The Effect of the New Rural Social Pension Insurance Program on the Choice of Medical Institutions for Rural Elderly

-- Evidence from Chinese Family Panel Studies

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Abstract. To explore the effect of the New Rural Social Pension Insurance (NRSPI) program on the choice of medical institutions for rural elderly is not only an effective entry point to test the influence of the NRSPI program, but also plays an significant role in maintaining people's health, improving our nation's retirement pension system and the construction of the new countryside. To this end, based on the five periods of Chinese Family Panel Studies (CFPS) data from 2010 to 2018, this paper used Logit model and DID model to empirically investigate the impact of the NRSPI program on the choice of medical institutions for rural elderly. The empirical results show that: first, the NRSPI program can significantly promote the rural elderly to choose higher level of medical institutions for medical treatment. Specifically, receiving the NRSPI pension will increase the probability of rural elderly choosing hospitals at the county level and above by 8.6%, the hospitals at the township level by 2.5%, and will decrease the likelihood of choosing hospitals at the village level by 5.5%. Second, the effects of the NRSPI program are heterogeneous. Compared with the rural elderly in high income families, the program has a greater impact on the choice of medical institutions for those in low income families. Compared with the rural elderly in the eastern region, the program has a greater impact on the selection of county level hospitals and above by those in the central and western regions, but has less impact on the selection of village level hospitals.

Keywords: New Rural Social Pension Insurance; Rural Elderly; Choice of Medical Institution.

1. Introduction

Health is the basic requirement for individual survival and also the fundamental condition for economic and social development. The report of the 19th National Congress of Communist Party of China (CPC) put forward the “implementation of a healthy China strategy”, which indicates that the CPC has elevated the protection of people's health to a national strategic height. In recent years, with the gradual improvement of people's material living standards, personal health, especially the health of the elderly in rural areas, has attracted increasing attention. At present, the health status of the elderly in China is not optimistic. In 2018, China's elderly population aged 60 and above reached 250 million, among which the proportion of the elderly suffering from more than one chronic disease was as high as 75%, and there were more than 40 million disabled or partially disabled elderly, with increasing demands for medical services. (For details, please refer to the press conference of "Guidelines on Establishing and Improving the Elderly Health Service System" held by the National Health Commission. [http:// www. scio. gov. cn/ xwfbh/ gbwxwfbh/ xwfbh/ wsb/ Document/ 1667631 /1667631.htm](http://www.scio.gov.cn/xwfbh/gbwxfbh/xwfbh/wsb/Document/1667631/1667631.htm)). However, for a long time, China's rural elderly have large population with low-income, “the difficulty of getting medical service” problem is outstanding. Although China has made great achievements in poverty alleviation in recent years, the phenomenon of “the illness-caused poverty and poverty-caused illness” is still common. According to relevant data, among the remaining poor, the proportion of family members falling into poverty and falling back into poverty due to illness is on the rise, from 42 % in 2015 to 44 % in 2017. (For details, please refer to The State Council Information Office. "Returning to poverty due to illness is one of the priorities for the next step.", [http:// www.scio. gov.cn/ xwfbh/ xwfbh/ wqfbh/ 35861/ 37191/ zy37195/ Document/ 1565610/1565610.htm](http://www.scio.gov.cn/xwfbh/xwfbh/wqfbh/35861/37191/zy37195/Document/1565610/1565610.htm)) Disease is still one of the main causes of poverty in rural China.

At present, China is in the decisive period of building a moderately prosperous society in all respects. Ensuring that the elderly in rural areas have access to care and medical treatment is not only an inevitable requirement to safeguard people's health and promote social equity, but also an important measure to achieve rural revitalization and promote national economic development. To this end, in 2009, the State Council decided to pilot the New Rural Social Pension Insurance (NRSPI) program for 10 % of counties across the country. The NRSPI program stipulates that the rural residents over 16 years old who did not participate in the basic old-age insurance for urban workers can participate in the program, and the rural residents over 60 years of age can directly receive the NRSPI pension, and the insurance premium will be paid by their insured children. In the meantime, basic payment standard of policy set 5 levels from 100 to 500 yuan per year, (In 2014, the central government adjusted the basic payment standard to 12 levels, ranging from 100 to 2000 yuan per year.) which will be chosen by the people participating in the program independently. On pension benefits, the pension is composed by basic pension and individual account pension. The basic pension standard set by the central government is 55 yuan per person per month, (The basic pension provided by the central government was raised to 70 yuan and 88 yuan per person per month in 2014 and 2018 respectively,) and local governments can subsidize it according to actual conditions. The individual account pension is the total amount saved in the individual account divided by 139. By the end of 2012, China had basically achieved full coverage of the NRSPI program with 460 million people participating in the program (Zhang Ye et al., 2016). The program provides a certain amount of pension income for the elderly in rural areas who are eligible for pension, and to partly improve their medical payment ability, thus affecting their medical treatment behavior. So, is the choice of medical institutions for rural elderly as an important part of their medical treatment behavior affected by the program? How deep is the program impact? Is there heterogeneity in the effects of the program? Further discussion on these issues is not only an effective entry point to test the influence of the NRSPI program, but also plays an significant role in maintaining people's health, improving our nation's retirement pension system and the construction of the new countryside.

The rest parts of this paper are arranged as follows: The second part is related literature review. The third part is variable selection, data source and model construction. The fourth part is the empirical results and analysis. The fifth part is the conclusion and policy suggestions.

2. Literature Review

2.1 Research on the Choice of Medical Institutions

For a long time, the choice of medical institutions has been a research hotspot. In the past, the academic research mainly focused on two aspects:

The first is to pay attention to the influencing factors of the choice of medical institutions. A large number of foreign studies (Bolduc et al, 1996; Jeffrey and David, 2003; Hanson et al., 2004; Philip and Theoharides , 2009) have shown that patients' personal and family characteristics (income, health condition, medical treatment habits, etc.) and medical environment characteristics (distance to medical facility, medical level, service price, reputation, etc.) have an important impact on patients' choice of medical institution. For example, Obinna (2005) used indicators of socio-economic conditions to study the factors influencing the utilization of community health centers in southwestern Nigeria. Borah (2006) revealed that the price of medical services and distance to medical facility are important factors affecting the choice of medical institutions, but after considering the quality of medical services, the distance will no longer limit the choice of medical institutions (Qian, 2009). Yao Zhaoyu and Zhu Huijie(2014) demonstrated that factors such as educational level, family economic income and distance to medical facility had significant influence on the choice of medical institution based on micro-survey data from Jiangsu Province. In addition, some scholars (Zhao Shaoyang et al., 2014; Yu Changyong, 2017) found that the setting of the support capacity and reimbursement ratio of medical insurance can effectively guide the selection of medical institutions for urban and rural residents.

The second is to pay attention to the impact of medical insurance on the choice of medical institutions. Mitchell and Hadley (1997) studied the influence of various types of insurance on the hospital choice of young women with breast cancer in the United States, and pointed out that the insured women were more likely to choose nearby cancer hospitals rather than distant hospitals. Yip et al. (1998) found through a case study of Shunyi County, Beijing, China, that patients with new rural cooperative medical system (NCMS) were more likely to use village level medical facilities. Marisol and Alexandrina (2004) found that people with government health insurance were 2.81 times more likely to choose a general practitioner than a specialist one. Jowett et al. (2004) found that patients who participated in voluntary insurance in Vietnam were more likely to use outpatient services and choose public health institutions for treatment, and the impact of insurance on low income people in Vietnam was more obvious. Jiang Jinqi (2014) believed that the NCMS increased the probability of rural residents going to county and township medical institutions. Zheng Lili (2017) pointed out that different medical insurance have different effects on guiding the selection of medical institutions.

2.2 Research on the Implementation Effects of the NRSPI Program

Since the implementation of the NRSPI program, its policy effect has been widely concerned by Chinese scholars. In China, empirical methods are mainly used to study the policy effect from the aspects of intergenerational support, consumption and subjective welfare.

First, in the aspect of family intergenerational support, Chen Huashuai and Zeng Yi(2013) found that the NRSPI program will significantly reduce intergenerational economic support, improved the elderly's economic independence, increase the likelihood of the elderly living alone (Chen Lingguo et al, 2013), but the policy effect is limited (Zhang Chuanchuan and Chen Binkai, 2014).In addition, some scholars (Jin Weidong et al., 2018) believed that the NRSPI program has enhanced the intergenerational economic support and will significantly reduce the intergenerational time support. Second, in terms of consumption, some studies found that the NRSPI program will significantly increase the household subsistence consumption (Zhang Fangfang et al., 2017), and mainly promote the consumption of food, daily necessities and water and electricity (Huang Hongwei and Hu Haoyu, 2018).However, other studies (Zhang Chuanchuan, 2014; Xie E, 2015) indicated that it has no significant impact on consumption. Third, in the aspect of subjective welfare, Zhang Ye et al. (2016) showed that the NRSPI program had a significant impact on improving the quality of farmers' old-age care, and the policy effect had regional heterogeneity. Some scholars (Chen Fei et al., 2020) found that insurance participation can significantly improve the subjective welfare of the elderly, but has no significant impact on health (Zheng Chao, Wang Xinjun, 2020).In addition, many scholars carried out studies from the aspects of labor supply (Zhang Chuanchuan et al., 2014) and government satisfaction (Ruan Rongping et al., 2020).

To sum up, although a large number of literatures have demonstrated the social and economic benefits of the NRSPI program in various aspects, there are few literatures studying the influence of the NRSPI program on the choice of medical institutions for rural elderly. Compared with the previous literature, the main contribution of this paper may be: this paper adopts the CFPS national micro survey data, uses the Logit model and DID model to empirically explore the impact of pension on the choice of medical institutions, and enriches the existing research from the research perspective. In addition, the paper further discusses the heterogeneity of the program to different groups, which is helpful to evaluate the policy effect more comprehensively.

3. Research Design

3.1 Data Sources

The data used in this paper are from five periods of Chinese Family Panel Studies (CFPS) from 2010 to 2018.CFPS is a social tracking survey program conducted by the Institute of Social Science Survey (ISSS) at Peking University. The survey sample covers 16,000 families in 25 provinces in

China, which is nationally representative (Yu Xinliang et al., 2019). The CFPS survey has been implemented and promoted since 2010, and is conducted every two years. So far, the data of five surveys from 2010 to 2018 have been collected. The survey contents cover education access, economic activities, population characteristics, physical and mental health, intergenerational relations and other aspects, providing all kinds of information needed for the study of this paper.

In this paper, according to the research purpose and relevant provisions of the NRSPI program, the following treatments are made for the sample selection: First, all samples of urban residents are eliminated. Second, samples under the age of 16 or in school were excluded. Third, samples that have received retirement allowance or participated in other pension insurance such as the rural social endowment insurance system or the commercial pension insurance were excluded (Jin Weidong et al., 2018). Finally, this paper based on personal and family information to select and match, and 103,433 valid samples were retained after elimination.

3.2 Variable Selection and Description

1. Explained variable. In this paper, “the choice of medical institution” (*Med- institution*) was selected as the explained variable. Specifically, the results of the survey “Where do you usually go to see a doctor?” are used to measure it. According to the definition of institutions provided by the original questionnaire, those medical institutions are divided into three types: hospitals at county level and above, township level and village level. Among them, hospitals at county level and above include general hospitals and specialized hospitals, township level include community health service centers and countryside health centers, and village level include community health service stations, village clinics, and the classified variable is treated as three dummy variables.

Table 1. Variable description and descriptive statistics

Variable name	Variable assignment	Obs	Mean	SD	Min	Max
Med-institution	county level and above hospitals =1, otherwise=0	87,534	0.249	0.432	0	1
	township level hospitals =1, otherwise =0	87,534	0.229	0.420	0	1
	village level hospital =1, otherwise =0	81,240	0.504	0.499	0	1
Pension	yes=1,no=0	103,433	0.124	0.330	0	1
Age	take the actual value(years)	103,412	45.55	17.128	16	109
Gender	male=1,female=0	103,433	0.483	0.499	0	1
Nation	Han=1, otherwise =0	86,015	0.874	0.330	0	1
Marital status	married or cohabitation =1, otherwise =0	103,433	0.783	0.411	0	1
Years of education	take the actual value (years)	100,654	5.006	4.538	0	22
Self-rated health	very healthy=1, pretty healthy=2, quite healthy=3, unhealthy=4, very unhealthy=5	103,412	2.825	1.323	1	5
Med-insurance	yes=1, no=0	103,212	0.895	0.305	0	1
Personal income	take the logarithm(yuan/year)	41,729	8.602	2.006	0	13.641
Family scale	actual family number(person)	102,735	4.548	2.004	1	26
Family income	take the logarithm(yuan/year)	98,138	10.133	1.225	0	16.119

2. Explanatory variable. In this paper, “Do you receive the NRSPI pension?” (*Pension*) is selected as the core explanatory variable. (According to the NRSPI program regulation, only the participants that have reached 60 be eligible to receive pension. However, due to the impact of factors such as the difference in implementation efficiency of local governments and different specific implementation plans of the program, in the actual implementation of it, there are cases of receiving the pension before the age of 60 (Zhang Chuanchuan et al., 2014; Yu Xinguang et al., 2019).) Specifically, the results of

the survey “Do you receive the NRSPI pension?” or “Do you receive pension insurance?” are used to measure it. The explanatory variable is a dummy variable, the value of which is 1 when receiving the NRSPI pension, and 0 when not receiving the NRSPI pension.

3. Control variables. In addition to the NRSPI pension, the choice of medical institutions for rural elderly will also be affected by other factors. This paper selected some control variables according to the existing literature, research objectives and the accessibility of relevant variables in the database, including: ① individual characteristics variables: *Age*, *Gender*, *Nation*, *Marital status*, *Years of education*, *Personal income*, *Self-rated health*, whether to participate in medical insurance (*Med-insurance*). (According to the definition provided by the original questionnaire, the types of medical insurance include free medical service, supplementary medical insurance, NCMS, etc.) ② family characteristic variables: *Family income* and *Family scale*. ③ regional dummy variable. In the stage of empirical analysis, this paper takes logarithms of all income indicators (Yu Xinliang, 2019). the names, assignments, and descriptive statistics of these variables are shown in Table 1.

3.3 Model Construction

1. Logit model

As the explained variable in this paper is a binary dummy variable, Logit model is selected in this paper for estimation. The specific model is set as:

$$\text{logit}(P) = \ln\left(\frac{P_1}{P_0}\right) = \beta_0 + \beta_1 X_1 + \sum \beta_i X_i + \varepsilon_i \quad (1)$$

Where, P_1 is the probability of choosing a certain level of hospital, P_0 is the probability of not choosing a certain level of hospital, β_0 is a constant term, X_1 is the core explanatory variable, β_1 is the regression coefficient of the core explanatory variable, X_i represents a series of control variables, ε_i represents random error term.

2. DID model

Since the NRSPI program follows the principle of voluntary participation, we must take into account the endogenous problems caused by the omitted variable in the participation of the NRSPI program when evaluating the effect of it. At this time, the results estimated by using the traditional regression method may be biased. DID method can eliminate the potential unobservable features of individuals and the influence of the common trend experienced by the treatment group and the control group from 2010 to 2014 on the estimated results through two differences (Zhang Ye et al., 2016), thus effectively alleviate the endogenous problem. At present, this method has been widely used in the policy effect assessment in the field of economics (Ashenfelter and Card, 1985; Duflo, 2001).

The implementation of the NRSPI program provides a quasi-natural experimental condition for this study. Draw lessons from the practice of existing literature (Jin Weidong et al., 2018), this paper takes 2012, the year when the NRSPI program was fully carried out, as the node, and the samples that did not receive the NRSPI pension in 2010 but received it in 2014 were classified into the treatment group, the samples that did not receive the NRSPI pension in 2010 and 2014 were grouped into the control group, and the effects of the program were tested by comparing the changes of medical institution selection before and after the program between the treatment group and the control group. Based on the model construction of existing literature (Hoynes et al., 2011), this paper only the interaction term of the treatment group dummy variables and the time dummy variables were included in the regression model, and the specific model was set as follows:

$$Y_{it} = \beta_0 + \beta_1 D_i \times T_t + \sum \beta_i X_{it} + z_t + \varepsilon_{it} \quad (2)$$

Where, Y_{it} represents the medical institution selection of individual i in the year t . The dummy variable D_i is used to distinguish the treatment group from the control group. $D_i=1$ means that

sample i belongs to the treatment group, and $D_i=0$ means that sample i belongs to the control group. Time dummy variable T_t is used to distinguish before and after the experiment. $T_t=1$ means that the investigation year was 2014, and $T_t=0$ means that the investigation year was 2010. The interaction term $D_i \times T_t$ is the core variable concerned by the model, and its coefficient β_1 is regarded as the effect of the NRSPI program. X_{it} represents a series of control variables, z_t represents the regional fixed effect, and ε_{it} represents random error term.

4. Empirical Analysis

4.1 The Influence of the NRSPI Program on the Choice of Medical Institutions for Rural Elderly

Table 2 reports the regression results for model (1). Where, (1), (2) and (3) are the regression results without any control variables added. The estimation results show that the estimated coefficients of the core explanatory variables *Pension* are significant at the level of 1%, and the estimated coefficient of *Pension* for the selection of hospitals at county level and above and township level is positive, while the estimated coefficient for the selection of hospitals at village level is negative. (4), (5) and (6) further control individual characteristic variables, family characteristic variables and regional fixed effects. The regression results show that *Pension* has a significant influence on *Med-institution* at the level of 1%, indicating that the NRSPI pension can promote the rural elderly to choose higher level hospitals. Specifically, receiving the NRSPI pension will increase the probability of rural elderly choosing hospitals at the county level and above by 8.6%, the hospitals at the township level by 2.5%, and will decrease the likelihood of choosing hospitals at the village level by 5.5%.

To sum up, this paper believes that the NRSPI program can significantly promote the elderly in rural areas to choose a higher level of medical institutions for medical treatment. However, in terms of the degree of program influence, the average marginal effect of *Pension* on *Med-institution* is less than 10%, indicating that the program effect is limited. This paper argues that the possible reasons for the results are as follows: first, the NRSPI program has produced income effect, providing a certain amount of continuous and stable pension income for participants, improved their capacity for medical payment and income expectations, thus prompting some rural elderly people who has the original choice of village level hospital to choose higher levels of hospital. Second, the NRSPI program reflects the concern for vulnerable groups, objectively improves the endowment quality (Chen Fei et al., 2020) and subjective welfare (Zhang Ye et al., 2016) in rural areas, and urges them to set higher requirements for their own health, thus increasing their demand for higher level hospitals. Third, the insurance level of the NRSPI program is inadequate, and the pension provided for the rural elderly is low, which makes it difficult to significantly change the choice of their medical institutions, thus limiting the benefits of the program.

For other control variables included in the model, the estimated results show that *Age*, *Gender*, *Years of education*, and *Med-insurance* and other factors have significant influences on *Med-institution* for rural elderly. Among them, older people are more likely to choose township level hospitals. It may be because of the influence of action capability, health expectation, income generation ability and other factors, they prefer low level medical institutions that are more convenient and lower in price. However, the improvement of income encourages them to seek medical treatment in township hospitals. The rural elderly with longer years of education tend to go to hospitals at the county level or above. One possible explanation is that they pay more attention to factors such as the environment and medical level, and have higher personal medical risk awareness. The research results are the same with those of Yao Zhaoyu and Zhu Huijie (2014). Self-rated health is the subjective feeling of patients on their own health. The rural elderly with poor self-rated health is more sensitive to their own diseases and more likely to choose hospitals at the county level or above with better medical level and sanitary conditions, which is consistent with the findings of Wang Yiqui and Zhang Bing (2009). Medical insurance will guide rural elderly to choose township hospitals and village hospitals for treatment, which is as same as the results of Zheng Lili's study (2017). Rural

elderly with higher family income and personal income has a stronger medical payment ability, can afford the medical expenses of high-level hospitals, and are less likely to choose low level hospitals, which is consistent with the research results of Sun Mengjie and Han Huawei (2013). The larger the family scale is, the less medical resources and financial support are allocated to them under the limited family resources, so they are more inclined to choose village level hospitals. Most of the results above are consistent with cognition, indicating that the results are highly reliable.

Table 2. Effect of NRSPI program on the Med-institution for rural elderly

Variable	(1) County level and above	(2) Township level	(3) Village level	(4) County level and above	(5) Township level	(6) Village level
Pension	0.019*** (4.57)	0.045*** (11.48)	-0.047*** (-9.72)	0.086*** (8.24)	0.025*** (2.62)	-0.055*** (-4.20)
Age				-0.00690*** (-4.47)	0.00756*** (5.03)	-0.00360** (-2.47)
Gender				-0.218*** (-6.23)	0.0764** (2.12)	0.141*** (4.29)
Nation				-0.458*** (-8.68)	-0.0193 (-0.33)	0.215*** (4.19)
Marital status				-0.107** (-2.42)	0.106** (2.29)	-0.00514 (-0.12)
Years of education				0.0344*** (8.01)	0.00372 (0.85)	-0.0243*** (-6.08)
Self-rated health				0.226*** (16.10)	0.0131 (0.94)	-0.118*** (-8.71)
Med-insurance				-0.228*** (-4.25)	0.233*** (3.81)	0.0963* (1.75)
Personal income				0.0937*** (7.77)	-0.0151 (-1.32)	-0.0380*** (-3.57)
Family scale				-0.0559*** (-5.70)	-0.00420 (-0.43)	0.0386*** (4.31)
Family income				0.174*** (9.07)	-0.00566 (-0.33)	-0.0726*** (-4.09)
Regional fixed effects	No	No	No	Yes	Yes	Yes
Constant	-1.118*** (-132.06)	-1.249*** (-142.42)	0.0488*** (6.40)	-2.777*** (-8.40)	-2.589*** (-5.77)	1.149*** (3.60)
Observations	87534	87534	81240	23546	23541	19234

Note: ①Standard errors in parentheses ②Significance level * $p < 0.10$, ** $p < 0.05$ and *** $p < 0.010$
③ the estimated coefficient of the core explanatory variable *Pension* is the average marginal effect obtained through calculation.

4.2 DID Model Estimation Results

Table 3 reports the regression results for model (2).The results show that the coefficients of the core variable $D_i \times T_t$ is significant, and the direction of the coefficients is consistent with the regression results in Table 2 (3), (4) and (5).This shows that the NRSPI pension can significantly promote rural elderly to choose hospitals at the county level and above and township level hospitals, reduce the possibility of choosing hospitals at the village level. To be more specific, after controlling for individual characteristic variables, family characteristic variables and regional fixed effects, the treatment group had a higher probability of choosing hospitals at county level and above than the control group by 3.1%, choosing hospitals at township level was 4.1% higher than the control group,

and choosing hospitals at village level was 3.6% lower than the control group. In addition, the average marginal effect of core variable $D_i \times T_t$ on *Med-institution* is between 3% and 5%, indicating that the effect of the NRSPI program is still limited after controlling endogenous problem. Thus, it can be seen that the program can promote rural elderly to choose higher level medical institutions for medical treatment, and it has reduced their choice of medical treatment in village hospitals, but the impact of the program is limited.

Table 3. DID model estimates results

Variable	(1)	(2)	(3)
	County level and above	Township level	Village level
$D_i \times T_t$	0.031**	0.041***	-0.036*
	(2.47)	(2.76)	(-1.86)
Age	-0.00418	0.00330	-0.00155
	(-1.29)	(1.19)	(-0.48)
Gender	-0.181**	0.0671	0.00369
	(-2.43)	(1.02)	(0.05)
Nation	-0.623***	0.0551	0.272**
	(-5.82)	(0.52)	(2.49)
Marital status	-0.235***	0.0828	0.0886
	(-2.66)	(1.00)	(1.06)
Years of education	0.0201**	0.000612	-0.0204**
	(2.02)	(0.07)	(-2.17)
Self-rated health	0.174***	-0.0388	-0.123***
	(5.69)	(-1.42)	(-4.40)
Med-insurance	-0.230*	0.0719	0.0105
	(-1.72)	(0.61)	(0.07)
Personal income	0.0444**	-0.0174	-0.00959
	(2.16)	(-0.96)	(-0.51)
Family scale	0.00912	-0.0162	0.0170
	(0.44)	(-0.89)	(0.88)
Family income	0.0134	-0.0383	-0.0156
	(0.39)	(-1.35)	(-0.49)
Regional fixed effects	Yes	Yes	Yes
Constant	0.0217	-1.014***	0.473
	(0.02)	(-2.87)	(0.40)
Observations	7145	7101	4365

Note: ①Standard errors in parentheses ②Significance level * $p < 0.10$, ** $p < 0.05$ and * $p < 0.010$ ③the estimated coefficient of the core variable $D_i \times T_t$ is the average marginal effect obtained through calculation.

4.3 Robustness Test

1. Change estimation method. Probit model is adopted to test the robustness of the above results in this paper, and the estimated results are shown in Table 4. The results show that the influence of the core explanatory variables *Pension* on *Med-institution* is still significant at the 1% level. To be specific, the rural elderly receiving the NRSPI pension are 8.6% more likely to choose hospitals at county level or above, 2.7% more likely to choose hospitals at township level, and 5.5% less likely to choose hospitals at village level. The regression results are similar to the results above, which preliminarily verifies that the estimation results above are robust.

2. Add new control variables. Although individual characteristic variables, family characteristic variables and regional fixed effects are controlled in this paper, some key variables may be omitted, which leads to bias in the estimation results. Existing literatures have shown that medical environment characteristics such as distance to medical facility and medical level have a significant impact on

patients' choice of medical institutions. Therefore, this paper further controls the characteristic variables of medical environment, including: ①*Medical condition* (According to the definition of the original questionnaire, *medical conditions* include medical treatment, medicine, medical treatment, hospitalization and other conditions, as well as the distance to seek medical treatment and the degree of convenient transportation.). Specifically, the results of the survey “Are you satisfied with the medical condition of the medical institutions?” was used to measure it, and the value was 1 to 5, which represented “very satisfied” to “very dissatisfied”. ②*Medical level*. Specifically, the results of the survey “What do you think of the medical level at the medical institutions?” was used to measure it with a value ranging from 1 to 5, representing “very good” to “very bad”. The estimated results after adding new control variables are shown in Table 5.

Table 4. Robustness test: Change estimation method

Variable	(1)	(2)	(3)
	County level and above	Township level	Village level
Pension	0.086***	0.027***	-0.055***
	(8.31)	(2.79)	(-4.16)
Age	-0.00370***	0.00421***	-0.00228**
	(-4.23)	(4.87)	(-2.55)
Gender	-0.123***	0.0422**	0.0862***
	(-6.09)	(2.06)	(4.28)
Nation	-0.272***	-0.0168	0.132***
	(-8.77)	(-0.51)	(4.18)
Marital status	-0.0649**	0.0573**	-0.00284
	(-2.55)	(2.18)	(-0.11)
Years of education	0.0203***	0.00222	-0.0150***
	(8.23)	(0.88)	(-6.13)
Self-rated health	0.131***	0.00981	-0.0721***
	(16.37)	(1.22)	(-8.73)
Med-insurance	-0.138***	0.128***	0.0591*
	(-4.35)	(3.74)	(1.75)
Personal income	0.0528***	-0.00861	-0.0232***
	(7.80)	(-1.31)	(-3.56)
Family scale	-0.0321***	-0.00237	0.0234***
	(-5.77)	(-0.43)	(4.27)
Family income	0.0968***	-0.00199	-0.0443***
	(9.10)	(-0.20)	(-4.09)
Regional fixed effects	Yes	Yes	Yes
Constant	-1.555***	-1.520***	0.703***
	(-8.01)	(-6.39)	(3.57)
Observations	23546	23541	19234

Note: ①Standard errors in parentheses ②Significance level * $p < 0.10$, ** $p < 0.05$ and * $p < 0.010$ ③ the estimated coefficient of the core explanatory variable *Pension* is the average marginal effect obtained through calculation.

It can be seen from Table 5 that after further controlling the characteristic variables of the medical environment, the direction and significance level of the regression coefficient are still consistent with the regression results in Table 2 (3), (4) and (5), which verifies the above conclusions again.

Table 5. Robustness test: Add new control variables

Variable	(1)	(2)	(3)
	County level and above	Township level	Village level
Pension	0.089*** (8.49)	0.023*** (2.39)	-0.055*** (-4.16)
Age	-0.00716*** (-4.61)	0.00767*** (5.08)	-0.00360** (-2.46)
Gender	-0.218*** (-6.17)	0.0751** (2.08)	0.139*** (4.23)
Nation	-0.476*** (-8.95)	-0.00807 (-0.14)	0.219*** (4.26)
Marital status	-0.0831* (-1.87)	0.0905* (1.96)	-0.0135 (-0.32)
Years of education	0.0378*** (8.71)	0.00150 (0.34)	-0.0249*** (-6.22)
Self-rated health	0.236*** (16.64)	0.00979 (0.70)	-0.119*** (-8.83)
Med-insurance	-0.222*** (-4.11)	0.225*** (3.68)	0.0936* (1.69)
Personal income	0.110*** (8.92)	-0.0257** (-2.21)	-0.0422*** (-3.90)
Family scale	-0.0571*** (-5.79)	-0.00307 (-0.31)	0.0390*** (4.35)
Family income	0.177*** (9.14)	-0.00656 (-0.38)	-0.0732*** (-4.11)
Medical condition	0.0245 (0.94)	-0.00169 (-0.06)	-0.0346 (-1.45)
Medical level	-0.302*** (-11.71)	0.183*** (6.90)	0.117*** (4.97)
Regional fixed effects	Yes	Yes	Yes
Constant	-2.267*** (-6.76)	-2.956*** (-6.54)	0.988*** (3.07)
Observations	23496	23491	19191

Note: ①Standard errors in parentheses ②Significance level * $p < 0.10$, ** $p < 0.05$ and * $p < 0.010$
 ③ the estimated coefficient of the core explanatory variable *Pension* is the average marginal effect obtained through calculation.

3. Adjust the research sample. In order to reduce the estimation bias, this paper refers to the existing literature (Jin Weidong, 2018), and deletes 9151 samples (accounting for about 8.85%) with low degree of cooperation and intelligence in the survey data, and conducts regression estimation on this basis. The estimated results show that the core explanatory variable *Pension* still has a significant impact on *Med-institution*, the magnitude and direction of the impact are similar to the empirical results above. Therefore, it can be seen that sample loss will not affect the conclusion, and the conclusions of the previous study are robust.

Table 6. Robustness test: Adjust the research sample

Variable	(1)	(2)	(3)
	County level and above	Township level	Village level
Pension	0.083***	0.022**	-0.050***
	(7.64)	(2.22)	(-3.65)
Age	-0.00649***	0.00753***	-0.00345**
	(-4.09)	(4.86)	(-2.30)
Gender	-0.228***	0.0769**	0.141***
	(-6.34)	(2.08)	(4.18)
Nation	-0.451***	-0.0192	0.207***
	(-8.26)	(-0.32)	(3.91)
Marital status	-0.116**	0.117**	-0.0161
	(-2.56)	(2.46)	(-0.38)
Years of education	0.0342***	0.00349	-0.0245***
	(7.74)	(0.77)	(-5.98)
Self-rated health	0.228***	0.00760	-0.117***
	(15.77)	(0.53)	(-8.42)
Med-insurance	-0.225***	0.211***	0.105*
	(-4.06)	(3.35)	(1.84)
Personal income	0.0923***	-0.0157	-0.0344***
	(7.43)	(-1.33)	(-3.14)
Family scale	-0.0543***	-0.00528	0.0395***
	(-5.39)	(-0.53)	(4.29)
Family income	0.176***	-0.0104	-0.0706***
	(8.86)	(-0.58)	(-3.85)
Regional fixed effects	Yes	Yes	Yes
Constant	-2.767***	-2.632***	1.111***
	(-8.16)	(-5.51)	(3.40)
Observations	22391	22387	18333

Note: ①Standard errors in parentheses ②Significance level * $p < 0.10$, ** $p < 0.05$ and *** $p < 0.010$
 ③ the estimated coefficient of the core explanatory variable *Pension* is the average marginal effect obtained through calculation.

4.4 Analysis of Heterogeneity

Heterogeneity analysis of samples with different characteristics helps to assess policy effects more comprehensively. In this paper, the samples are grouped according to the differences in family income and region, so as to identify the heterogeneous characteristics of the effect of the NRSPI program in different groups.

1. Heterogeneity analysis of family income differences. In this paper, the average family income of all the samples is taken as the standard, and the samples are divided into two categories: low income families and high income families. The specific grouping estimation results are shown in Table 7. The results show that compared with the rural elderly in high income families, the rural elderly in low income families are more affected by the program in the choice of medical institutions. To be specific, the degree of influence on the choice of medical institutions at all levels was higher than that of the rural elderly in high income families by 3.3%, 0.9% and 1% respectively. The possible reason for the above results is that the NRSPI pension occupies a relatively low proportion in the income structure of high income families, which has little impact on it. However, the economic resources of low income families are relatively scarce, and the rural elderly in low income families get more marginal

utility from it. Therefore, the effect of the NRSPI program on the rural elderly of different income levels has obvious heterogeneity, and it has a greater impact on the rural elderly of low income families.

Table 7. Heterogeneity analysis of family income differences

Variable	County level and above		Township level		Village level	
	Low income families	High income families	Low income families	High income families	Low income families	High income families
Pension	0.092*** (6.97)	0.059*** (3.82)	0.031** (2.19)	0.022* (1.72)	-0.054*** (-2.70)	-0.044** (-2.49)
Age	-0.00423 (-1.57)	-0.00768*** (-4.01)	0.00539** (2.23)	0.00888*** (4.53)	-0.00797*** (-3.03)	-0.00202 (-1.13)
Gender	-0.155** (-2.42)	-0.243*** (-5.75)	0.119** (1.98)	0.0561 (1.24)	0.0154 (0.25)	0.189*** (4.80)
Nation	-0.595*** (-6.17)	-0.367*** (-5.76)	0.0288 (0.30)	-0.0163 (-0.22)	0.0920 (0.93)	0.243*** (4.02)
Marital status	-0.151** (-1.98)	-0.0860 (-1.57)	0.0674 (0.93)	0.132** (2.17)	0.0377 (0.52)	-0.0222 (-0.43)
Years of education	0.0409*** (5.14)	0.0283*** (5.49)	-0.0147* (-1.96)	0.0142*** (2.59)	-0.0124* (-1.67)	-0.0278*** (-5.81)
Self-rated health	0.281*** (11.53)	0.194*** (11.19)	-0.0193 (-0.86)	0.0328* (1.81)	-0.101*** (-4.26)	-0.124*** (-7.48)
Med-insurance	0.0721 (0.69)	-0.343*** (-5.39)	0.204** (2.04)	0.259*** (3.33)	-0.106 (-0.99)	0.165** (2.53)
Personal income	0.0931*** (4.61)	0.0935*** (6.16)	-0.0241 (-1.31)	-0.00988 (-0.67)	-0.0398** (-2.21)	-0.0400*** (-3.00)
Family scale	-0.0169 (-0.87)	-0.0702*** (-6.09)	-0.0353* (-1.94)	0.00674 (0.57)	0.0298 (1.63)	0.0391*** (3.71)
Family income	0.0506 (1.39)	0.291*** (7.58)	0.00610 (0.20)	-0.0406 (-0.98)	-0.0309 (-0.88)	-0.139*** (-3.80)
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.479*** (-2.73)	-3.796*** (-7.54)	-2.029* (-1.80)	-2.543*** (-4.02)	1.671** (2.03)	1.743*** (3.57)
Observations	8380	15162	8378	15158	5623	13609

Note: ①Standard errors in parentheses ②Significance level * $p < 0.10$, ** $p < 0.05$ and * $p < 0.010$ ③ the estimated coefficient of the core explanatory variable *Pension* is the average marginal effect obtained through calculation.

2. Analysis of regional heterogeneity. Existing literatures have pointed out (Liu Ruiming and Zhao Renjie, 2015) that the resource endowment of the place where the policy is implemented may have an impact on the policy effect. Therefore, the samples are divided into the eastern region and the central and western region to discuss the impact of the NRSPI program on the choice of medical institutions for the elderly in the eastern region and the central and western region respectively. The

specific grouping estimation results are shown in Table 8. The results show that in the eastern region, the core explanatory variable *Pension* has a significant impact on *Med-institution* for rural elderly. For the central and western regions, *Pension* has a significant impact on the selection of county level hospitals and village level hospitals for rural elderly, but has no significant impact on the selection of township level hospitals. In terms of the degree of program influence, compared with the eastern region, the probability of the elderly in the central and western regions choosing hospitals at the county level and above was 2.1% higher, and the probability of choosing hospitals at the village level was 4.7% lower.

Table 8. Analysis of regional heterogeneity

Variable	County level and above		Township level		Village level	
	Eastern region	Central and western regions	Eastern region	Central and western regions	Eastern region	Central and western regions
Pension	0.072*** (4.36)	0.093*** (6.8)	0.033** (2.36)	0.018 (1.37)	-0.078*** (-3.98)	-0.031* (-1.76)
Age	-0.00738*** (-3.10)	-0.00659*** (-3.24)	0.0101*** (4.18)	0.00611*** (3.16)	-0.00241 (-1.08)	-0.00476** (-2.44)
Gender	-0.224*** (-4.17)	-0.212*** (-4.57)	0.0194 (0.34)	0.121*** (2.60)	0.173*** (3.45)	0.116*** (2.66)
Nation	-0.320*** (-3.65)	-0.522*** (-7.85)	-0.000296 (-0.00)	-0.0146 (-0.21)	0.252*** (3.06)	0.172*** (2.61)
Marital status	0.0157 (0.22)	-0.190*** (-3.33)	0.106 (1.40)	0.100* (1.71)	-0.0496 (-0.76)	0.0243 (0.45)
Years of education	0.0487*** (7.15)	0.0251*** (4.50)	0.0202*** (2.82)	-0.00644 (-1.16)	-0.0452*** (-7.13)	-0.00980* (-1.90)
Self-rated health	0.258*** (11.78)	0.207*** (11.25)	0.0286 (1.27)	0.00562 (0.31)	-0.162*** (-7.83)	-0.0853*** (-4.78)
Med-insurance	-0.239*** (-3.23)	-0.213*** (-2.71)	0.294*** (3.38)	0.162* (1.88)	-0.00422 (-0.06)	0.202** (2.49)
Personal income	0.0931*** (4.61)	0.0935*** (6.16)	-0.0241 (-1.31)	-0.00988 (-0.67)	-0.0398** (-2.21)	-0.0400*** (-3.00)
Family scale	-0.106*** (-6.67)	-0.0249** (-1.99)	-0.0217 (-1.37)	0.00596 (0.48)	0.0836*** (5.82)	0.00867 (0.75)
Family income	0.177*** (5.63)	0.176*** (7.18)	0.0265 (0.89)	-0.0185 (-0.86)	-0.118*** (-4.19)	-0.0386* (-1.68)
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.157*** (-7.31)	-3.338*** (-11.66)	-3.205*** (-6.05)	-2.131*** (-7.84)	2.033*** (5.01)	1.270*** (4.59)
Observations	9573	13973	9575	13966	8349	10885

Note: ①Standard errors in parentheses ②Significance level * $p < 0.10$, ** $p < 0.05$ and *** $p < 0.010$ ③ the estimated coefficient of the core explanatory variable Pension is the average marginal effect obtained through calculation.

This paper believes that the possible reasons for this result are as follows: the rural elderly in different regions are all affected by the NRSPI program, so there are significant changes in the selection of medical institutions at all levels for them, and the change direction is consistent with the empirical results above. Among them, the NRSPI pension has no significant influence on the choice of township level hospitals for the elderly in central and western regions, because the program may

further improve their income expectations, enhance their awareness of their own health, and more promote the elderly who has the original choice of village level hospital to directly choose the highest level of medical institutions. In terms of the degree of program influence, on the one hand, as the economic development level of the western region is relatively backward, the pension has a greater impact on the disposable income and personal expectations of the elderly in the central and western regions. on the other hand, the basic pension in the eastern region is generally higher than that in the central and western regions (Zhang Ye, 2016), and the policy support capacity is stronger. In the process of policy implementation, as for the choice of village level hospitals, the impact of pension difference is greater than that of regional economic development, so the program has a greater impact on the eastern region. As for the choice of county level and above hospitals, the impact of pension difference is smaller than that of regional economic development, so it has a greater impact on the central and western regions. Thus, it can be seen that there are obvious regional differences in the effect of the NRSPI program. It has a greater impact on the choice of county level hospitals and above for rural elderly people in central and western regions, and a greater impact on the choice of village level hospitals for elderly people in eastern regions.

5. Conclusions and Policy Suggestions

In recent years, with the gradual improvement of people's material living standards, personal health, especially the health of rural elderly, has attracted increasing attention. However, for a long time, China's rural elderly have large population with low income, "the difficulty of getting medical service" problem is outstanding, the phenomenon of "the illness-caused poverty and poverty-caused illness" is still common, and disease is still one of the main causes of poverty in rural China. The NRSPI program provides a certain amount of pension income for rural elderly who are eligible for pension, and to partly improve their medical payment ability, thus affecting their medical treatment behavior. Therefore, to explore the impact of the new agricultural insurance on the choice of medical institutions for rural elderly is not only an effective entry point to test the influence of the NRSPI program, but also plays a significant role in maintaining people's health, improving our nation's retirement pension system and the construction of the new countryside.

Based on the five periods of Chinese Family Panel Studies (CFPS) data from 2010 to 2018, this paper used Logit model and DID model to empirically investigate the impact of the NRSPI program on the choice of medical institutions for the elderly in rural areas. The empirical results show that: first, the NRSPI program can significantly promote the rural elderly to choose higher level of medical institutions for medical treatment. Specifically, receiving the NRSPI pension will increase the probability of rural elderly choosing hospitals at the county level and above by 8.6%, the hospitals at the township level by 2.5%, and will decrease the likelihood of choosing hospitals at the village level by 5.5%. However, in terms of the degree of program influence, the average marginal effect of the NRSPI program on the selection of medical institutions of all levels is less than 10%, indicating that the policy effect is limited. In addition, robustness tests were carried out by changing the estimation method, adding new control variables and adjusting the original sample, and the results were found still robust. Second, the effects of the NRSPI program are heterogeneous. Compared with the rural elderly in high income families, the program has a greater impact on the choice of medical institutions for those in low income families. Compared with the rural elderly in the eastern region, the program has a greater impact on the selection of county level hospitals and above by those in the central and western regions, but has less impact on the selection of village level hospitals. Based on the above research conclusions, this paper proposes the following suggestions:

First, strengthen policy publicity and encourage farmers to participate in the program. This study found that the NRSPI program can significantly promote the elderly in rural areas to choose a higher level of medical institutions, confirming the actual effect of it. Therefore, the government should strengthen policy publicity, encourage farmers to establish pension consciousness, increase pension capital investment. In addition, it is necessary to give full play to the incentive role of divided payment

in the program, and promote the sustainable implementation of the NRSPI program. Second, increase the policy support and build a multi-security mechanism for the elderly in rural areas. This paper verified the limited effect of the NRSPI program, which is not enough to change the majority of people's preference for medical institutions. Therefore, governments at all levels should appropriately increase financial subsidies for the program within the financial affordability, and enhance the support capacity of the program. And the existing medical insurance systems should be further improved, and formed multiple security systems of medical insurance and endowment insurance to reduce the risk of rural residents becoming poor due to illness. And it is necessary to give full play to market forces, actively develop commercial pension insurance and other pension insurance, diversify the pension income of the rural elderly, and build a multi-security mechanism for the rural elderly with the joint role of the government and the market. Third, take targeted measures. This paper verified the difference of the influence of the NRSPI program on different groups. Based on this, the government should avoid "one size fits all" when making policies, set more detailed and precise payment and subsidy standards, give more preferential policies to the vulnerable elderly groups in low income families and the central and western regions, optimize the allocation structure of endowment resources, and actively promote the equalization of basic public services.

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