The Alleviating Effect of the Pension Insurance System on the Health of the Elderly When the Spouse Suffers from Major Chronic Diseases

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Abstract. China has entered a deeply aging society, and the high incidence of chronic diseases poses a serious challenge to the health of the elderly group, especially through the burden of care within the family and economic pressure. Based on the data of the China Health and Pension Tracking Survey (CHARLS) from 2011 to 2020, this paper uses a double difference model to analyze the alleviating effect of pension insurance on the impact of major chronic diseases (stroke, heart disease, etc.) on the health of the elderly by using a double difference model. The results show that the spouse's major chronic illness significantly reduces the mental health of the elderly, worsens depressive symptoms, and slightly affects their ability to perform activities of daily living and cognitive function. Pension insurance can effectively buffer this health shock, especially the most significant protective effect on mental health. The mechanism analysis shows that pension insurance mainly plays a role by providing stable economic sources, reducing the pressure of medical expenditure, and reducing the burden of care. The findings of this paper provide an important basis for improving the pension insurance system and formulating targeted health support policies, which are of positive significance for improving the health level of the elderly.

Keywords: Pension Insurance, Chronic Disease, Health Shock, Aging, Double Difference Method.

1 Introduction

China has entered "deep aging", and the degree of aging is in the upper middle level in the world, showing the characteristics of large scale and fast speed. With the aging of the population and the continuous changes in residents' production and lifestyle, the report of the National Health Commission shows that the incidence of chronic diseases such as cardiovascular and cerebrovascular diseases and cancer in our country is generally on the rise, and the number of deaths from chronic diseases accounts for more than 80% of the total deaths of residents. The health impact of chronic diseases on the elderly is not only reflected in the decline of physiological functions but may also have a chain reaction on the health status of patients and their spouses through the burden of care within the family, the pressure of medical expenditure and psychological stress. In

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this context, the pension insurance system, as the core pillar of the social security system, has attracted much attention for its economic compensation and social support functions to alleviate health risks.

The existing research on pension insurance includes the impact of pension insurance on residents' consumption level, health behavior, psychological status, financial asset allocation, etc., and this paper mainly focuses on the impact of pension insurance on residents' health level. Existing studies have focused more on the impact of pension insurance on individual health, and several empirical studies have explored the impact of pension policies on the health of the elderly [1]. Domestic studies have shown that pensions improve the health of rural elderly people in various ways, such as increasing food and medical consumption, extending rest time, promoting intergenerational care, and reducing bad behaviors such as smoking [2]. Relevant studies have also been conducted abroad, and relevant scholars have conducted surveys in rural areas of South Africa and found that the monthly pension subsidy of $150 significantly improves the physiological health indicators of the elderly [3]. In rural Mexico, studies have confirmed that the increase in pension amounts has a positive impact on the mental health of older adults [4]. Similarly, analysis of pension reform data in South Africa found that increasing pension levels can effectively reduce the risk of depression in the elderly population [5]. Based on this situation, this paper studies the alleviating effect of pension insurance system on the health of the elderly when the spouse suffers from major chronic diseases. The significance of this study is that with the deepening of China's aging and the increase in the incidence of chronic diseases, the mechanism of health risk transmission within families is becoming increasingly prominent. In this context, as the core pillar of social security, the core function of pension insurance to alleviate the impact of health risks by providing economic compensation and necessary social support needs to be empirically tested. This paper supplements the empirical research evidence on the buffering effect of the pension insurance system on family health risks in the existing academic literature and fills the knowledge gap in related fields. At the same time, it also provides a scientific basis for relevant decision-making departments to optimize the design and implementation of the pension security system, which has significant practical significance and practical value for improving the health level of the elderly and reducing the burden of family care.

The article is arranged as follows: the first part is an introduction, focusing on the background and significance of the research; The second part introduces the data sources, variable definitions and model settings used in the research. The third part analyzes the empirical results; the fourth part puts forward policy suggestions based on the analysis conclusions; the fifth part summarizes the full text and points out the limitations and future directions of the research.

2 Data, Descriptive Statistics and Model Setting

2.1 Data Source and Sample Selection

The data used in this article are from CHARLS. CHARLS is a representative follow-up survey of people aged 45 and above in Chinese mainland, using a multi-stage stratified sampling method, covering urban and rural areas in 28 provinces, municipalities and autonomous regions in China. The data provides basic information, health status, employment and income, social security and other information of respondents and their family members, and the survey content covers economics, sociology, medicine and other fields. This article uses 2011, 2013, 2015, 2018, and 2020. A total of five survey data were conducted on the elderly aged 60 and above and their spouses as the research objects, and the impact of pension insurance policies on the health of the elderly when their spouses suffered from major chronic diseases. A total of 5926 samples were included in this study, after retaining samples in which both spouses were not sick and only one spouse was sick, and the samples with missing important information were deleted.

2.2 Variable Definition and Measurement

Health Indicators. This paper focuses on examining the impact of major chronic diseases on the health status of older adults. Most of the existing studies use a single indicator to measure health, but this article attempts to introduce multi-dimensional health indicators. Different dimensions of health indicators imply different economic costs, and different health indicators can also reflect the different health effects of major chronic diseases on the health of spouses from the perspective of timeliness. This paper mainly uses self-rated health, mental health, whether daily activities need help, and cognitive ability as indicators to measure the health of the elderly [6].

The explanation of each health indicator is as follows: First, self-rated health is an extremely important core indicator to measure the health level of the elderly. Self-rated health reflects the subjective perception and judgment of an individual's overall health status, and can effectively predict future mortality risk, morbidity risk, and functional decline, and is considered to be a comprehensive indicator that comprehensively reflects physical condition. Second, mental health. This paper uses depression scores to reflect the mental health of older adults. There are 10 questions (DC009-DC018) in the CHARLS depression scale, each of which is assigned a score of 0-3 for a total score of 30. The higher the score, the more pronounced the depressive symptoms. It is a key indicator of the overall mental health and emotional well-being of middle-aged and elderly people. It reflects respondents' current psychological distress, stress levels, and emotional regulation abilities, and is a key predictor of understanding the overall health, social adaptability, and future care needs of middle-aged and older adults. Depression is closely related to chronic diseases (such as cardiovascular disease), cognitive decline, and the risk of dementia, and depression significantly increases the loss of healthy life expectancy in the elderly, which places a heavy burden on society and the healthcare

system [7]. Third, whether the Activities of Daily Living (ADL) need help. Daily activity capacity measures a relatively serious physical health condition, and if daily activities require help, it will bring a heavy financial burden and huge care pressure, significantly reducing the quality of life of the whole family. Fourth, cognitive ability is an important embodiment of its brain function, involving memory, thinking, judgment, learning and other aspects, which not only reflects the natural aging process, but also is closely related to health status and quality of life.

Major Chronic Diseases. Referring to previous literature and combining the scope definition of major chronic diseases in the "Healthy China Initiative (2019-2030)", major chronic diseases are defined as the occurrence of stroke, heart disease, cancer, lung disease, and diabetes [8]. This variable is based on respondents' responses to "Have you been told by your doctor about a disease and when you were first diagnosed?" If the respondents suffered from the above major chronic diseases during the five surveys in 2011-2020, the value would be 1, otherwise the value would be 0.

2.3 Model Setting

In order to accurately assess the impact of chronic diseases on the health of the elderly, the sample was limited to the elderly over 60 years old in 2011 and estimated by using a double difference model. In this paper, health indicators are taken as explanatory variables, the core explanatory variables are pension insurance and major chronic diseases, and some demographic characteristics and socio-economic factors are used as control variables, and the basic model is set as follows:

$$h_{it} = \alpha + \beta_1 \text{Pension}_{it} + \beta_2 \text{Chronic}_{it} + \beta_3 (\text{Pension}_{it} \times \text{Chronic}_{it}) + \gamma X_{it} + \varepsilon_{it} \quad (1)$$

h_{it} is the health status of an individual i in the phase. Pension_{it} is whether individual i has pension insurance in the t phase, and if so, the assignment is 1; otherwise, the value would be 0. Chronicit is whether the spouse of individual i has a chronic disease in the t phase, and if so, the experimental group, with a value of 1; Otherwise, it is a control group, and the value is 0. X_{it} are other control variables that affect personal health, including age, gender, education level, household status, number of children born to the elderly and logarithm of per capita household consumption. The number of children born mainly reflects the care and financial support that older people may receive from their children. Household per capita consumption mainly measures the socio-economic conditions faced by the elderly, and studies have shown that consumption expenditure can more accurately reflect the actual living conditions of the elderly population in developing countries than traditional economic indicators such as income and wealth [9]. Ɛ is a random perturbation term.

As shown in Table 1, it reflects the negative impact of spouse's chronic illness on mental health and ability to perform activities of daily living. From a gender perspective, men have better levels of health indicators than women.

Table 1. Descriptive statistics of variables.

	No chronic diseases	Chronic diseases	Male	Female
a.Health characteristics				
Self-rated health	3.247	3.263	3.325	3.182
Mental health	7.106	6.88	6.105	7.919
ADL	0.261	0.271	0.22	0.311
Cognitive ability	11.62	11.929	12.436	11.061
b.Demographic characteristics				
Gender (female = 1)	0.5	0.5		
Residence（city=0）	0.628	0.541	0.591	0.592
Household consumption	12018.16	14646.95	12953.057	13274.641
Number of children born	2.936	2.834	2.887	2.901
Education level	1.909	2.113	2.28	1.707

3 Analysis of Empirical Results

The results of the study show (Table 2) that when the spouse suffers from major chronic diseases, the health level of the elderly is affected. Spouses with major chronic diseases have negative effects on older adults' self-rated health, ability to perform activities of daily living, mental health, and cognitive ability. Pension insurance has a certain buffer effect on the impact of various health indicators of the elderly whose spouses suffer from major chronic diseases. Pension insurance has a significant effect on improving the mental health level of residents whose spouses suffer from major chronic diseases.

First, pension insurance reduces the financial pressure of medical expenses. Chronic disease treatment is usually accompanied by long-term medication, regular follow-ups, and possible hospitalization (e.g., diabetes, hypertension, etc.), and the out-of-pocket part of these costs may crowd out the family's basic living expenses. Pension income can cover medical expenses (such as medicines, examinations, surgeries, etc.) by increasing household disposable income, avoiding anxiety caused by treatment expenses. Second, it relieves the pressure of uncertainty. Spouses with chronic illnesses often come with concerns about unpredictable future medical expenses. The stable cash flow provided by pension insurance reduces the family's worries about unexpected medical

expenses. In addition, pensions may also promote mental health by changing the allocation of family resources. For example, some families may use pensions to purchase care services (such as caregivers, rehabilitation equipment) to reduce the pressure of caregiving burden or indirectly reduce the psychological loss of caregivers by improving family nutrition levels, living environment and other factors. In addition, the increase in pensions has the potential to improve health behaviors, such as the frequency of physical examinations, which indirectly affects the health of older adults.

Table 2. Baseline regression results.

	Self-rated health	ADL	Mental health	Cognitive ability
Whether respondents have pension insurance	0.00849	-0.0225	-0.152	0.148
	（0.20）	(-0.64)	(-0.60)	(1.04)
Whether the spouse suffers from major chronic diseases	-0.0950	0.0183	0.821*	-0.245
	(-1.49)	（0.33）	(1.91)	(-1.10)
Pension insurance × major chronic diseases	0.101	0.00248	-0.862*	0.198
	(1.47)	(0.04)	(-1.89)	(0.83)
age	-0.00693***	0.0149***	-0.0189	-0.0564***
	(-2.62)	(6.20)	(-1.26)	(-6.45)
gender	0.132***	-0.0921***	-1.417***	0.667***
	(5.21)	(-4.49)	(-9.57)	(8.01)
Education level	0.0366***	-0.0444***	-0.610***	1.404***
	(2.89)	(-5.08)	(-8.47)	(34.70)
Per capita consumption of households	0.0253*	-0.00173	-0.0177	0.163***
	(1.75)	(-0.15)	(-0.21)	(3.37)
Residence	-0.132***	0.0787***	1.332***	-0.795***
	(-4.90)	(3.71)	(8.49)	(-8.78)
Number of children born	-0.0322***	0.0334***	0.245***	-0.201***

	(-3.26)	(3.68)	(4.08)	(-5.77)
Intercept	3.516***	-0.710***	8.965***	11.87***
	(16.39)	(-3.86)	(7.21)	(16.51)
Observations	5926	5926	5926	5926

4 Suggestion

At present, our country's rural pension insurance system needs to be improved urgently, especially in dealing with the economic burden of chronic diseases among the elderly. The level of rural pensions is generally low, and it is difficult to effectively cover the growing medical expenditure. Therefore, it is necessary to improve rural pension insurance benefits, narrow the gap between urban and rural pension security, and enhance the ability of rural elderly groups to cope with family health crises. Relevant decision-making departments can establish a dynamic adjustment mechanism linked to the price index and medical expenses to ensure that the level of protection matches the actual demand. For economically underdeveloped areas, financial transfer payments should be strengthened, differentiated subsidy policies should be used to increase the enthusiasm for insurance participation, and special assistance mechanisms should be established for elderly families with sick spouses to alleviate their special economic pressure [10].

In terms of protection content, the existing system focuses too much on economic compensation and ignores the supply of health services. The organic connection between pension insurance and medical and health services should be promoted, and regular health examinations and chronic disease management should be included in the scope of basic protection. For the disabled elderly, a hierarchical nursing subsidy system can be established based on international experience, and priority should be given to ensuring the elderly care needs of their institutions. It is worth noting that spouse illness often poses significant mental health risks to the elderly. Mental health screening and intervention services should be included in the routine services of primary medical and health institutions, and a professional psychological support system can be established at the community level, including interventions such as counselors, mental health education, and the formation of mutual support groups.

System optimization also needs to focus on the innovation of insurance incentive mechanisms. At present, farmers generally choose low-grade payment for insurance, resulting in limited protection effects. It is recommended to improve the attractiveness of high-end payment through the tiered subsidy design and use data sharing technology to achieve accurate identification and assistance. For groups with special difficulties such as living alone and being widowed, more targeted safeguard measures should be formulated, including raising the allowance standard and reducing the proportion of medical out-of-pocket payments. These reform measures need to be piloted in typical

areas, gradually improved through scientific policy evaluation, and finally form a sustainable and multi-level rural pension security system.

5 Conclusion

This paper analyzes the impact of major chronic diseases on the health status of older adult spouses. The results showed that the impact of major chronic diseases by spouses increased the overall mental depression of the elderly, increased the probability of needing help for daily activities, and reduced the cognitive ability of the elderly. However, pension insurance can reduce the adverse effects of major chronic diseases on the health of the elderly. Based on this, this paper has the following suggestions: first, the treatment standards of urban workers, urban and rural residents and new rural social pension insurance should be gradually improved, and efforts should be made to narrow the difference in the level of protection between different systems to ensure the fairness and sustainability of pension security. Secondly, through policy guidance and market incentives, elderly families, especially groups in rural areas, can be encouraged to participate in commercial medical insurance to enhance their ability to resist the risk of major chronic diseases. In addition, it is necessary to optimize the incentive mechanism for urban and rural residents' pension insurance, such as providing additional subsidies for long-term continuous contributors, so as to enhance the enthusiasm of rural residents to participate in insurance and promote higher-grade payment options and ultimately achieve the overall improvement of basic pension insurance coverage and protection level. This empirical part still has some limitations, such as not distinguishing differences in disease severity, disease stage, and treatment costs. This paper also lacks consideration of environmental factors such as the density of medical resources in the place of residence. For future research, people can start from the moderating effect of different disease severity and length of illness and explore the interaction between other social security (such as long-term care insurance) and pension insurance and continue to conduct research to provide new possible directions for the optimization of the current pension insurance system.

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