers of co-residing children in each of three age categories for both boys and girls: 0-5, 6-12, and 13-18. Non-earned income is a sum of husband's wage, subsidies, rental payments for household assets, welfare funds and cash income received from other relatives. Household's total asset is the total value of the household's houses, tools, equipment, electrical appliances and other goods. The variables of local paid caregivers' wages, female wages, and male wages, measured as 10 thousand yuan per year, are obtained from the database for local communities. Female and male wages are introduced to control for local labor market conditions. The variables of unearned income, household's total asset, caregivers' wages, and male and female wages are discounted by the consumer price index at the provincial level with 2000 as the base year. The price index is obtained from *China Statistical Yearbooks* of each year. The descriptive statistics of independent variables are presented in Appendix A.

RESULTS

Table 1 presents self-reported health of married women by different categories of caregiving hours. Of 820 observations, the proportion of women taking care of their own parents is 8.17 percent, whereas caring for parent-in-law is 4.63 percent. And the proportion of women who care for their parents and in-laws for more than 1 hour per day is 4.02 and 1.59 percent respectively, meanwhile accounting for 49.25 percent and 39.39 percent of the women who are caregivers. In Table 1, it could be found that the proportion of women who take care of their own parents and report "Excellent" health is 13.43 percent, "Good" and "Fair" health is 41.79 percent, and "Poor" health is 2.99 percent, with χ^2-test not significant. The proportion of women who take care of their parent-in-law and report "Excellent" health is 10.53 percent, "Good", "Fair" and "Poor" health is 52.63, 31.58 and 5.26 percent respectively, also with χ^2-test not significant. In terms of "Hours caring for own parents more than 1 hour", we find that for women who care for own parents more than 1 hour per day the proportion of "Excellent", "Good", "Fair" and "Poor" is 24.24, 42.42, 27.27 and 6.06 percent, whereas the proportion is 0.00, 23.08, 61.54 and 15.38 percent for those who take care of parent-in-law more than 1 hour per day. The results of χ^2-test show that it is

possible that married women who spent more hours on parental care are more likely to have lower level of self-reported health status. We would then apply multi-regression model to examine the relationship between eldercare and self-reported heath of married women, with controlling all other things being equal.

Table1. The self-reported health of married women and caregiving hours %

	Hours caring for own parents >0	Hours caring for parent-in-law>0	Hours caring for own parents >1	Hours caring for parent-in-law>1	Total
Excellent	13.43	10.53	24.24	0.00	11.34
Good	41.79	52.63	42.42	23.08	47.93
Fair	41.79	31.58	27.27	61.54	36.22
Poor	2.99	5.26	6.06	15.38	4.51
	$\chi^2 = 1.857$ $p = 0.603$	$\chi^2 = 0.494$ $p = 0.920$	$\chi^2 = 6.206$ $p = 0.102$	$\chi^2 = 8.999$ $p = 0.029$	
Proportion of total women	8.17	4.63	4.02	1.59	

Note: the number of hours caring for own parents and parent-in-law may be overlapped as it is probable that women take care of both of their own parents and in-laws.

Table 2 presents the results of ordered probit regression estimates of married women's self-reported health. With other things being equal, hours caring for parent-in-law increase, then the married women are more likely to report worse health. The coefficient is 0.128 and the difference is statistically significant at $0.05\,\alpha - level$. The variables concerning the spouse of women, such as age and education of the husband, are statistically significant. The coefficients of age and education of the husband are 0.243 and -0.021 respectively, which show that women whose husbands are older and educated for more years report better health status. Based on the estimation of regression coefficients in Table 2, we would then calculate the marginal effect of parental care on women's self-reported health which is the more concern for our study.

Table2. Ordered probit regression estimates of married women's self-reported health

Dependent Variable: Self-reported health	Coefficients	Standard Error
Independent Variables		
Hours caring for own parents	-0.018	0.058
Hours caring for parent-in-law	0.128**	0.064

Age	-0.142	0.212
Age^2	0.002	0.002
Education (years)	-0.003	0.008
Age (Husband)	0.243**	0.118
Age^2 (Husband)	-0.002**	0.001
Education (Husband)	-0.021**	0.008
Non-earned income	-0.038*	0.020
Household's total assets	-0.004	0.004
Number of children aged 0-5	0.228	0.309
Number of children aged 6-12	-0.040	0.115
Number of children aged 13-18	-0.022	0.071
Local paid caregiver's wage	0.134**	0.054
Local female wage	0.156	0.331
Local male wage	-0.061	0.288
2004	0.057	0.099
2006	0.059	0.109
Wald χ^2 value	55.43	
P-value	0.001	
Pseudo R^2	0.031	
No. observations	820	

Note: 1. ***, ** and * denote significance level of 1, 5, 10 percent, respectively.

2. In order to avoid the coefficients and standard errors being equal to zero, here we measure non-earned income, family total assets, local paid caregiver's wage, local female wage and local male wage with "10 thousand Yuan per year".

3. There includes the province dummy in the regression of which the coefficients are not presented in the table.

Table 3 presents the marginal effect estimates of order probit regression. With other variables being controlled for, hours caring for parent-in-law has negative effect on "Excellent" and "Good" health, which suggests that the probability of "Excellent" and "Good" health reduce by 2.3 and 2.6 percent respectively for one more extra hour caring for parent-in-law, whereas it has positive effect on "Fair" and "Poor" health, as one more hour caring for in-law leads to the probability of "Fair" and "Poor" health reduced by 3.8 and 1.1 percent.

It could be concluded that taking care of old parents especially parent-in-law is related to the current health status of married women. This conforms to our hypothesis, more hours taking care of parents, worse self-reported health of married women, especially for the parent-in-law. This is possibly because women are more likely to experience long-term stress if they care for their parent-in-law rather than their own

parents, as it is the traditional pattern that sons' family especially the daughter-in-laws take the majority of caregiving responsibility in China. The support to the caregivers, however, is still limited. As a result, those who spend much more time on parental care would more likely suffer from the pain and mental illness.

The regression results of Table 3 also show, variables of the husband have the statistically significant effect on the self-reported health. Age of the husband increases by 1-year-old, then the probability of "Excellent" and "Good" health declines by 4.4 and 5.0 percent respectively, whereas the probability of "Fair" and "Poor" health increased by 7.3 and 2.1 percent respectively. In terms of husband's education, one more year educated increases, the probability of better health increases by 0.4 percent, the probability of "Fair" and "Poor" self-reported health decreases by 0.6 and 0.2 respectively. The unearned income has positively significant effect on self-reported health of married women, as a 10-thousand-yuan of unearned income increases, the probability of "Excellent" and "Good" health increases by 0.7 and 0.8 percent, whereas the probability of "Fair" and "poor" health reduces by 1.1 and 0.3 percent. The numbers of the children in different three age groups, however, have no significant effect on the self-reported health of married women.

Table3. Marginal effects estimates of married women's self-reported health

Dependent Variable: Self-reported health	Excellent	Good	Fair	Poor
Independent Variables				
Hours caring for own parents	0.003	0.004	-0.005	-0.002
	(0.010)	(0.012)	(0.017)	(0.005)
Hours caring for parent-in-law	-0.023**	-0.026**	0.038**	0.011**
	(0.012)	(0.013)	(0.019)	(0.006)
Age	0.026	0.029	-0.043	-0.012
	(0.038)	(0.044)	(0.064)	(0.019)
Age^2	-0.000	-0.000	0.000	0.000
	(0.000)	(0.001)	(0.001)	(0.000)
Education (years)	0.000	0.001	-0.001	-0.000
	(0.001)	(0.002)	(0.003)	(0.001)
Age (Husband)	-0.044**	-0.050**	0.073**	0.021**
	(0.021)	(0.025)	(0.036)	(0.010)
Age^2 (Husband)	0.000**	0.001*	-0.001**	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Education (Husband)	0.004**	0.004**	-0.006**	-0.002**
	(0.002)	(0.002)	(0.002)	(0.001)
Non-earned income	0.007*	0.008*	-0.011*	-0.003*

	(0.004)	(0.004)	(0.006)	(0.002)
Household's total assets	0.001	0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)
Number of children aged 0-5	-0.036	-0.054	0.066	0.024
	(0.041)	(0.082)	(0.085)	(0.038)
Number of children aged 6-12	0.007	0.008	-0.011	-0.003
	(0.021)	(0.024)	(0.034)	(0.010)
Number of children aged 13-18	0.004	0.005	-0.007	-0.002
	(0.013)	(0.015)	(0.021)	(0.006)
Local paid caregiver's wage	-0.024**	-0.028**	0.040**	0.012**
	(0.010)	(0.011)	(0.016)	(0.005)
Local female wage	-0.028	-0.032	0.047	0.013
	(0.060)	(0.068)	(0.100)	(0.028)
Local male wage	0.011	0.013	-0.018	-0.005
	(0.052)	(0.060)	(0.087)	(0.025)
2004	-0.010	-0.012	0.017	0.005
	(0.017)	(0.021)	(0.030)	(0.009)
2006	-0.010	-0.013	0.018	0.005
	(0.019)	(0.024)	(0.032)	(0.010)
No. observations				

Note: 1. ***, ** and * denote significance level of 1, 5, 10 percent, respectively.

2. In order to avoid the coefficients and standard errors being equal to zero, here we measure non-earned income, family total assets, local paid caregiver's wage, local female wage and local male wage with "10 thousand Yuan per year".

3. There includes the province dummy in the regression of which the coefficients are not presented in the table.

Table 4 shows the results of 2SLS estimates of married women's self-reported health by ordered probit model under the endogeneity assumptions and the results of the Hauman test for this assumption.[10] The Hausman test presented at the bottom of Table 4 cannot reject the null hypothesis that parental caregiving is exogenously determined at any conventional level of significance.[11] As can be seen from the table, "Hours caring for parent-in-law" has not significant effect on the self-reported health whereas "Hours caring for own parents" has negative significant effect on the health status. With other variables being controlled, hours caring for parents has negative effect on "Excellent" and "Good" health, which suggests that one more hour caring for parents results in the probability of "Excellent" and "Good" health reduced by 6.7 and 7.7 percent respectively, whereas it has positive effect on "Fair" and "Poor" health, one more hour of caring for in-law increasing the probability of "Fair" and "Poor" health by11.2 and 3.2 per cent.

Turning to the covariates that are statistically significant, we note that results of the husband's education and none-earned income are nearly similar with those in Table 3. Women married to better-educated husbands have better self-reported health, with the probability estimates of 0.4 percent of "Excellent" and "Good" health increased for one additional year of schooling. Women whose household have more non-earned income are more likely to report better health.

Table4. 2SLS of ordered probit estimates of married women's self-reported health

Dependent Variable: Self-reported health	Excellent	Good	Fair	Poor
Independent Variables				
Hours caring for own parents	-0.067*	-0.077*	0.112*	0.032*
	(0.035)	(0.041)	(0.059)	(0.017)
Hours caring for parent-in-law	-0.037	-0.043	0.063	0.018
	(0.066)	(0.076)	(0.111)	(0.031)
Age	0.018	0.021	-0.030	-0.009
	(0.038)	(0.044)	(0.064)	(0.018)
Age^2	-0.000	-0.000	0.000	0.000
	(0.000)	(0.001)	(0.001)	(0.000)
Education (years)	0.001	0.001	-0.002	-0.000
	(0.002)	(0.002)	(0.003)	(0.001)
Age (Husband)	-0.034	-0.040	0.058	0.016
	(0.022)	(0.025)	(0.037)	(0.011)
Age^2 (Husband)	0.000	0.000	-0.001	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Education (Husband)	0.004**	0.004**	-0.006**	-0.002**
	(0.001)	(0.002)	(0.002)	(0.001)
Non-earned income	0.009**	0.010**	-0.014**	-0.004**
	(0.004)	(0.005)	(0.007)	(0.002)
Household's total assets	0.001	0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)
Number of children aged 0-5	0.010	0.011	-0.017	-0.005
	(0.065)	(0.064)	(0.103)	(0.027)
Number of children aged 6-12	0.003	0.003	-0.004	-0.001
	(0.021)	(0.024)	(0.035)	(0.010)
Number of children aged 13-18	0.001	0.002	-0.002	-0.001
	(0.013)	(0.015)	(0.021)	(0.006)
Local paid caregiver's wage	-0.023**	-0.027**	0.039**	0.011**
	(0.009)	(0.011)	(0.016)	(0.004)
Local female wage	-0.040	-0.047	0.068	0.019
	(0.060)	(0.069)	(0.100)	(0.028)
Local male wage	0.032	0.037	-0.054	-0.015

	(0.053)	(0.061)	(0.089)	(0.025)
2004	-0.017	-0.020	0.029	0.008
	(0.018)	(0.022)	(0.030)	(0.009)
2006	-0.005	-0.006	0.009	0.002
	(0.019)	(0.023)	(0.033)	(0.010)
Hausman test: χ^2 statistics	4.54			
P value	0.103			
No. observations	820			

Note: 1. ***, ** and * denote significance level of 1, 5, 10 percent, respectively.

2. In order to avoid the coefficients and standard errors being equal to zero, here we measure non-earned income, family total assets, local paid caregiver's wage, local female wage and local male wage with "10 thousand Yuan per year".

3. There includes the province dummy in the regression of which the coefficients are not presented in the table.

DISCUSSION

Informal care is the primary support pattern for old people in China, and women have taken the main responsibility of parental caregiving. A sharp decline in government support for care provision and the fast population aging have increased the care burden on the women in the family. In this paper, with the data derived from China Health and Nutrition Survey (CHNS) in 2000, 2004, and 2006 and ordered probit model, we try to examine the relation between hours of parental care and self-reported health of married women in urban China based on both assumption of exogeneity and endogeneity of parental caregiving. Our results show that the married women would report much worse health if hours caring for parent-in-law increase, with the probability of "Excellent" and "Good" health reduced, and the probability of "Fair" and "Poor' health increased. It is possibly concluded that traditional patrilineal familial norms still play a role in shaping intra-household allocation in urban China as hour burden of caregiving for parent-in-law would significantly strengthen married women's mental stress while that of caring for their own parents not. In addition, with comparing the results between assumption of exogeneity and the 2SLS estimation, there is good evidence to assume that the endogeneity of hours of parental care with respect to women's self-reported health should be small in recent urban China.

Along with economic restructuring and income growth, the role of women as the income earner has increasingly important, but it would inevitably increase the burden

of caregiving shouldered by women that government get out of the field of reproduction and China's elderly population grow rapidly. Therefore, the conflict between women's dual roles of income earners and the caregivers is increasing. It is likely to be a major challenge to balance the employment, family and eldercare which is one of the factors related to women's health status and quality of life.

Our findings of this paper have important policy implications. The contributions of female have usually been neglected, mainly because the contributions of women to the economy in agricultural and informal sector have not been seen. We should pay attention to the responsibility of caregiving which is heavy increasingly, as well as the negative effect to women's emotional, physical aspects and social welfare caused by the great competition between the demands of employment and family caregiving. Given women's role in social reproduction, the deterioration of women's economic, health, and social status has severe negative consequences for the well-being of children, the elderly, and families. To deal with the impending eldercare crisis, and to improve the health of the elderly and women and gender equality, changes should be made to China's existing eldercare policies. The perfect network of family and social support must be set up to provide the women who take care of old parents with the necessary help and assistance. Such changes need to include greater recognition of unpaid care work within social security systems; creation of the harmonious family atmosphere encouraging the children, relatives and friends provide female caregivers with much more informal support; increasing the functions of socialized services for the elderly support, especially from the formal support of the social service systems to reduce the pressure of the caregivers.

Appendix Table A **Descriptive summary of the independent variables**

	Mean	Standard Error
Hours caring for own parents	0.14	0.02
Hours caring for parent-in-law	0.06	0.02
Age	43.52	0.17
Age^2	1917.30	14.55
Education (years)	9.79	0.19
Age (Husband)	45.74	0.20
Age^2 (Husband)	2124.07	18.44
Education (Husband)	10.75	0.18
Non-earned income	21087.60	701.12
Household's total assets	41785.90	3043.60
Number of children aged 0-5	0.01	0.00

Number of children aged 6-12	0.19	0.01
Number of children aged 13-18	0.49	0.02
Local paid caregiver's wage	5393.45	220.74
Local female wage	7680.39	132.60
Local male wage	9523.14	154.30
Mother alive	0.64	0.02
Father alive	0.46	0.02
Mother-in-law alive	0.56	0.02
Father-in-law alive	0.39	0.02
Mother needs care	0.10	0.01
Father needs care	0.07	0.01
Mother-in-law needs care	0.07	0.01
Father-in-law needs care	0.04	0.01
Number of wife's bother	1.68	0.04
Number of wife's sister	1.75	0.05
Number of husband's brother	1.71	0.05
Number of husband's sister	1.53	0.05
No. observations	820	

Notes: Earnings are discounted by consumer price index at the provincial level with 2000 as the base. We measure non-earned income, household's total assets, local paid caregiver's wage, local female wage and local male wage with "Yuan per year".

Appendix Table B **The OLS estimates of the reduced-form equation**

Dependent Variables	Hours caring for own parents		Hours caring for parent-in-law	
Independent Variables	Coef.	S.E	Coef.	S.E
Age	-0.075	0.114	0.031	0.060
Age^2	0.001	0.001	0.000	0.001
Education (years)	0.007	0.005	-0.005	0.003
Age (Husband)	0.095**	0.045	0.011	0.035
Age^2 (Husband)	-0.001*	0.000	0.000	0.000
Education (Husband)	0.003	0.008	0.000	0.002
Non-earned income	0.026	0.022	0.015	0.010
Household's total assets	0.000	0.002	-0.001	0.002
Number of children aged 0-5	0.733	0.619	-0.060	0.043
Number of children aged 6-12	-0.046	0.053	-0.068*	0.037
Number of children aged 13-18	-0.032	0.034	-0.023	0.022
Local paid caregiver's wage	-0.033	0.054	0.005	0.022
Local female wage	-0.262*	0.138	-0.070	0.142
Local male wage	0.362***	0.134	0.146	0.133
2004	-0.098*	0.054	0.020	0.026
2006	0.072	0.076	0.030	0.050
Mother alive	0.013	0.037	0.016	0.044
Father alive	0.098*	0.058	-0.012	0.044

Mother-in-law alive	-0.075	0.052	-0.008	0.045
Father-in-law alive	0.094	0.059	0.034	0.051
Mother needs care	0.542***	0.165	0.007	0.134
Father needs care	0.202	0.155	-0.032	0.058
Mother-in-law needs care	-0.163**	0.067	0.205**	0.092
Father-in-law needs care	0.047	0.181	0.370	0.230
Number of wife's bother	-0.034**	0.016	0.012	0.012
Number of wife's sister	-0.015	0.015	0.004	0.013
Number of husband's brother	0.039**	0.017	0.001	0.010
Number of husband's sister	0.020	0.013	0.004	0.012
No. observations	820			

Notes: 1. ***, ** and * denote significance level of 1, 5, 10 percent, respectively.

2. In order to avoid the coefficients and standard errors being equal to zero, here we measure non-earned income, family total assets, local paid caregiver's wage, local female wage and local male wage with "10 thousand Yuan per year".

3. There includes the province dummy in the regression of which the coefficients are not presented in the table.

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[1] China Statistics Year Book, 2011.

[2] According to data from the Second China National Survey on Disability in 2006, there are 44.16 million disabled persons who are 60 years old and above. Compared with the first survey in 1987, disabled persons of 60 years old and above increased by 23.65 million, accounting for 75.5 percent of the total newly increasing number of the disabled persons all over the whole country.

[3] For instance, the 2006 Survey shows that about 57 and 38 percent of the disabled elderly received care from daughter and daughters-in-law, respectively; the respective percentages for sons and sons-in-law were 40 and 27 percent. These figures are derived based on the responses of the elderly care recipients.

[4] Please see, Asada, Kinoshita, and Kakuma(2000), Glaser and Kiecolt-Glaser.(1997), Schulz and Beach(1999), Zhang, Vitaliano and Lin(2006)

[5] In terms of the latent variable method of ordered probit model, please see Powers and Xie (2009).

[6] The CHNS is jointly sponsored by the Carolina Population Center at the University of North Carolina at Chapel Hill, the Institute of Nutrition and Food Hygiene of China and the Chinese Academy of Preventive Medicine. Detailed information about the CHNS is available at the website www.cpc.unc.edu/china/home.html.

[7] The information of caregiving is from the Survey of Ever-Married Women under Age 52. The sample in 2000, 2004 and 2006 has been included in our research as the information of the siblings could not be accessible in the year of 1989, 1991, 1993 and 1997 which would be the basis to construct the effective instrumental variables for the hours of caregiving.

[8] We adjust the standard errors of estimates for heteroscedasticity and also for clustering by cross-sectional units.

[9] Ettner (1995, 1996) and Wolf and Soldo (1994) use parents' health status to measure the parents' demand for caregiving and number of siblings for the availability of other family members to share

caregiving responsibilities. Information on the health status of parents is unavailable in the CHNS, and information on siblings is unavailable for the 1993 and 1997 surveys.

[10] The OLS estimation results of the reduced-form equation are presented in Appendix Table B.

[11] Based on the Hausman test, the assumption that "hours caring for parents" is determined by care needs and availability of care resources not by health status seems a plausible assumption for urban China (Please see the results of the reduced-form in Appendix Table B).