

Study on the influence of long-term care insurance on life satisfaction of the elderly—— Empirical analysis based on CHARLS data from 2011 to 2020

Meng Xue *

School of Ethnology and Sociology, Inner Mongolia University, Hohhot, China

* Corresponding Author Email: 15048933372@163.com

Abstract. As China's population ages, the number of elderly people is increasing sharply, and mental health issues among the elderly are becoming more prominent. This paper uses data from five waves of the Chinese Health and Retirement Longitudinal Study (CHARLS) from 2011 to 2020, employing a progressive difference-in-differences model to investigate the impact and mechanisms of long-term care insurance on the life satisfaction of the elderly. The baseline regression results show that long-term care insurance has a more significant effect on the life satisfaction of men, rural residents, those without pension insurance, those with no social activities, older individuals, and low-income seniors. Through mediation mechanism research, it is found that long-term care insurance significantly influences the life satisfaction of the elderly through pathways such as physical health, mental health, and satisfaction with children. Notably, long-term care insurance does not significantly improve emotional connections between the elderly and their children, nor does it significantly enhance their life satisfaction. Based on the pilot experience of long-term care insurance, suggestions are made to improve top-level design, gradually expand the scope of pilots and coverage of insured individuals, establish a precise identification mechanism for nursing assistance, increase subsidies for disadvantaged groups, strengthen grassroots public health facilities, and promote equal access to basic public services.

Keywords: long-term care insurance, healthy aging, active aging, life satisfaction.

1. Problem raising

Since the pilot program for long-term care insurance was launched, the number of participants nationwide has exceeded 180 million, benefiting over 2.6 million disabled individuals, effectively alleviating the caregiving challenges faced by some elderly groups. Notably, life satisfaction among the elderly, as a core indicator of subjective quality of life, is influenced by multidimensional factors. These include not only basic elements such as economic security, family support, and health status but also deeper dimensions like social participation and psychological adjustment. Under the dual pressures of accelerating aging and rising risks of disability, long-term care insurance, as an important innovation in the social security system, has a growing direct impact on the life satisfaction of the elderly, particularly those with disabilities. Currently, although long-term care insurance has achieved phased results, its coverage still falls far short of the scale of disabled elderly populations. Additionally, there is room for systematic optimization in areas such as funding mechanisms, service provision, and benefit standards. In this context, focusing on the pathways and impact effects of long-term care insurance on the life satisfaction of the elderly not only provides empirical evidence for improving social security policies but also serves as a critical entry point for advancing the Healthy Aging Strategy and realizing the better life aspirations of the elderly.

This paper uses the fifth phase data from the China Health and Retirement Longitudinal Study (CHARLS) for 2011-2020, employing a progressive difference-in-differences model to investigate the impact and mechanisms of long-term care insurance on elderly life satisfaction. The baseline regression results show that long-term care insurance has a significant effect on elderly life satisfaction. Heterogeneity analysis reveals that the impact of long-term care insurance on life satisfaction is more pronounced among males, rural residents, those without pension insurance, those with no social activities, older individuals, and low-income seniors. Mediation mechanism research

finds that long-term care insurance influences elderly life satisfaction through multiple pathways, with physical health, mental health, family consumption, and satisfaction with support from children all playing significant mediating roles in affecting elderly life satisfaction.

2. Literature review

2.1. Factors influencing the life satisfaction of the elderly

Life satisfaction is a crucial tool for assessing the quality of life, more specifically, subjective well-being, among the elderly population. It serves as a benchmark for measuring the happiness index of Chinese seniors and is an essential component in achieving healthy aging and implementing the Healthy China strategy. The academic community has extensively explored factors influencing elderly life satisfaction, including personal characteristics, family characteristics, health status, and social support. In terms of personal characteristics, elderly life satisfaction is primarily influenced by gender, age, marital status, and educational level. The impact of gender on life satisfaction remains controversial. Liu Bingbing and Liu Xiaomei (2021) found that female seniors have higher life satisfaction than male seniors and adapt to changes in their social roles more quickly after retirement^[1]. However, Deng Dasong and Tang Jiali (2021) demonstrated that male seniors have higher life satisfaction, attributing this to their greater rationality and stronger emotional regulation skills^[2]. Additionally, Liu Shixiang et al. (2020) found no significant correlation between gender and life satisfaction.^[3] Regarding family characteristics, factors such as place of residence, family income levels, and the number of children significantly influence elderly life satisfaction. Research conclusions on the impact of place of residence vary. Yuan Ni et al. (2020) found that there is no significant effect of place of residence on the life satisfaction of elderly people. Due to the advancement of urban-rural integration, new rural social pension, and new rural cooperative medical policies, the lives of rural elderly have been secured, reducing the gap between urban and rural areas^[4]. Jin Ling (2011), however, believes that rural elderly have higher life satisfaction, with lower living expectations, making them more likely to feel satisfied with their lives^[5]. In contrast, Sun Kuili et al. (2010) argue that urban elderly have higher life satisfaction because of the higher level of economic development and richer social services in cities^[6]. Regarding health status, the life satisfaction of the elderly is mainly influenced by factors such as chronic diseases, daily living activities, and self-rated health conditions. Yin et al. (2019) found a significant positive correlation between life satisfaction and daily living activities, while having chronic diseases has an opposite effect^[7]. Luo Sheng et al. (2016) believe that elderly people with chronic diseases or those who cannot take care of themselves are often worried about their physical health and medical treatment, leading to negative emotions^[8]. Xu Bo et al. (2010) suggest that elderly people with chronic diseases incur higher economic expenses, experience greater psychological stress, and have reduced physiological functions and resistance, making them more susceptible to mobility issues and pain, thus affecting their quality of life.^[9] The social security system is also a crucial factor influencing the life satisfaction of the elderly. Regarding the social security system, Zhang Zihao and Tan Yanzhi (2018) found that social insurance can enhance residents' life satisfaction and boost their confidence in future life. On one hand, the risk protection aspect of social insurance reduces future uncertainties, encouraging savings and increasing current consumption. On the other hand, its redistributive function helps to narrow the wealth gap and reduce feelings of relative exploitation, thereby enhancing life satisfaction.^[10]

2.2. Research on the influence of long-term care insurance on life satisfaction of the elderly

Disability care issues have garnered significant social attention, and long-term care insurance is an essential component of the formal social support system. It is necessary to study the relationship between long-term care insurance and elderly life satisfaction. In terms of direct impact research on long-term care insurance, a review of domestic and international literature confirms that long-term care insurance helps improve physical health, reduce medical burdens, and enhance healthcare utilization among the elderly. Xie Yufei and Feng Jin (2022) used data from disability assessments

and medical insurance in a typical central urban area to find that long-term care insurance can significantly improve the health of disabled individuals and notably lower mortality rates in both employee and resident medical insurance samples.^[11]Ma et al. (2022) found that long-term care insurance can significantly reduce out-of-pocket medical expenses and improve self-rated health levels.^[12] Regarding indirect impacts of long-term care insurance, extensive literature focuses on its effects on labor supply, household consumption, informal care, and intergenerational support. In terms of labor supply, Fu et al. (2017) discovered that long-term care insurance has a significant positive spillover effect on the labor participation rate of Japanese family caregivers, with varying impacts based on gender and age.^[13]Jing Tao et al. (2021) analyzed that long-term care insurance can significantly promote employment, with regional and scale differences in this effect, and individual health levels playing a mediating role.^[14]Ma Guangbo and Xu Kun (2022) found that long-term care insurance can significantly boost household consumption through the mechanism of increasing household income.^{[15][16]}In the study of the impact of long-term care insurance on elderly life satisfaction, a few studies have shown that long-term care insurance can enhance the life satisfaction of the elderly. Gao Xuyao (2022) found that participating in long-term care insurance can significantly improve the caregiving satisfaction of disabled seniors.^[17]Lei et al. (2022) discovered that the implementation of long-term care insurance can effectively reduce unmet care needs among the elderly, alleviate the financial burden of family care, improve self-rated health status, and increase the happiness of both the elderly and their families.^[18]Li Li and Lu Miaomiao (2022) found that long-term care insurance has a significant positive effect on the life satisfaction of middle-aged and older adults, particularly for men, unmarried or cohabiting individuals, and those with fewer children. This effect is confirmed to be achieved through increased intergenerational economic support.^[19]

Therefore, this paper uses the fifth phase data from the China Health and Retirement Longitudinal Study (CHARLS) for 2011-2020, employing a progressive difference-in-differences model to investigate the impact and mechanisms of long-term care insurance on elderly life satisfaction. The study employs mediation mechanisms to analyze how long-term care insurance affects elderly life satisfaction through its influence on physical health, mental health, and intergenerational relationships. It also explores differences in gender, household registration, pension insurance, social activities, age, and income from an individual heterogeneity perspective. Based on a holistic view of life satisfaction, the study examines the impact of long-term care insurance on the quality of life for the elderly and analyzes the mechanisms that influence life satisfaction.

3. Theoretical analysis and research hypothesis

3.1. Hierarchy of Needs Theory

The impact of long-term care insurance on the life satisfaction of the elderly can be explained through Maslow's hierarchy of needs, focusing on the fulfillment of both basic and higher-level needs. Firstly, in terms of basic needs, long-term care insurance can provide disabled elderly individuals with daily care, medical treatment, or financial support, ensuring their basic living needs are met. This improves the quality of life for disabled elderly individuals, maintains or enhances their physical functions to some extent, reduces the long-term care burden and financial pressure on families, and provides health and economic security, meeting the physiological and safety needs of the elderly. Secondly, regarding higher-level needs, the disability care provided by long-term care insurance ensures the basic dignity of the elderly, eases family relationships, and alleviates the psychological burden of feeling like a burden to their children. Whether it is the care from medical staff or the companionship of family members, these measures help meet the elderly's social and respect needs to some extent.

3.2. Theory of determinants of health

The theory of social determinants of health is composed of personal, social, and functional factors. These factors can lead to different outcomes for individuals. The World Health Organization (WHO) defines 'social determinants of health' (SDH) as a series of factors that, in addition to those directly causing diseases, influence people's work and living environments due to differences in resources and social status. These factors are often considered the 'root causes' of diseases. Based on this theory, long-term care insurance aims to systematically improve the life satisfaction of the elderly by intervening in multiple social health determinants. Based on the above analysis, this paper proposes the following hypothesis:

H1: Long-term care insurance can improve the life satisfaction of the elderly.

H2: Long-term care insurance improves the life satisfaction of the elderly by improving their physical health, mental health and intergenerational relationship.

H3: Long-term care insurance has a more significant impact on the life satisfaction of elderly men, rural residents, those without pension insurance, those without social activities, and those with advanced age and low income.

4. Data sources and research methods

4.1. Data sources

The data for this study are derived from the China Health and Longevity Tracking Survey (CHARLS) and the China Long-term Care Insurance Pilot Policy Database, spanning five years from 2011 to 2020. The CHARLS is conducted by the National School of Development at Peking University and the Chinese Social Science Survey Center at Peking University. In 2008, the CHARLS data project team conducted preliminary surveys in Zhejiang and Gansu provinces, representing the eastern and western regions, respectively. The national baseline survey began in 2011, followed by national surveys every 2-3 years. Follow-up surveys were conducted in 2013, 2015, 2018, and 2020 across 28 provinces (autonomous regions, municipalities), covering 150 counties and 450 communities (villages).

4.2. Variable selection

4.2.1. Dependent variable: life satisfaction

This paper uses the life satisfaction of the elderly as the dependent variable. Life satisfaction is a subjective perception and evaluation of their objective living conditions. The response to the question "Overall, are you satisfied with your life?" serves as a measure of the elderly's life satisfaction. In the questionnaire, those who answered "extremely satisfied" were assigned a value of 1, "very satisfied" 2, "somewhat satisfied" 3, "not very satisfied" 4, and "not at all satisfied" 5. A higher number indicates poorer life satisfaction among the respondents.

4.2.2. Independent variable: long-term care insurance

This paper constructs a dual-difference model of long-term care insurance, considering both urban areas and years. Given the varying start times of pilot programs across different regions and the potential differences in data values within the same region over time, this study compiles information on pilot cities that implemented long-term care insurance from 2011 to 2019. This data is then matched with the pilot areas covered by CHARLS. In the selected pilot cities, individuals are screened based on the type of medical insurance they are enrolled in, given the different populations covered by the long-term care insurance pilot program. If an individual is included in the pilot program and is enrolled in basic medical insurance, their value is set to 1; otherwise, it is set to 0. Additionally, the study excludes individuals aged 45-60, focusing only on those aged 60 and above.

4.2.3. Control variables

Drawing on previous research, this paper selects population, health, family, and social support as control variables. In terms of demographic characteristics, these mainly include age, gender, education level, marital status, and household registration; regarding health characteristics, they primarily cover the presence or absence of chronic diseases; concerning family characteristics, they include total family income and number of children; in terms of social support, they encompass participation in pension insurance. The variable assignment and descriptive statistical results are presented in Table 1 and Table 2.

Table 1. Variable list

Variable groups	Variable name	variable declaration
Core independent variable	Long-term care insurance	Pilot projects that have been carried out and included in the pilot scope = 1; pilot projects that have not been carried out or have been carried out but not included in the pilot scope =0
dependent variable	Life satisfaction	Very satisfied = 1, very satisfied = 2, relatively satisfied = 3, not satisfied = 4, not satisfied at all =5
Demographic characteristics	age	Actual survey value (years)
	sex	Male = 1, female =0
	educational status	Uneducated (illiterate) =0, not finished primary school =3, graduated from primary school =6, junior high school =9, high school =12, college =15, undergraduate =16, master =19, doctor =22
	marriage	Married = 1, unmarried =0
	number of households and total population	Non-agricultural household registration = 1, rural household registration =0
Health characteristic variables	chronic disease	Chronic disease = 1, no chronic disease =0
Family characteristic variables	Total household income	Actual survey value (ten thousand yuan)
	quantity of children	Actual survey value (per)
Social support variables	Whether to participate in pension insurance	They have participated in the basic old-age insurance for employees, supplementary old-age insurance and urban and rural areas Any one of the following social endowment insurance for residents, endowment insurance for urban residents, new rural social endowment insurance or land acquisition endowment insurance is assigned a value of 1, otherwise it is assigned a value of 0.

Table 2. Descriptive statistics

variable	observed value	mean	standard deviation	least value	crest value
Life satisfaction	12786	2.741	0.773	1	5
age	12786	70.911	6.249	60	110
sex	12786	0.491	0.5	0	1
educational status	12786	4.484	3.475	1	19
marriage	12786	0.758	0.428	0	1
Number of households and total population	12786	0.198	0.398	0	1
doings	12786	0.482	0.5	0	1
chronic disease	12786	0.833	0.373	0	1
Total household income	12786	2.358	4.703	0	188.97
Quantity of children	12786	3.459	1.482	0	11
Economic support for children	12786	0.483	1.345	0	75
endowment insurance	12786	0.477	0.499	0	1
hospitalization insurance	12786	0.941	0.236	0	1

4.3. Model construction

Due to the inconsistent time of long-term care insurance pilot in different regions of China, and the gradual expansion of the pilot scope in some regions according to the operation of policies, this paper uses the gradual double difference method to test the impact of long-term care insurance pilot on the mental health of the elderly, and sets the model as follows:

$$Y_{ict} = \beta_0 + \beta_1 treat_{it} + \beta_2 \chi_{ict} + \varepsilon_t + \omega_c + \mu_{ict}$$

Among them, Y_{ict} represents the mental health of the elderly; $treat_{it}$ indicates the pilot program for long-term care insurance, where if individual i is in an area that has launched a pilot program for long-term care insurance at time t and individual i is included in the pilot program, the value is 1; otherwise, it is 0; χ_{ict} represents control variables, including demographic characteristics, health characteristics, family characteristics, intergenerational economic support, and social support; ε_t represents the fixed effect of year; ω_c represents the fixed effect at the provincial level; μ_{ict} represents the random disturbance term; β_0 is the constant term, and β_1 and β_2 are the estimated coefficients.

5. Empirical results and research findings

5.1. Benchmark regression results

Using the double difference model, Table 1 added population characteristics, health characteristics, economic characteristics and social support characteristics control variables one by one from model (1) to (6), and the results were all significantly negative, indicating that long-term care insurance can improve the life satisfaction of the elderly more. The adjusted R2 results are increasing continuously, which enhances the persuasiveness of the model.

Table 3. Baseline regression results

	(1)	(2)	(3)	(4)	(5)	(6)
Long-term care insurance	-0.128***	-0.128***	-0.127***	-0.123***	-0.128***	-0.127***
	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
age		-0.010***	-0.010***	-0.010***	-0.009***	-0.009***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
sex		-0.034**	-0.028*	-0.032**	-0.038**	-0.036**
		(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Educational level		0.008***	0.007***	0.008***	0.009***	0.009***
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
marriage		-0.047***	-0.047***	-0.043**	-0.038**	-0.038**
		(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
number of households and total population		-0.078***	-0.081***	-0.059***	-0.070***	-0.076***
		(0.019)	(0.019)	(0.019)	(0.020)	(0.020)
chronic disease			0.110***	0.110***	0.111***	0.110***
			(0.018)	(0.018)	(0.018)	(0.018)
Total household income				-0.008***	-0.008***	-0.008***
				(0.002)	(0.002)	(0.002)
quantity of children					-0.015***	-0.015***
					(0.005)	(0.005)
Economic support for children					-0.028***	-0.028***
					(0.005)	(0.005)
endowment insurance						-0.080***
						(0.019)
constant term	2.751***	3.503***	3.395***	3.415***	3.376***	3.435***
	(0.007)	(0.098)	(0.099)	(0.099)	(0.100)	(0.101)
fixed effect	yes	yes	yes	yes	yes	yes
sample capacity	12786	12786	12786	12786	12786	12786
adjust R ²	0.022	0.028	0.031	0.033	0.036	0.037
Observations	12786	12786	12786	12786	12786	12786

Standard errors in parentheses

Note: The standard error of robustness is in parentheses; *, **, and *** indicate the significance level of 10%, 5%, and 1%, respectively

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.2. Robustness test

5.2.1. Parallel trend test

The use of the DID model for policy evaluation of long-term care insurance is contingent on the parallel trend assumption, which posits that the experimental group and the control group exhibit similar development trends before the policy is implemented. The parallel trend test indicates that before the pilot policy was introduced, the confidence intervals of the regression coefficients for life satisfaction among the elderly in both groups included the value 0, indicating no significant difference between the two groups prior to the policy intervention. This satisfies the parallel trend assumption of the DID model, thereby validating the study design's effectiveness. The post-trend effect exhibits

a lag, interacting with the average trend results to enhance the persuasiveness of the findings. As the policy progresses, the impact of long-term care insurance on life satisfaction continues to grow, meeting the empirical robustness test of this study.

5.2.2. PSM structure

This paper employs the propensity score matching double difference (PSM-DID) method to evaluate the impact of long-term care insurance on the life satisfaction of elderly individuals. This approach prevents samples with significant endogeneity from being used for estimation, thus ensuring the accuracy of the results. The estimation results are shown in Table 4. Even after applying the propensity score matching double difference method, the results remain significant, confirming that long-term care insurance has a substantial impact on the life satisfaction of elderly individuals.

Table 4. Results of PSM-DID method

	Life satisfaction
Long-term care insurance	-0.176***
	(0.035)
constant term	3.170***
	(0.308)
adjust R ²	0.019
Observations	8679

Note: The standard error of robustness is in parentheses; *, **, and *** indicate the significance level of 10%, 5%, and 1%, respectively

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.2.3. Placebo test

This paper randomly selects 5,000 samples from the total of 12,786 for a placebo test as the "pseudo-experimental group," and repeats this random sampling process 500 times. The product of policy variables and time variables is used as the core explanatory variable for re-regression. Most of the regression coefficients in the model are close to zero, showing a normal distribution, thus indicating that the regression results in the benchmark regression are robust.

5.3. Mechanism analysis

Long-term care insurance influences the life satisfaction of elderly individuals through multiple pathways. In terms of physical health, the professional nursing services it provides significantly improve self-rated health levels and enhance daily activity capabilities through rehabilitation training, laying the foundation for greater independence in daily living. Regarding mental health, it reduces the burden of family caregiving, effectively alleviating psychological stress in the elderly. Coupled with health management services, it strengthens disease prevention awareness, collectively improving mental health status. In social activities, long-term care insurance shares the pressure of family caregiving by providing professional nursing services, allowing children to step back from heavy caregiving responsibilities and focus more on emotional companionship and interaction, thereby reinforcing intergenerational emotional connections. Based on these assumptions, this study attempts to use the mediating variables of elderly physical health, mental health, and intergenerational support as intermediaries, employing a mediation mechanism to analyze the impact of pilot programs of long-term care insurance on the life satisfaction of the elderly.

Table 5. Mechanism analysis variables

physiology	Self-assess your health	Good = 2, good = 2, average = 3, not good = 4, very bad =5
psychology	Daily functioning	Any impairment in daily activities (including bathing, dressing, getting up, going to the toilet, controlling urination and defecation, eating) = 1, all Being able to work independently =0
	mental health	The score ranged from 0 to 30, and the higher the score, the worse the mental health status of the elderly
Intergenerational support	Children's emotional connection	Meet/Contact
	Satisfaction with children	Very satisfied =1 very satisfied =2 relatively satisfied =3 not satisfied =4 Not satisfied at all =5

5.3.1. Physical health

The study explores how long-term care insurance enhances the physical health of the elderly and improves their life satisfaction by enhancing medical care services. Table 6 shows that long-term care insurance significantly impacts self-assessed health and daily activities. Self-assessed health and daily activities reflect the physical health of the elderly, indicating that long-term care insurance improves their physical health and life satisfaction by enhancing self-assessed health and daily activities. The improvement in the physical health and life satisfaction of the elderly is attributed to the synergistic effects of multiple mechanisms. Economically, insurance helps cover care costs, alleviating financial pressure on families and encouraging the elderly to actively seek medical resources and improve their health management practices. Service-wise, professional care directly enhances daily activities and reduces the risk of complications through preventive measures, thereby delaying functional decline. Psychosocially, insurance provides psychological security, reducing anxiety and depression, while social support alleviates loneliness, promotes social participation, and fosters a positive 'psychological-physical' cycle. Family relationships are also improved, as the burden on caregivers is reduced, leading to a more harmonious family environment, fewer intergenerational conflicts, and enhanced self-esteem and control over their lives, thus improving mental health. These mechanisms collectively enhance the overall health and life satisfaction of the elderly.

Table 6. Mediating effect of physical health

	model 1	model 2	model 3	model 4
Long-term care insurance	-0.150*** (0.031)		-0.205** (0.096)	
Self-assess your health		0.201*** (0.007)		
Daily functioning				0.036*** (0.002)
constant term	2.912*** (0.123)	2.853*** (0.101)	0.940** (0.381)	3.402*** (0.101)
adjust R ²	0.077	0.094	0.140	0.055
Observations	12718	12718	12718	12718

Note: The standard error of robustness is in parentheses; *, **, and *** indicate the significance level of 10%, 5%, and 1%, respectively

* p < 0.1, ** p < 0.05, *** p < 0.01

5.3.2. Mental health

The study explores the impact of long-term care insurance on improving mental health and enhancing life satisfaction among the elderly through medical care services. The results in Table 7 show that long-term care insurance has a significant effect on mental health. Mental health reflects the spiritual state of the elderly, indicating that long-term care insurance improves mental health and enhances their life satisfaction. Therefore, the possible reasons can be investigated from the following aspects: First, in terms of social networks, institutional care services and professional involvement form a dual support system. Professional nursing institutions not only provide standardized medical care but also promote social participation among the elderly by creating stable social environments. Professional psychological intervention teams conduct targeted emotional guidance and cognitive training, effectively alleviating feelings of depression and loneliness in the elderly, thereby improving their mental health status. Second, at the level of life expectancy, the insurance mechanism significantly reduces family anxiety about medical expenses through risk sharing. The relief of economic pressure frees the elderly from the worry of falling into poverty due to illness, enhancing their sense of control and security regarding future life. This positive psychological expectation directly translates into higher life satisfaction. Third, in terms of the restructuring of intergenerational relationships within families, this policy has a significant gender equality promotion effect. By replacing the traditional caregiving responsibilities primarily borne by women in families, it not only releases the career development potential of female labor force but also reconstructs the intergenerational interaction model. The reduction of economic burdens alleviates the conflict over support, while the sharing responsibility by professional institutions allows family members to focus more on emotional companionship, thus fostering a positive interactive atmosphere that strengthens the psychological belonging of the elderly. Therefore, long-term care insurance can ultimately achieve the overall improvement of life satisfaction in old age through the improvement of mental health.

Table 7. Mediating effect of mental health

	model 1	model 2
Long-term care insurance	-0.955*** (0.207)	
emotional health		0.043*** (0.001)
constant term	14.606*** (0.820)	2.811*** (0.096)
adjust R ²	0.094	0.153
Observations	12718	12718

Note: The standard error of robustness is in parentheses; *, **, and *** indicate the significance level of 10%, 5%, and 1%, respectively

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.3.3. Intergenerational support

The results in Table 8 show that long-term care insurance has no significant impact on emotional connections with children but significantly affects their satisfaction. By reflecting the intergenerational relationship of elderly people through emotional connections and satisfaction with children, it is concluded that long-term care insurance improves children's satisfaction, moderates intergenerational relationships, and enhances the life satisfaction of the elderly. However, long-term care insurance does not affect emotional connections with children. The reasons for the significant impact of long-term care insurance on children's satisfaction are as follows: First, long-term care insurance provides professional nursing services, reducing the pressure on children in daily care and economic burdens. Freed from heavy caregiving tasks, children can focus more on emotional support, reducing friction and negative emotions caused by prolonged care. Elderly people feel their children's

concern shifting from "obligatory care" to "emotional interaction," leading to a significant improvement in subjective evaluations (satisfaction) of intergenerational relationships. Second, since satisfaction is a subjective indicator, it is easily influenced by psychological factors. Elderly people may experience an increase in "sense of security" and a feeling of being "socially supported" due to the intervention of long-term care insurance. Even if the actual frequency of contact remains unchanged, the assurance of nursing services can enhance their trust in their children's "potential support capacity," thus leading to a more positive evaluation of intergenerational relationships. Third, long-term care insurance may reshape family roles: children shift from being "primary caregivers" to "emotional companions." Elderly people's expectations for their children's role change from "providing care" to "maintaining emotions." This role transformation may lower the requirement for frequent contact and place greater emphasis on the quality of interaction, thereby increasing satisfaction. The reason why the impact of long-term care insurance on children's emotional contact (meeting/frequency of contact) is not significant may be that it is difficult to change due to short-term policy factors, and the frequency of children's emotional contact with the elderly (such as meeting and talking) is restricted by structural factors such as geographical distance, work intensity and living habits.

Table 8. Mediating effect of intergenerational support

	(3)	(4)	(5)	(6)
Long-term care insurance	0.020		-0.059**	
	(0.026)		(0.025)	
Children's emotional connection		-0.008		
		(0.009)		
Satisfaction with children				0.462***
				(0.011)
constant term	1.011***	3.444***	2.497***	2.280***
	(0.102)	(0.102)	(0.138)	(0.133)
adjust R ²	0.183	0.037	0.014	0.209
Observations	12718	12718	7563	7563

Note: The standard error of robustness is in parentheses; *, **, and *** indicate the significance level of 10%, 5% and 1%, respectively

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6. Heterogeneity study

By conducting regressions on different group types, we explore individual heterogeneity. Table 9 reveals that long-term care insurance has a more significant impact on the life satisfaction of men, rural residents, those without pension insurance, those with no social activities, elderly individuals, and low-income seniors. The reasons may be as follows: In terms of gender, in traditional gender roles, men often bear the responsibility of being the economic pillar of the family. When their self-care abilities decline, they may face greater psychological distress and economic dependency pressure. Long-term care insurance alleviates this anxiety by providing financial and nursing support. Additionally, men may seek medical help later, leading to the accumulation of health issues, which are more effectively addressed when insurance intervenes. Regarding household registration, rural residents may experience structural resource scarcity. Medical resources, elderly care facilities, and community services in rural areas lag far behind those in urban areas. Insurance serves as an accessible formal support system with higher marginal utility. Moreover, due to generally lower household incomes in rural areas, the proportion of nursing expenses in household budgets is larger, and insurance significantly reduces economic pressure through cost-sharing mechanisms. The outflow of young adults from rural areas may also weaken traditional family-based eldercare

functions, and insurance fills some gaps in intergenerational support. In terms of social security, there may be a multidimensional poverty phenomenon among those without pension insurance. The lack of pension insurance often accompanies economic poverty and a scarcity of social capital. Long-term care insurance not only provides nursing support but also alleviates multidimensional deprivation through economic compensation. At the same time, those without pension insurance have fewer reserves to cope with health shocks, making the "risk buffer" function of insurance more directly impactful on their stability of living. Long-term care insurance may become one of the few institutional guarantees, providing a stronger sense of psychological security. In terms of social interaction, it could break the deadlock of social isolation among groups with no social activities. Care service providers might become one of their few channels for social contact, and the care process itself carries social functions, enhancing subjective well-being. Furthermore, social interaction represents a difference in information acquisition; active social groups may obtain support resources through other channels, while isolated groups rely more heavily on insurance. According to some studies, those lacking social connections have a higher risk of depression, making emotional support in care services more sensitive to improvements in mental health. Regarding age, the disability rate among elderly people significantly increases, and their need for care is rigid. Insurance services better match their actual needs, and the older the elderly, the older their children tend to be, which to some extent indicates a decline in intergenerational support. Children may also enter old age and find it difficult to provide care, making insurance substitution effects more pronounced. In terms of income, the lower the household income of the elderly, the greater the marginal effect, with insurance economic compensation accounting for a larger proportion of their income, leading to a more noticeable consumption smoothing effect. Low-income families are more likely to abandon work due to caregiving responsibilities, and the effect of insurance in reducing opportunity costs is more prominent. Additionally, there is a bidirectional causal relationship between income and health, making the effect of insurance breaking the vicious cycle of "poverty and illness" more evident.

Table 9. shows the results of heterogeneity test

variable	sex		number of households and total population		endowment insurance		doings		age		income	
	the male sex	femininity	town	rural area	There is pension insurance	No pension insurance	There's socializing	No socializing	Old age	Young age	high income	low income
Long-term care insurance	-0.164**	-0.108**	-0.057	-0.156**	-0.125**	-0.193**	-0.133**	-0.137**	-0.148**	-0.105*	-0.129**	-0.141**
	(0.034)	(0.039)	(0.054)	(0.030)	(0.028)	(0.066)	(0.037)	(0.036)	(0.031)	(0.049)	(0.032)	(0.044)
constant term	3.437**	3.583**	3.282**	3.561**	3.377**	3.582**	3.578**	3.507**	3.715**	3.415**	3.422**	3.688**
	(0.128)	(0.146)	(0.195)	(0.112)	(0.157)	(0.127)	(0.135)	(0.139)	(0.186)	(0.252)	(0.132)	(0.142)
adjust R ²	0.047	0.031	0.037	0.039	0.022	0.037	0.038	0.043	0.033	0.036	0.037	0.041
Observations	6258	6460	2525	10193	6056	6662	6146	6572	6185	6533	6355	6363
controlled variable	control	control	control	control	control	control	control	control	control	control	control	control
fixed effect	control	control	control	control	control	control	control	control	control	control	control	control

7. Research conclusions and policy recommendations

Long-term care insurance has a significant impact on the life satisfaction of elderly people. The effect is more pronounced for men, those with rural household registration, those without pension insurance, those who do not engage in social activities, and older or lower-income seniors. Long-term care insurance influences the life satisfaction of the elderly through multiple pathways, with physical health, mental health, and intergenerational support all playing significant mediating roles. Notably, long-term care insurance does not significantly improve emotional connections between the elderly and their children, which could enhance their life satisfaction. Based on this, it is recommended to improve top-level design, gradually expand the pilot scope and coverage of insured individuals, establish a precise identification mechanism for care assistance, increase subsidies for disadvantaged groups, strengthen grassroots public health facilities, and promote equal access to basic public services. First, improve top-level design and gradually expand the pilot scope of long-term care insurance. It is suggested to further advance the implementation of the long-term care insurance system nationwide based on expanded pilots, and achieve provincial and national coordination in phases, gradually establishing a universal long-term care insurance system so that everyone can enjoy fair care opportunities. Second, optimize the long-term care insurance system and expand the coverage of insured individuals. According to local conditions, gradually cover urban and rural residents' medical insurance participants, extend benefits from severely disabled individuals to moderately disabled individuals, and gradually expand from disabled individuals to dementia patients, ensuring that more groups are included in the long-term care insurance system, making sure that those with long-term care needs are fully covered. Third, establish a precise identification mechanism for care assistance and increase subsidies for disadvantaged groups. The pilot cities have not provided subsidies for low-income and other disadvantaged groups to participate in long-term care insurance, which is detrimental to the protection of these groups. Therefore, the long-term care insurance policy should focus on identifying and supporting extremely poor individuals, elderly people, disabled persons, and low-income rural residents. The policy should increase support for these vulnerable groups, leveraging the role of fiscal guarantees and redistribution. This includes providing appropriate financial assistance for special hardship groups, offering free training for those engaged in nursing work, and subsidizing the participation of disadvantaged groups in elderly care needs assessments.

Reference

- [1] Liu Bingbing and Liu Xiaomei. The Impact of Interpersonal Relationships on the Life Satisfaction of the Elderly in the Context of Active Aging [J]. *Social Security Research*, 2021, No.78(05):49-59.
- [2] Deng Dasong, Tang Jiali. Study on the Life Satisfaction of the Elderly and Its Influencing Factors —— Based on the Data from China Health and Pension Tracking Survey [J]. *Theoretical Monthly*, 2021, No.480(12):116-124.
- [3] Liu Shixiang, Sun Yan, Du Xiaopeng. Social Support and Life Satisfaction of the Elderly: The Mediating Role of Life Meaning and Physical and Mental Health [J]. *Chinese Journal of Clinical Psychology*, 2020,28(06):1265-1269+1273.
- [4] Zhi Chuanru and Xing Dawei. An Empirical Analysis of Rural Elderly People's Life Satisfaction: A Case Study of 1008 Samples from 5 Cities in Northern Jiangsu [J]. *Journal of Nanjing Institute of Population Management*, 2012,28(03):41-45+69.
- [5] Jin Ling. Factors influencing the life satisfaction of the elderly and their comparative analysis [J]. *Population and Economy*, 2011, (02):85-91.
- [6] Sun Kui Li, Liu Gengchang, Liu Yizhi. Factors influencing the life satisfaction of the elderly [J]. *Northwest Population*, 2010,31(05):116-119.
- [7] Yin, X., Abruquah, L., & Ding, Y. Dynamics of Life Satisfaction Among Rural Elderly in China: The Role of Health Insurance Policies and Intergenerational Relationships [J]. *Sustainability*, 2019,11(3):701.

- [8] Luo Sheng, Zhang Jin, Guo Jizhi, Li Wei, Zhuang Lihui, Wang Xuejing, Hu Shanju, Dong Yi. Analysis of the Life Satisfaction Survey and Influencing Factors of the Elderly in Shandong Province [J]. Chinese Journal of Health Statistics, 2016,33(03):392-395.
- [9] Xu Bo, Cong Xiaona, Tang Wanqin, Chen Weihong, Cao Shang, Luo Pengfei, Luo Danyi, Wei Pingmin. A Study on the Chronic Disease Status and Quality of Life of the Elderly in Nanjing Nursing Institutions [J]. Modern Preventive Medicine, 2010,37(17):3254-3256.
- [10] Zhang Zihao and Tan Yanzhi. Social Insurance and Chinese National Happiness [J]. Journal of Financial Economics, 2018,33(03):116-128.
- [11] Xie Yufei, Feng Jin. Does long-term care insurance narrow the health gap of disabled elderly? [J]. Insurance Research, 2022, No.414(10):19-33.
- [12] Ma G, Xu K. Value-Based Health Care: Long-Term Care Insurance for Out-of-Pocket Medical Expenses and Self-Rated Health [J]. International Journal of Environmental Research and Public Health, 2022, 20(1): 192.
- [13] Fu, R., Noguchi, H., Kawamura, A., Takahashi, H., & Tamiya, N. Spillover effect of Japanese long-term care insurance as an employment promotion policy for family caregivers [J]. Journal of health economics, 2017,56: 103-112.
- [14] Jing Tao, Xing Huixia, Wang Wenqing. A Study on the Effect of Long-term Care Insurance Policy in Promoting Labor Employment —— Experience Data from 11 Pilot Cities [J]. Price Theory and Practice, 2021, No.444(06):23-29+43.
- [15] Ma Guangbo, Xu Kun. Long-term Care Insurance, Household Income Level and Household Consumption —— An Empirical Study Based on CHARLS Data [J]. Journal of Nanjing Medical University (Social Sciences Edition), 2022,22(05):449-457.
- [16] Shu Zhan, Han Yu. A Study on the Impact of Long-term Care Insurance on Intergenerational Support for Families of Disabled Elderly [J]. Population & Development, 2022,28(04):143-154+117.
- [17] Gao Xuyao. Can long-term care insurance improve the satisfaction of caregivers for disabled elderly people? —— An empirical analysis based on data from CLHLS 2018 [J]. Aging Research, 2022,10(02):54-67.
- [18] Lei, X., Bai, C., Hong, J., & Liu, H. Long-term care insurance and the well-being of older adults and their families: Evidence from China [J]. Social science & medicine, 2022,296: 114745.
- [19] Li Li, Lu Miaomiao. The Impact of Long-term Care Insurance on the Life Satisfaction of Middle-aged and Elderly People —— An Empirical Analysis Based on CHARLS Data [J]. Southern Population, 2022,37(05):26-37.