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The Impact of the New Rural Pension Scheme on Retirement Sustainability in China: Evidences of Regional Differences in Formal and Informal Labor Supply

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Abstract: This paper evaluates the effect of China's New Rural Pension Scheme (NRPS) on the retirement sustainability in forms of both formal labor supply and informal labor supply, using data from China Health and Retirement Longitudinal Study (CHARLS). We explore the regional differences of the NRPS effect on labor supply between the Western regions and the other regions of China. Our analysis shows that western rural China has a more severe problem of "ceaseless toil" compared to the rest of the country. We find that NRPS improves the "ceaseless toil" situation of the Chinese rural elderly, and the results show a very different pattern between western China and other parts of the country.

Keywords: China Rural Pension Scheme, retirement sustainability, labor supply, grandchildren care, Western China, ceaseless toil

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I. Introduction

Labor supply behavior is an important factor in the sustainability of the retirement system [1, 2]. The retirement pattern of the Chinese elderly in rural regions has been described as "ceaseless toil", due to the fact that most elderly in rural China continue to work until they are no longer physically capable of labor [3, 4, 5, 6]. One of the causes of the "ceaseless toil" situation was the lack of an established rural pension system. Self-labor income and financial transfer from adult children have become the main income sources for the rural elderly [7, 8, 9]. However, since the Chinese economic reform in the 1980's, a large portion of the young and middle-aged rural population migrated to cities, leaving the elderly living on their own. Moreover, the One Child Policy, which was implemented in 1980, has significantly reduced the labor force and weakened a family's ability to support the elderly. Therefore, the traditional Chinese family pattern of old-age provision is no longer sustainable, resulting in many of the elderly finding themselves relying increasingly on their own labor [5].

In 2009, the Chinese government launched the New Rural Pension Scheme (NRPS), which has covered all regions of rural China since 2012, aiming to provide income support for the rural elderly and release them from the "ceaseless toil" [10]. The NRPS is a voluntary program that allows participants to receive a pension, starting age 60 after 15 years of contributions[1]. The pension includes two components: a basic pension component, and an individual account with matching contributions. The basic pension varies across different regions according to local government policies[2]. For example, the basic pension level in Beijing is 280 CNY per month [11] and 370 CNY per month in Shanghai[3]. However, in Western China, the highest basic pension level is only 85 CNY per month (Qinghai Province)[4]. China's central government fully

[1] Participants older than 45 when enrolling in NRPS will be required to make a lump-sum payment to cover the shortfall years.

[2] China Statistical Yearbook 2015, http://www.stats.gov.cn/tjsj/ndsj/2015/indexeh.htm.

[3] http://www.12333sh.gov.cn/201412333/xxgk/flfg/gfxwj/zrsxwj/201405/t20140507_1182703.shtml.

[4] http://www.gov.cn/fwxx/sh/2012-06/19/content_2164434.htm.

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finances the basic pension in the Western regions. However, it only finances up to 50% of basic pension in other regions, due to significant regional income inequalities and regional differences in economic development. Moreover, matching and management of the individual accounts are determined by local governments that vary across different regions [12]. Therefore, it is important to investigate the regional differences in NRPS program and its impacts on social welfare in different regions of China.

Several studies used the data from the China Health and Retirement Longitudinal Survey (CHARLS) to examine the impacts of NRPS on the rural elderly's labor activities including agricultural work, wage-earning work, self-employed activities, and unpaid family business work, but the conclusions were often conflicting. For example, Ning et al. [6] found that NRPS had no effect on the labor participation of the rural elderly. In contrast, Huang et al. [13] and Chen et al. [14] suggested that NRPS decreased the rural elderly's labor participation and increased their probability of retirement.

In addition to the formal labor activities studies mentioned above, the majority of China's rural elderly take up informal labor work such as household chores for their children or caring for grandchildren, so that their children are willing to support them later on in life [5]. These informal labor activities increase the labor intensity and economic pressure of the elderly and may also have a negative impact on their health. Therefore, to evaluate NRPS's impact on the rural elderly's wellbeing, one should also consider their participation in both formal and informal labor activities.

In this study, we evaluated the effect of NRPS on labor supply of the rural elderly in forms of both formal labor work (agricultural practices and off-farm employment) and informal labor work (the time spent caring for grandchildren) using data from the 2013 CHARLS. We found that NRPS improves the "ceaseless toil" situation of the Chinese rural elderly, hence contributing to the sustainability of the rural retirement system in China. Moreover, our results show a very different pattern between Western

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China and other parts of the country. To our knowledge, this is the first study to look at the regional differences of the impact of NRPS on rural elderly's labor supply.

II. Data and Variables

The data used in our research came from 2013 CHARLS, which is a biennial national survey of Chinese residents in 150 counties/districts and 450 villages/residential committees. We focus on the rural residents aged between 50 and 70, with 6,504 samples for formal labor analysis, and 3,119 samples for informal labor analysis[5]. Formal labor supply, in our study, is calculated as total weekly labor hours in activities including work on the farm, off-farm work for a wage, work for the household's off-farm business. Informal labor supply is calculated as weekly hours of taking care of grandchildren under the age of 16. We define the Western regions of China according to the "Western Development Program" of the Chinese government[6], which includes 6 provinces (Gansu, Guizhou, Qinghai, Shaanxi, Sichuan, and Yunnan), 5 autonomous regions (Guangxi, Inner Mongolia, Ningxia, Tibet, and Xinjiang), and 1 municipality (Chongqing), whereas all the other regions are defined as non-Western regions. The descriptions of the variables used in the study and the summary statistics are presented in Table 1.

Table 1. Definition of Variables and Descriptive Statistic

Variable	Definition	Mean	SD
Formal Labor	Weekly labor hours	38.097	37.421
Informal labor	Hours of taking care of grandchildren weekly	29.513	5.368
NRPS	If received NRPS pension (=1).	0.434	0.496
Ti	If age >= 60 (=1)	0.498	0.500
Pension	The amount of NRPS payment (CNY)	38.383	98.845

[5] The sample size of informal labor analysis is smaller than that of formal labor analysis because for each household, only one person is surveyed about the time spent caring grandchildren.

[6] http://www.chinawest.gov.cn

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Age	Age	59.305	5.478
Gender	Female (=1).	0.528	0.499
Education	Junior high school or higher (=1).	0.248	0.432
Married	Married and lives with spouse (=1).	0.841	0.366
Health	Health status (1=Excellent；2=Very good；3=Good；4=Fair；5=Poor；6=Very poor).	4.037	0.949
Land	Total land area including plough, forest land, meadow, pool (mu).	12.635	85.447
Income	Weekly household income (CNY).	305.202	782.086
West	Western China =1	0.265	0.441

Notes: The data is from CHARLS，2013-2014.

III. Methods

We employ the regression discontinuity method (RD) to examine the NRPS effect on the rural elderly's labor supply [See 7, 15, 16]. A standard fuzzy RD design is applied because not all rural elderly aged 60 or older receive NRPS pension[7]. Moreover, some elderly people started receiving pension before the age of 60, as they participated in the Old Rural Pension Scheme under which they could receive pension at the age of 55 or 50 in different regions[8]. Figure 1 illustrates the relationship between probability of receiving NRPS pension and age, and shows a discontinuous jump at age 60.

[7] The number of elderly aged 60 or older who did not receive NRPS pension in our sample is 501, which accounts for 15 percent of all elderly aged 60 or older in the analysis.

[8] The Old Rural Pension Scheme (ORPS) of China was implemented in 1992. People who enrolled in ORPS were automatically enrolled in the NRPS. The elderly who received the pension before age of 60 account for 1.29% of our sample.

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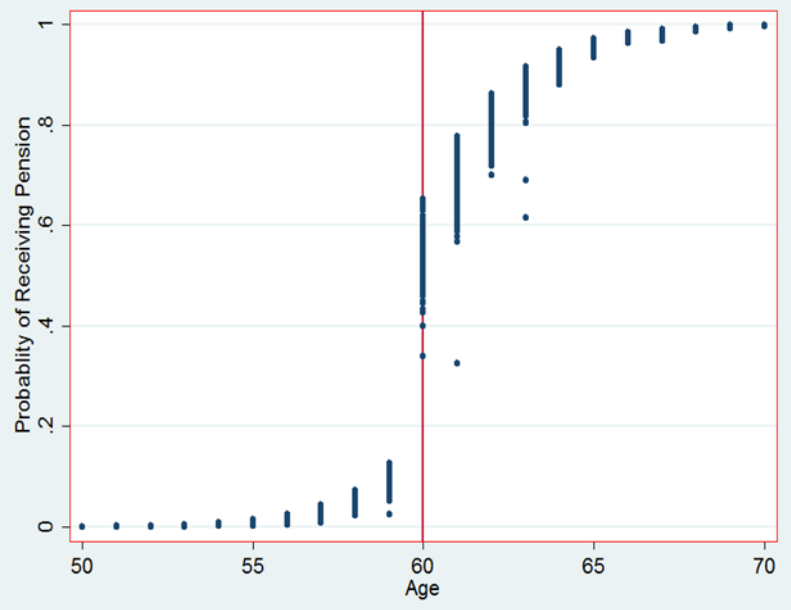

Figure 1. Relationship of Age and Probability of Receiving NRPS Pension

The first stage model is set up as

$$\Pr(NRPS_i = 1) = F(\alpha_0 + \alpha_1 Age_i + \pi T_i + \gamma'_i X_i + \nu_i), \qquad (1)$$

where *Pr(NRPSi=1)* represents the probability of receiving NRPS pension, and *Ti* is the treatment dummy, which is 1 when the individual is older than 60. *Xi* is a vector of control variables including income, gender, marriage status, health condition, education level, and land acreage. The second stage model analyzes the effect of NRPS status on labor supply (Y_i)

$$Y_i = \gamma_0 + \gamma_1 \Pr(NRPS_i = 1) + Age_i + \beta_i X_i + \varepsilon_i . \qquad (2)$$

IV. Results

We first estimate the effect of NRPS on labor supply in both formal labor work and informal labor work of rural elderly by pooling the samples from both West and non-West regions together (Table 2). The amount of pension payment decreases the informal labor supply significantly, but has no effect on formal labor supply. Unsurprisingly, females contribute less to formal labor, but more to informal labor compared to males. Furthermore, the elderly in the West regions contribute significantly more to formal labor than non-Western regions, implying that Western China has a more severe problem of "ceaseless toil" compared to the rest of the country. Formal labor decreases with worse health condition. In addition, married elderly tend to provide more

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formal labor.

Table 2. NRPS Effects on Formal and Informal Labor Supply

Variable	Formal labor	Informal labor
Pr(NRPS)	-2.076	4.722
	(0.248)	(0.411)
Pension	-0.001	-0.012**
	(0.769)	(0.029)
Age	-0.584***	-1.356***
	（0.000）	（0.003）
Gender	-8.830***	6.380***
	（0.000）	（0.002）
Education	-0.273	0.156
	(0.752)	(0.957)
Married	2.782***	3.433
	（0.001）	(0.197)
Health	-0.759***	0.742
	（0.003）	(0.428)
Income	0.001**	0.003***
	(0.038)	（0.004）
Land	0.001	-0.013
	(0.839)	(0.071)
West	4.194***	3.590
	（0.000）	(0.116)

Notes: *significant at 1%; ** significant at 5%; *** significant. P-values are presented in parentheses.

To study the regional differences in the effect of NRPS, we further divide our sample into two region groups: the Western regions and non-Western regions. The result is presented in Table 3, and the two regions show very different patterns. We found that, as people age, their formal labor supply decreases significantly in the non-Western regions, but not in the Western regions, which again implies the “ceaseless toil” situation in Western rural China. The informal labor supply decreases significantly as people age in both regions. Furthermore, increasing the amount of pension payment significantly decreases the informal labor supply in the non-Western regions, but has no effect in the Western regions.

Table 3. Regional Model of NRPS Effects on Labor Supply

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	Formal labor		Informal labor	
Variable	West region	Non-west region	West region	Non-west region
Pr(NRPS)	-7.418**	0.112	5.443	2.540
	(0.023)	（0.958）	（0.593）	（0.721）
Pension	-0.009	0.0001	-0.005	-0.012**
	（0.256）	（0.984）	（0.823）	(0.026)
Age	-0.003	-0.807***	-1.396*	-1.184**
	（0.989）	(0.000)	(0.068)	(0.036)
Income	0.00004	0.002**	0.013**	0.002*
	（0.968）	(0.038)	(0.046)	(0.066)
Married	4.466***	2.300**	5.989	1.790
	(0.006)	(0.027)	（0.132）	（0.606）
Health	-0.890*	-0.728**	2.265	0.114
	(0.094)	(0.011)	（0.302）	（0.909）
Gender	-6.097***	-9.837***	-2.796	9.617***
	(0.000)	(0.000)	（0.528）	(0.000)
Education	-2.487	0.250	-6.428	1.777
	（0.188）	（0.797）	（0.266）	（0.594）
Land	0.014	0.0004	-0.228**	-0.012
	（0.786）	（0.906）	(0.042)	（0.109）

Notes: *significant at 1%; ** significant at 5%; *** significant. P-values are presented in parentheses.

V. Discussion and Concluding Remarks

In this study, we evaluate the effect of NRPS on the retirement sustainability in forms of both informal and formal labor supply, and explore the regional differences in the effects of NRPS. Our results show that western rural China has a more severe problem of “ceaseless toil” compared to the rest of the country. We found that receiving NRPS pension significantly improves the “ceaseless toil” situation, especially in western China, by decreasing the formal labor supply. This effect is not evident in the non-Western regions, although increasing the amount of pension payment can significantly decrease the informal labor supply in the non-West region. This regional difference of the NRPS effect may be due to the income differences between the two regions. In sum, our results show that the NRPS program improves retirement sustainability by alleviating the “ceaseless toil” situation of the Chinese elderly, and also justifies the needs to develop region-specific pension programs in China.

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