参赛队员姓名： 陈嘉佑

中学： 上海平和学校

省份： 上海

国家/地区：中国

指导教师姓名： 刘庆富

指导教师单位： 复旦大学经济学院

论文题目： Impact of Social Insurance on the Basic Living Ability of Older Persons

Impact of Social Insurance on the Basic Living Ability of Older Persons

Jiayou Chen

Shanghai Pinghe School

Abstract

The issue of population ageing is currently a universal concern of the international community. The health and care of the elderly is a major concern for enhancing social welfare for the elderly. This paper discusses the impact of social security participation on the ability of older people to live independently. This paper utilizes CLHLS data and uses IPW and PSM to explore the impact of participation in social insurance on the ability of the elderly to perform their daily lives, as well as the mechanism of action. We have found that participation in social security enhances the ability of older people to live independently. We conclude with some recommendations for social welfare for the elderly

1 Introduction

The demographic dividend has provided sustained momentum for China's rapid economic growth. While, with the decline of the total fertility rate and the extension of life expectancy, China will face the largest aging process in the 21st century in the next three decades. By 2050, the number of people aged 65 or older is expected to reach 378 million, accounting for 27.7% of the total population by weight. Elderly people over 80 years old account for 34% of the total elderly population, and the proportion of empty nesters is as high as 54%. The rapid aging of the population and the increasing trend of aging and empty-nest of the elderly population make the demographic dividend more and more transformed into a huge care burden.

Affected by population distribution, social and economic development, and natural geographical conditions, the health status and aging process of the elderly in different regions are not the same. In particular, the regional differences in the growth and distribution of the elderly with disabilities, a key demand group for family care, will directly determine the basic direction of the spatial coordination of social pension and medical service resources in China at present and in the future, and will have a far-reaching impact on the sustainable social and economic development of all regions. Therefore, it is necessary to further push the overall forecast of the elderly family photo demand to a more accurate regional forecast, and establish a scientific and effective regional comparison and forecast scheme. This not only meets the general requirements of the national balanced population development strategy in the new era to strengthen overall planning and strive to achieve coordinated development of population with economic society, resources, and environment but also has important significance for the establishment of population spatial development and aging response strategy consistent with the national functional area planning.

Since the reform and opening up in 1978, with the economic growth, the average life expectancy in China has increased significantly. Data show that in 1981, the average life expectancy in China was about 67.9 years old, and in 2019, the average life expectancy in China was close to 77.3 years old, an increase of nearly 9.4 years, and

4.48 years higher than the world average life expectancy of 72.82 years in the same period. According to the National Population Development Plan (2016-2030), the average life expectancy will reach 79 years by 2030. According to the projections in the World Population Prospects 2019 released by the United Nations (2019), the average life expectancy of Chinese residents will further rise to 81 years in 2040-2045. On the one hand, the extension of life expectancy has intensified the aging degree of China's population, and on the other hand, it has created conditions for making full use of the increasingly large elderly labor resources and extending the demographic dividend.

From the perspective of economic theory, the extension of life expectancy will make individuals face the risk of insufficient nursing resources and will challenge the pension system.

In 2003 and 2007, the new rural cooperative medical insurance system and the basic medical insurance system for urban residents were implemented on a pilot basis, marking the realization of comprehensive coverage of China's social medical insurance system at the institutional level. In 2016, the State Council issued the Opinions on Integrating the Basic Medical Insurance System for Urban and Rural Residents to integrate the basic medical insurance system for urban residents and the new rural cooperative medical insurance system. The 2022 National Economic and Social Development Statistics Bulletin released by the National Bureau of Statistics shows that the number of people participating in basic medical insurance in 2022 was 134.57 million, accounting for 95.3% of the total population, of which the number of people participating in basic medical insurance for employees was 362.42 million, and the number of people participating in basic medical insurance for urban and rural residents was 983.28 million. The number of people participating in basic medical insurance for urban and rural residents was 983.28 million, according to the National Bureau of Statistics.

Based on the richness of the connotation of poverty, illness can lead not only to poverty in terms of economic status, but also to poverty in terms of capabilities. The high prevalence of diseases in the elderly group often makes it impossible to ensure

their basic living capacity, making poverty alleviation even more difficult. Research on the impact of the basic medical insurance system on the basic living ability of the elderly group can be an important basis for health poverty alleviation and health insurance poverty alleviation. In other words, if empirical research can prove that health insurance can improve the health condition of beneficiary groups related to capability poverty, i.e. basic living ability, to a certain extent, then from the perspective of capability poverty, the continuous popularization of urban and rural residents' health insurance will help poverty alleviation. On the other hand, research on the effectiveness of the current health insurance system for urban and rural residents can also provide theoretical policy recommendations for improving the system.

The remainder of the paper is organized as follows: Section 2 provides a literature review, Section 3 describes our model and methodology, Section 4 is the empirical analysis, and Section 5 is our conclusion and recommendations.

2 Literature review

The issue of population ageing is currently a universal concern of the international community. The health and care of the elderly is a major concern for enhancing social welfare for the elderly. Studies have been conducted to discuss the interplay between health and care needs of older people (Unutzer et al., 1997; Zunzunegui et al., 2001; Stabile et al., 2006; Vasiliadis et al., 2013; Barnay and Juin, 2016). A large number of studies have used Activities of daily living/ADL (ADL) to measure the quality of life of older adults (Liang et al., 1999). ADL is closely related to the cost of care required by older people, which is partly paid for by government finance or social insurance (Hu, 2019) and partly borne by their children and relatives (Kim and Cook, 2011). However, in China, a large number of parents in one-child families are deprived of "old-age resources" due to the family planning policy, and the reduction in family size reduces the support that parents receive from their children, thus posing a potential risk in old age (Zimmer and Kwong, 2013), and poverty due to illnesses

occurs at times (Damme and Cook, 2011). (Damme et al., 2004). Social insurance is an important part of bearing the costs of elderly care. In addition, social insurance may also enhance the health of older people, making them better able to take care of themselves.

Many literatures have extensively discussed whether the social health insurance system is effective in improving the health of the population, with some studies proving that social health insurance improves the health of the population (Cheng et al., 2015; Huang and Zhang, 2021) and mitigates the problem of health inequality (He and Sato, 2013), and some articles arguing that the social health insurance is improving residents' health is inefficient and limited in its impact (Lei and Lin, 2009) and will not change their health status.

And we also consider the mechanism of action of the impact of social insurance on the health of the elderly, on the one hand, social insurance will compensate the participants for medical expenses, thus increasing the level of their health care utilization (Card et al., 2009; Costa-Font et al., 2018; Finkelstein et al., 2012). In addition, participation in social health insurance will cause ex ante moral hazard (Yilma et al., 2012) and increase their unhealthy behaviors, but there is no unanimity on this point, and there are also studies that show that this moral hazard does not exist (Courbage and Coulon, 2004). In this paper, we will provide more empirical evidence on the impact of social insurance on the health of older adults by using an empirical analysis to test whether participation in social insurance enhances older adults' ability to care for themselves.

3 Data and Model

In this section, we describe the data and methods we used to analyze the impact of social insurance on elders' living ability.

3.1 Data Description

The research data for this paper comes from the published 2018 Chinese Longitude Healthy Longevity Survey (CLHLS), which is surveyed by the Center for Healthy

Aging and Development /National Institute for Development Studies at Peking University. The survey covers 23 provincial administrative regions in China, and the target population is elderly people aged 65 and above. The questionnaire contains the basic situation of the elderly and their families, socio-economic background and family structure, financial sources and economic status, self-assessment of health and quality of life, cognitive functioning, personality and psychological characteristics, ability to carry out daily activities, lifestyle, life care, treatment of illnesses, and medical expenses.

Table 1 Definition of Variables

Variables	Definition
ADL	Basic living ability ranging from 0 to 6
bathing	Could bath without assistant = 1
dressing	Could dress without assistant = 1
toileting	Could go to toilet without assistant = 1
indoor	Could do some indoor activities without assistant = 1
continence	Could control defecation = 1
feeding	Could eat without assistant = 1
insurance	Participate in basic health insurance = 1
age	Age
gender	Male = 1
marriage	Married = 1
edu	Year of schooling
family	Living with family
children	Number of children
lnincome	Logarithm of total household income
urban	Living in urban = 1
drink	Previous or current regular drinking = 1
smoke	Previous or current regular smoking = 1
exercise	Previous or current regular exercising = 1
physical_exam	Annual medical examinations = 1
access	Access to medical care in case of illness
hospital_time	Number of hospitalizations in the last two years

The main focus of this study is the basic living ability of Chinese older adults, an aspect of the current quality of life of the elderly in China. We measured the basic living abilities of older adults based on the Activities of Daily Living (ADL) scale in the CLHLS questionnaire, which consists of six activities of daily living: washing, eating, dressing, going to the toilet, indoor activities, and controlling defecation. Options on this scale include “doesn't need any help”, “needs some help”, and “needs more help”. In this paper, the basic living ability of the elderly is defined as the number of basic living activities that can be accomplished by the respondent “doesn't need any help”. As a result, the score ranges from 0-6.

In this paper, the outcome is ADL defined in Section 3. The treatment variable is a dummy indicating whether the individual is enrolled in basic health insurance. The treatment variable equals 1 when an individual participates in either of them, and 0 otherwise. Based on the relevant literature, this paper also incorporates some other variables, including age, gender, marital status, years of schooling, living with family or not, number of children, the logarithm of household’s income, living in urban or not, lifestyle, physical exam regularly and medical accessibility. The detailed definitions of all the variables involved in the empirical analysis are shown in Table 1. We first describe the statistics of these variable and test the difference between two groups in Table 2. The table provides a comparative analysis between two groups of elderly individuals based on their participation in social insurance (Insurance=1) or non-participation (Insurance=0). The group with social insurance has better ADL scores (higher is better) compared to those without insurance. This suggests that insured elderly individuals may have better physical functioning. Across all tasks, the insured group performs better than the uninsured group, as indicated by negative differences and significant t-statistics. Besides, many variables have significant differences between two groups, indicating that making unconditional comparison is not a good idea because the characteristics of two groups are quite different.

Table 2 Decriptive Statistics

	Insurance=0		Insurance=1			
Variables	mean	sd	mean	sd	diff	t-stat
ADL	5.099	1.684	5.402	1.410	-0.303	-5.746***
bathing	0.707	0.455	0.798	0.402	-0.091	-6.338***
dressing	0.834	0.372	0.896	0.305	-0.062	-5.316***
toileting	0.850	0.357	0.898	0.302	-0.049	-4.334***
indoor	0.862	0.345	0.915	0.280	-0.052	-4.860***
continence	0.924	0.265	0.954	0.210	-0.030	-3.609***
feeding	0.922	0.268	0.942	0.234	-0.020	-2.323**
age	86.192	12.200	83.606	11.989	2.586	6.632***
gender	0.478	0.500	0.451	0.498	0.027	1.686*
married	0.467	0.499	0.507	0.500	-0.039	-2.459**
edu	4.661	4.968	3.423	4.204	1.238	7.939***
family	0.968	0.176	0.969	0.172	-0.001	-0.220
children	3.799	1.977	3.876	1.989	-0.077	-1.222
urban	0.426	0.495	0.211	0.408	0.215	13.868***
lnincome	10.229	1.671	10.049	1.457	0.180	3.413***
smoke	0.340	0.474	0.310	0.462	0.031	2.021**
drink	0.273	0.446	0.275	0.447	-0.002	-0.170
exercise	0.494	0.500	0.387	0.487	0.107	6.703***
physical_exam	0.581	0.494	0.708	0.455	-0.127	-8.122***
access	0.204	0.403	0.183	0.387	0.021	1.620
hospital_time	0.370	1.007	0.376	1.052	-0.006	-0.188

3.2 Model

This paper would like to evaluate the impact of social insurance participation of the elderly on their ability to make a basic living. Generally, we introduce the potential outcome framework to help us identify the causal relationship. We define the potential outcome of basic living abilities (ADL) as $ADL(1)$ when the elderly participate in social insurance, i.e., $D = 1$, and $ADL(0)$ when the elderly does not participate in social insurance, i.e., $D = 0$. We could only observe one of them and

we further define the observed basic living abilities as $ADL = D \cdot ADL(1) + (1-D) \cdot ADL(0)$. Then the average treatment effect could be written as

$$\tau = ATE = E(ADL(1) - ADL(0)) = E(ADL(1)) - E(ADL(0)).$$

Due to we can not observe $ADL(1)$ and $ADL(0)$ simultaneously, we must make counterfactual estimation to evaluate the policy effect.

The average treatment effect can be estimated with many methods. First, we can estimate the ATE by computing the difference of the sample mean of two groups:

$$\hat{\tau}^{diff} = \frac{1}{n_1} \sum_{i:D_i=1} Y_i - \frac{1}{n_0} \sum_{i:D_i=0} Y_i,$$

where n_1 and n_0 are the number of the treatment group and control group, respectively. The estimator is unbiased only when the treatment is assigned randomly. However, in many survey data, the treatment is not random, like the data we use. Therefore, its results are not very plausible and we need to use more appropriate estimators.

We can estimate the ATE using a Inverse Probability Weighting Estimator:

$$\hat{\tau}^{IPW} = \frac{1}{n} \sum_{i=1}^{n} \frac{D_i Y_i}{p_i} - \frac{(1-D_i)Y_i}{1-p_i},$$

where D_i is a dummy variable indicating that whether an individual receive a treatment or not, Y_i is the outcome variable ADL in this paper, p_i is the probability that individual i is treated and n is the number of oberservations. IPW estimator is a statistical technique used to estimate treatment effects in observational studies where treatment assignment is not random. It adjusts for the potential confounding variables by weighting individuals by the inverse of the probability of receiving the treatment they actually received. This method helps in mimicking a randomized experiment. We need to specify a function of the treatment assignment. It is usually done using a logit model or probit model where the treatment status is regressed on the confounding variables:

$$p_i = e(X_i) = P(D_i = 1|X_i) = \Lambda(X_i'\gamma),$$

where X_i represents the confounding variables, $\Lambda(\cdot)$ is the link function, γ is the parameters need to be estimated. Then the IPW estimator can be written as:

$$\hat{\tau}^{IPW} = \frac{1}{n}\sum_{i=1}^{n}\frac{D_i Y_i}{e(X_i)} - \frac{(1-D_i)Y_i}{1-e(X_i)}.$$

IPW assumes no unmeasured confounders and correct model specification for the propensity score model. And it's important to check that there is common support (overlap) between the treatment and control groups in terms of the propensity scores.

Except the two estimators, we could also estimate the ATE with linear regression model:

$$Y_i = \beta_0 + \beta_1 D_i + \beta_X X_i + \epsilon_i$$

where Y_i is the outcome variable ADL in this paper, D_i is the treatment variable indicating that whether the individual participate in the social insurance or not, X_i are the control variables including that age, gender, marital status, years of schooling, residency status, number of children, occupation, household income, economic resources and area of residence, ϵ_i is the residual and β_0, β_1, β_X are parameters to be estimated. With the exogeneity assumption $E(\epsilon|D, X) = 0$, we can acquire a consistent estimation.

But the results of regression analysis can only show correlation, not causation. One approach with causal interpretive implications is to find control groups with the same characteristics X for each treatment group, and to obtain an estimate of the treatment effect by comparing the average difference between the matched sample treatment group and the control group. However, since X is multidimensional, it is nearly impossible to find individuals with identical characteristics for each individual in a multidimensional space. As a result, we further introduce propensity score matching (PSM) to conduct causal inference. The PSM method is a statistical technique used primarily in observational studies to reduce selection bias when estimating causal

treatment effects. By dimensionality reduction, multiple characterization metrics are compressed into a single metric, the propensity score value. It helps to create a more balanced comparison between treated and control groups by matching units (e.g., individuals, cases) with similar propensity scores. Similar with IPW method, we also need estimate the propensity score using logit or probit model for all units. PSM has three matching methods: nearest neighbor matching, radius matching, and kernel matching. In general, there is no significant difference in the effectiveness of these three matching methods. Finally, a balance test is needed to ensure the quality of the matching results. If the standard deviation of the data decreases significantly and becomes more centralized after matching, then the quality of the match is better.

4 Empirical results

In this section, we report the empirical results and draw some conclusions. Also, we make mechanism analysis and robustness check.

4.1 Evaluating treatment effect

In this subsection, we assessed the impact of social insurance participation on the ability of older adults to perform their daily lives. Table 3 compares treatment effects estimated by three different methods. The three methods all support that there exist positive effect of social insurance participation. The treatment effect estimate in Column (1) is 0.303, which is higher than the estimates from Columns (2) and (3) (0.093 and 0.091, respectively). This method calculates the average treatment effect (ATE) by directly comparing the means of treated and control groups. This approach might not account for potential confounding variables. Futhermore, Columns (2) and (3) use inverse probability weighting to adjust for differences in baseline characteristics between treated and control groups. They apply probit and logit models to estimate the propensity scores, which are then used to weight the observations. Despite similar estimates from probit and logit, they are lower than the simple difference estimate, indicating that the simple difference may overestimate the treatment effect by not accounting for confounding factors. Older persons who

participates in social insurance have access to more medical resources, which reduces the cost of medical care and allows them to choose to seek timely medical care when they fall ill, which is conducive to the accumulation of their health capital and thus have a good ability of daily life.

Table 3 Treatment effect estimated by different methods

	(1) $\hat{\tau}^{diff}$	(2) $\hat{\tau}^{IPW}$	(3) $\hat{\tau}^{IPW}$
ATE	0.303***	0.093**	0.091**
	(0.052)	(0.043)	(0.043)

Note: Column (1) is estimated by take difference between two groups simply, Column (2) and (3) are estimated by IPW method with probit and logit link function, respectively. ***, **, * represent that it is significant at 1%, 5%, 10% level, respectively. Standard errors are in parentheses. The significance labeling of subsequent tables is the same as here

In order to control as much as possible for differences in the characteristics of insured and uninsured seniors and to avoid selectivity bias, we further used the PSM method to estimate treatment effects. Table 4 presents the estimated Average Treatment Effect (ATE) using different Propensity Score Matching (PSM) methods. Radius Matching yields the highest estimate (0.184), followed by One-to-One Matching (0.179) and Kernel Matching (0.142). This indicates that different matching methods might produce slightly different estimates of the treatment effect. All methods produce ATE estimates that are statistically significant, either at the 1% or 5% level. This indicates that the treatment effect is robust across different matching techniques. The ATE estimates are consistent across the different PSM methods, with Radius Matching yielding the highest estimate and Kernel Matching the lowest. All estimates are statistically significant, indicating a robust treatment effect. The differences in estimates and standard errors highlight the sensitivity of the treatment effect estimate to the choice of matching method. Radius Matching appears to provide the most

precise estimate, while Kernel Matching, though slightly lower in estimate, still provides a significant result with a relatively small standard error. This suggests that different matching techniques can influence the estimated treatment effect, but the overall effect remains significant across methods.

Table 4 Treatment effect estimated by PSM methods

	(1) One-to-One	(2) Radius	(3) Kernel
ATE	0.179**	0.184***	0.142**
	(0.076)	(0.057)	(0.059)

Table 5 Balance test

	Mean			t-test		
Variable	Treated	Control	%bias	t	p>|t|	V(T)/V(C)
age	83.606	83.435	1.4	0.84	0.398	0.99
gender	0.451	0.458	-1.4	-0.82	0.412	-
married	0.507	0.521	-2.9	-1.71	0.088	-
edu	3.423	3.498	-1.6	-1.05	0.293	0.96
family	0.969	0.970	-0.1	-0.05	0.961	-
children	3.876	3.920	-2.2	-1.34	0.180	1.07*
urban	0.211	0.209	0.3	0.22	0.825	-
lnincome	10.049	10.026	1.5	0.88	0.378	0.74*

Note: This test is based on the results of one-to-one match. * represents that the variance ratio outside [0.85, 1.05].

Of course, we tested the validity of the PSM model by examining whether the covariates of the treatment and control groups were balanced after matching, i.e., whether there was a significant difference between the means and variances of the covariates of the treatment and control groups. If there is no significant difference, it means that the matching has achieved our expected effect and improved the comparability between the treatment and control groups. Table 5 presents the results

of a balance test conducted to evaluate the equivalence of covariates between treated and control groups after one-to-one matching. Overall, the balance test results indicate that most variables are well balanced between the treated and control groups after one-to-one matching. Most variables do not show significant differences in means between the groups, indicating effective matching. Some variables, such as children and lnincome, have variance ratios outside the acceptable range, suggesting minor imbalances in variance. The results suggest that while matching has generally succeeded in balancing covariates, there may be slight imbalances in the variance for some variables.

4.2 Mechanism analysis

According to the previous section, we have found that participation in social insurance can enhance the ability of the elderly in their daily lives. In this subsection, we discuss why this effect occurs.

Participation in social insurance can, on the one hand, have an impact on the health capital of older persons, for example, by changing their habits, making them reduce bad habits or undergo medical check-ups, and on the other hand, it can reduce the cost of health care for older persons, which makes them more inclined to seek medical treatment when they are sick. We first estimated the effect of social insurance participation on bad lifestyle habits, that is, smoking and drinking, using the multiple methods of estimating treatment effects from the previous section, and then similarly estimated the effect of social insurance participation on physical examinations.

Table 6 Lifestyle effect

	(1)	(2)	(3)
	smoke	drink	physical_exam
diff	-0.031**	0.002	0.127***
	(0.015)	(0.014)	(0.016)
IPW_probit	-0.037***	-0.026*	0.100***
	(0.014)	(0.015)	(0.016)
IPW_logit	-0.038***	-0.026*	0.099***
	(0.014)	(0.015)	(0.016)

One-to-one	-0.043**	-0.031	0.111***
	(0.022)	(0.020)	(0.022)
Radius	-0.032**	-0.013	0.120***
	(0.016)	(0.015)	(0.017)
Kernel	-0.038**	-0.023	0.110***
	(0.017)	(0.016)	(0.017)

Table 6 presents the estimated effects of treatment on three lifestyle outcomes using various methods. Most methods show a negative effect on smoking, with significance at the 1% or 5% level for Probit, Logit, One-to-One, Radius, and Kernel methods. This indicates a consistent finding that the treatment leads to a reduction in smoking. The results for drinking are less consistent. Only the IPW_probit and IPW_logit methods show a significant negative effect at the 10% level, while other methods show insignificant results. This suggests that the treatment's impact on drinking is less robust and may vary depending on the method used. All methods report a positive and statistically significant effect on physical examination. This consistent result across different methods suggests that the treatment has a robust and significant impact on encouraging physical examinations.

Further, we test whether participation in social security makes older people more likely to choose to seek medical treatment when they are sick, and we test this hypothesis by assessing the effect of social security participation on whether they seek medical treatment versus the number of times they seek medical treatment. Table 7 presents the estimated effects of a treatment on two medical outcomes. The treatment does not have a significant effect on whether individuals visit a hospital. This outcome is consistent across all methods, with very small and statistically insignificant estimates. The treatment may have a minor positive effect on the time spent in the hospital, as indicated by the One-to-One Matching method. However, this effect is not consistently significant across other methods, suggesting that the impact on hospital time is not robust and should be interpreted with caution. Overall, the treatment does not appear to have a strong or consistent effect on medical outcomes

related to hospital visits and time spent in the hospital. The slight increase in hospital time observed with One-to-One Matching is the only notable result, but it is not supported by other methods.

Table 7 Medical effect

	(1) Hospital_dummy	(2) Hospital_time
diff	-0.011	0.006
	(0.013)	(0.032)
IPW_probit	0.000	0.045
	(0.014)	(0.029)
IPW_logit	0.001	0.046
	(0.014)	(0.029)
One-to-one	0.000	0.073*
	(0.019)	(0.037)
Radius	0.002	0.042
	(0.014)	(0.035)
Kernel	0.002	0.043
	(0.015)	(0.036)

4.3 Robustness analysis

To show that our conclusions are robust, we first estimate the effect of whether or not one is socially insured on daily living ability using a multiple linear regression model with control variables and controlling for province fixed effects.

Table 8 presents regression results from four different models analyzing the impact of various factors on ADL (Activities of Daily Living). The coefficient for insurance is consistently positive across all models, indicating that having insurance is associated with an increase in ADL. Including province fixed effects provides a more nuanced

understanding of the relationship between insurance and ADL which are controlled for in Columns (2) and (4), highlighting that the effect of insurance is somewhat reduced when accounting for provincial differences. The additional variables included in Columns (3) and (4) also provide a more comprehensive picture, showing that demographic and socioeconomic factors play significant roles in explaining ADL.

Table 8 Regression results

	(1)	(2)	(3)	(4)
	ADL	ADL	ADL	ADL
insurance	0.303***	0.251***	0.134***	0.119**
	(0.053)	(0.060)	(0.048)	(0.056)
age			-0.048***	-0.047***
			(0.002)	(0.004)
gender			0.151***	0.141***
			(0.030)	(0.028)
married			0.151***	0.172***
			(0.035)	(0.042)
edu			0.002	0.005
			(0.004)	(0.006)
family			-0.389***	-0.396***
			(0.075)	(0.057)
children			0.032***	0.023*
			(0.010)	(0.013)
urban			-0.224***	-0.106*
			(0.042)	(0.052)
lnincome			0.032***	0.027*
			(0.011)	(0.013)
_cons	5.099***	5.121***	9.148***	9.068***
	(0.050)	(0.053)	(0.182)	(0.288)
Province FE	No	Yes	No	Yes
N	8133	8133	8133	8133

R^2	0.005	0.026	0.196	0.212

In addition, we examined the impact of participation in social insurance on each of the daily living abilities of older adults to determine which of the daily living abilities was specifically affected by participation in social insurance. Table 9 presents the estimated treatment effects on six detailed activities of daily living (ADL), labeled A1 through A6. The results in Table 9 suggest that the treatment has a positive and statistically significant effect on most of the activities of daily living (A1 to A5). The robustness of these results across different methods enhances confidence in the findings. However, the effect on A6 appears weaker and less consistent, indicating that the treatment's impact on this specific activity may be more sensitive to the estimation method used or potentially less effective. Overall, the treatment seems to improve daily living activities, with some variation in the strength of these effects across different activities.

Table 9 Detailed activities of daily living

	(1)	(2)	(3)	(4)	(5)	(6)
	A1	A2	A3	A4	A5	A6
diff	0.091***	0.062***	0.049***	0.052***	0.030***	0.020**
	(0.014)	(0.012)	(0.011)	(0.011)	(0.008)	(0.008)
IPW_probit	0.026**	0.023**	0.014	0.020**	0.013*	-0.003
	(0.012)	(0.010)	(0.009)	(0.009)	(0.007)	(0.007)
IPW_logit	0.026**	0.023**	0.013	0.020**	0.013*	-0.003
	(0.012)	(0.010)	(0.009)	(0.009)	(0.007)	(0.007)
One-to-one	0.041**	0.046***	0.034**	0.032**	0.022*	0.003
	(0.021)	(0.017)	(0.016)	(0.016)	(0.012)	(0.012)
Radius	0.055***	0.041***	0.030**	0.035***	0.019**	0.003
	(0.015)	(0.013)	(0.012)	(0.012)	(0.009)	(0.009)
Kernel	0.041***	0.032**	0.023*	0.029**	0.017*	0.000
	(0.016)	(0.013)	(0.012)	(0.012)	(0.009)	(0.009)

5 Conclusion and Recommendations

5.1 Conclusion

This paper utilizes CLHLS data and uses IPW and PSM to explore the impact of participation in social insurance on the ability of the elderly to perform their daily lives, as well as the mechanism of action. Through empirical analysis, we get the following conclusions, first, participating in social insurance significantly improves the daily life ability of the elderly, second, participating in social insurance reduces the bad habits of the elderly, such as smoking and drinking, third, participating in social insurance makes the elderly willing to have a medical checkup, and fourth, we don't find that participating in social insurance makes the elderly more willing to go to the doctor.

5.2 Recommendations

In the past decade of precision poverty alleviation, government officials have tended to target income poverty in their poverty alleviation efforts, while ability poverty has usually been neglected. In view of the above findings, this paper puts forward the following policy recommendations for improving the effectiveness of basic health insurance in improving the basic living capacity of the elderly:

First, in-depth implementation of health poverty alleviation programs. Local governments should actively study support policies for people whose income level is slightly higher than that of the documented poor households, so as to prevent the problems of returning to poverty and poverty caused by illness. They should improve the early warning mechanism for returning to poverty, and follow up in a timely manner on the health status of households that have escaped from poverty, their participation in insurance, and other hidden information; the collection of early warning information on returning to poverty should be endeavored to be factual, accurate and complete. Medical resources should be further tilted towards impoverished areas, ensuring that counties, townships and villages have medical and health service institutions that meet standardized construction requirements.

Second, the reform of the medical insurance system should be continued and

deepened, and protection should be strengthened. Promote the inclusion of outpatient medical expenses in the scope of payment by the basic medical insurance co-ordination fund, and improve the differentiated reimbursement ratio. It has actively explored the reform of the medical insurance payment method, promoted the reform of the payment method according to the diagnosis-related grouping (DRG)/disease itemization (DIP), incentivized hospitals to improve the quality of their services, controlled costs, reduced the waste of resources, and enhanced the efficacy of the use of the medical insurance fund.

Third, new systems such as medical assistance, major illness insurance, and long-term care insurance should be strengthened to link up with basic medical insurance, so as to improve the basic multi-level social medical insurance system. Focusing on alleviating the burden of medical expenses for serious and large-scale illnesses on people in difficulty, we are strengthening the integrated protection of basic medical insurance, major illness insurance and medical assistance. Promoting the nationwide implementation of long-term care insurance, establishing and improving standards for assessing levels of incapacity, and standardizing and clarifying the institutions, personnel, and processes of assessment; scientifically measuring the corresponding financial needs for basic care services, and rationally determining the funding mechanism.

Fourth, social care for the disabled elderly should be strengthened. A system of regular visits to special groups of older persons has been established, and older persons who are at risk of safety and living in difficulty have been made the focus of assistance, with one-on-one care activities being carried out. For communities that are seriously ageing, especially in rural areas, barrier-free facilities have been promoted in public places, and senior citizen canteens or meal assistance service points have been created to address the problem of special groups of older persons eating. Implementing a system of subsidies for old-age and disability services for the economically disadvantaged, and subsidizing special groups of older persons to carry out age-appropriate renovations. Supporting social forces to explore specialized services that meet the needs of special groups of older persons.

Reference

[1] Barnay, T., and S. Juin, 2016, "Does Home Care for Dependent Elderly People Improve Their Mental Health?", Journal of Health Economics, 45, 149-160.

[2] Card, D., C. Dobkin, and N. Maestas, 2009, "Does Medicare Save Lives?", The Quarterly Journal of Economics, 124(2): 597-636.

[3] Cheng, L., H. Liu, Y. Zhang, K. Shen, and Y. Zeng, 2015, "The Impact of Health Insurance on Health Outcomes and Spending of the Elderly: Evidence from China's New Cooperative Medical Scheme", Health Economics, 24(6): 672-691.

[4] Costa-Font, J., S. Jimenez-Martin, and C. Vilaplana, 2018, "Does Long-Term Care Subsidization Reduce Hospital Admissions and Utilization?", Journal of Health Economics, 58: 43-66.

[5] Courbage, C., and A. Coulon, 2004, "Prevention and Private Health Insurance in the UK", The Geneva Papers on Risk and Insurance-Issues and Practice, 29(4): 719-727.

[6] Damme, W. V., L. V. Leemput, I. Por, W. Hardeman, and B. Meessen, 2004, "Out-of-Pocket Health Expenditure and Debt in Poor Households: Evidence from Cambodia", Tropical Medicine & International Health, 9(2): 273-280.

[7] Finkelstein, A., S. Taubman, B. Wright, S. Taubman, B. Wright, M. Bernstein, J. Gruber, J. P. Newhouse, H. Allen, K. Baicker, and Oregon Health Study Group, 2012, "The Oregon Health Insurance Experiment: Evidence from the First Year". The Quarterly Journal of Economics, 127(3): 1057-1106.

[8] Hu, B., 2019, "Projecting Future Demand for Informal Care among Older People in China: The Road towards a Sustainable Long-Term Care System", Health Economics, Policy and Law, 1:61-81.

[9] Huang, W., and C. Zhang, 2021, "The Power of Social Pensions: Evidence from China's New Rural Pension Scheme", American Economic Journal: Applied Economics, 13(2): 179-205.

[10] Kim, E. H. W., and P. J. Cook, 2011, "The Continuing Importance of Children in Relieving Elder Poverty: Evidence from Korea", Ageing & Society, 31(6): 953-976.

[11] Lei, X., and W. Lin, 2009, "The New Cooperative Medical Scheme in Rural China: Does More Coverage Mean More Service and Better Health?", Health Economics, 18(S2): S25-S46.

[12] Liang, H., 1999, "Studies on Self-supporting Abilities of Rural Elderly in China", Population and Economics, 4: 21-25.

[13] Stabile, M., L. Audrey, and P. C. Coyte, 2006, "Household Responses to Public Home Care Programs", Journal of Health Economics, 25: 674-701.

[14] Unutzer, J., D. L. Patrick, G. Simon, D. Grembowski, E. Walker, C. Rutter, and W. Katon, 1997, "Depressive Symptoms and the Cost of Health Services in HMO Patients Aged 65 Years and Older. A 4-year Prospective Study", Journal American Medical Association, 277(20): 1618-1623.

[15] Vasiliadis, H. M., P. A. Dionne, M. Préville, L. Gentil, D. Berbiche, and E. Latimer, 2013, "The Excess Healthcare Costs Associated with Depression and Anxiety in Elderly Living in the Community", American Journal of Geriatric Psychiatry, 21(6): 536-8.

[16] Yilma, Z., L. van Kempen, and T. de Hoop, 2012, “A Perverse “Net” Effect? Health Insurance and Ex-ante Moral Hazard in Ghana”, Social Science & Medicine, 75(1): 138-147.
[17] Zimmer, Z., and J. Kwong, 2003, “Family Size and Support of Older Adults in Urban and Rural China: Current Effects and Future Implications”, Demography, 40(1): 23-44.
[18] Zunzunegui, M. V., F. Béland, and A. Otero, 2001, “Support from Children, Living Arrangements, Self-rated Health and Depressive Symptoms of Older People in Spain”, International Journal of Epidemiology, 30(5): 1090-1099.

Acknowledgement

Participating student Jiayou Chen has completed writingthe paper " Impact of Social Insurance on the Basic Living Ability of Older Persons " and related study with the help of Professor Qinfu Liu.

Chen Jiayou, the participant, completed the writing the paper " Impact of Social Insurance on the Basic Living Ability of Older Persons " and related research of the essay under the guidance of Liu Qingfu, a teacher of our school.

I would like to express my sincere thanks to Professor Liu Qingfu for his help in the research method, data analysis and writing of the paper.

I am interested in data analysis. So I attended the CodingMarch's training for programming, AI and science. In the process of writing the competition, the data analysis was helped by Mr.Yang in CodingMarch.

I know Professor Liu through the introduction of my teacher in Shanghai Pinghe School and teachers from CodingMarch. Professor Liu helped me with my essay writing and taught me knowledge on data analysis, modelling, statistics ans so on which contributed a lot when I was working on the paper. There is no way I can have access to this type of knowledge. Finishing the paper with the guide of Professor Liu was incredible. I am still impressed by Professor Liu's idea and criticism when I was working on the paper. He gave me many valuable suggestion on essay writing and made me understand the method of writing more deeply. Professor Liu is not paid and I want to show him my sincere gratitude.

Before we determined the topic, I had several lessons with Professor Liu. He made me read eight papers by others and taught me lessons on econometrics using the text book, Introductory Econometrics by Jeffery M.Wooldridge. Knowledge beyond this syllabus used in data analysis of the paper were explained by Professor Liu to me patiently.

My grandpa was a healthy old man. But a year ago, he got Alzheimer Disease and he suffered from it. What is more, there is still more than two hundred thousand elderly in my hometown, Chongming. As a result, I chose this topic.

In the process of working on this paper, what I did was paper writing and writing codes to do the data analysis. Professor Liu collected the data, offered me a guide on what I should wrote and help me when there was a mistake with my calculation or some problems on my word choices.

Everything was going on very well, but we often face difficulties. When I was writing program on Anaconda Jupyter Notebook, I face problems on the codes. For nearly a week, I couldn't find out which part went wrong. My programming teacher Mr. Yang had helped me with many problems like that. But this time, I couldn't turn to Mr. Yang for he had a full schedule. So I sent my code to Professor Liu. We looked it over, and Professor Liu even had onw of his students to solve my problem. After two hours of checking, nearly every part of my code was amended and the problem was finally fixed.

Again, I would like to express my sincere thanks to Professor Liu Qingfu. Thank you for helping me, guiding me and teaching me.