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# Dynamics of Life Satisfaction Among Rural Elderly in China: The Role of Health Insurance Policies and Intergenerational Relationships

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**Abstract:** The pursuit of achieving Goal 3 of the 2030 United Nations agenda for Sustainable Development, “ensuring healthy lives, achieving universal health coverage and promoting wellbeing for all”, has been a cardinal concern of governments and policy makers. The rural–urban divide in China has resulted in equality of health care distribution. To address this anomaly, the government of China has put in place the New Cooperative Medical Scheme (NCMS). This intervention aims at ensuring the equitable distribution and affordability of health care in rural areas. Despite this measure, certain drawbacks in its implementation affect overall life satisfaction. Rural–urban migration resulting in age distribution gaps has also been generally identified by a plethora of literature to hamper intergenerational interaction, which is essential to overall life satisfaction especially for the elderly. However, little is known about the extent to which the NCMS, coupled with its drawbacks and intergenerational interaction, affect the overall life satisfaction of the rural elderly in China. Using an ordered response model, this study presents a thorough analysis on the life satisfaction of rural elderly making comparison across age groups and residence status sub-samples using a panel data from the two waves, 2011 and 2013, from China’s Health and Retirement Longitudinal Survey. The empirical results indicate that though the NCMS is indeed beneficial to promoting health and overall life satisfaction of rural elderly, there are some attendant limitations. We also find that intergenerational interaction in the form of frequent communication and financial assistance from children who fall within the non-cohabiting category promotes life satisfaction of the rural elderly. The degree of importance however varies across the aforementioned groups.

**Keywords:** new rural cooperative medical scheme; parent–child relationship; Chinese rural elderly; life satisfaction

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## 1. Introduction

Over the past few decades, China has experienced remarkable economic growth. This has contributed to poverty reduction and the general improvement in living conditions of its people. In spite of the significant strides made towards economic growth, the development of social welfare—especially in rural China—is lagging behind. It is worth noting that a well-founded social safety net contributes significantly to the improvement of personal life satisfaction and overall societal wellbeing as compared to economic growth [1–3]. In view of this, the need for the enhancement of China’s social welfare system to complement its rapid economic growth was acknowledged in the recent 17th CPC National Congress [4]. To improve the livelihood of its citizens and achieve the United Nations Sustainable Development Goals, the central government of China has launched several social

welfare policies such as pension funds, medical insurance, labor insurance, and other social inclusion and assistance policies [5].

Prominent among such social welfare policies is the Rural Medical Insurance Scheme. As compared to most social welfare policies in rural China, the medical insurance policy has a longer history dating as far back as the 1950s. The medical insurance scheme, which was previously known as the Cooperative Medical Scheme (CMS), has evolved and made significant strides overtime. Efforts by the central government to improve the medical care system for rural residents birthed the establishment of the New Rural Cooperative Medical Scheme (NCMS) in 2003 [6,7]. Since its establishment, the NCMS has made significant contributions to healthcare delivery and attained nationwide coverage. Despite its merits of wide coverage and improvement in access to health care, there exist certain disparities with the method of reimbursement and the reimbursement ratio, which is likely to vary the effect of the scheme across different categories of beneficiaries. For instance, rural residents can only be reimbursed in counties their 'Hukou' is located. In order to receive re-imbursement when rural residents incur medical cost outside their 'Hukou' location, they are required to first personally pay for the medical expenses and go back to their hometowns to receive reimbursement. Also, the reimbursement ratio for outpatient and in-patient medical costs varies.

China's rapid economic growth associated with increased industrialization has also altered the family structure of China's rural areas. More and more young adults migrate from rural to urban areas in pursuit of better job opportunities. This has left a gap in the age distribution of most rural areas creating a hollow, made up of a majority of the elderly and children. The age distribution gap has hampered intergenerational interaction, which also sits at the core of a successful social safety net. Compared to young adults, intergenerational interaction has been found throughout literature to be very beneficial to the health and wellbeing of the elderly [8]. The older generation tend to be more affected by the various facets of intergenerational interaction namely living arrangement, emotional support in the form of communication and financial support than the younger generation [9–11]. In the past, the elderly relied mostly on their children especially in terms of emotional and financial support as they aged and were incapable of solely supporting themselves [12,13]. In the advent of social welfare policies such as medical insurance and pension benefits, the level of dependency on children is likely to reduce. Though literature provides evidence of the positive effects of well-designed and sustainable social welfare policies on life satisfaction, not much is known about the role of intergenerational interaction in the midst of social welfare policies having in mind its effect on the various categories of rural residents.

In order to achieve sustainable development in China, it is important to access the wellbeing of the rural elderly under the aforementioned policies and social changes. As previously indicated, medical insurance as well as intergenerational relationships are critical to achieving a secure and happy later life for the rural elderly.

Focusing on the rural elderly in China, this paper analyses the effect of the NCMS and intergenerational interaction in the form of living arrangements, and financial and emotional support on life satisfaction. Since there are still certain drawbacks associated with the NCMS, this study also pays special attention to major setbacks raised in literature [6,14] such as the method of reimbursement and reimbursement ratio and its effect on happiness across different categories namely age groups, residence status in the midst of demographic transitions.

## 2. Literature Review

### 2.1. Life Satisfaction in China

Life satisfaction (LS) research is currently prevalent in both developed and developing economies. A wide range of studies has explored demographic, psychological, economic, and social, determinants, and their effect on LS [15–17]. Likewise, LS studies in China have expanded and are gradually advancing to the standard of research conducted in most developed countries. The effect of most

determinants of LS in China is generally comparable to findings worldwide [18,19]. Researchers have probed into these general determinants of life satisfaction across different population groups and geographical segregations such as rural residents and urban citizens in addition to the dynamics of demographic transitions such as rural–urban migration. For example, with regard to economic determinants, Song and Appleton discovered life satisfaction of urban residents to be generally low with high income as a strong determinant [20]. On the other hand, Knight and Song found both past and anticipated relative income to be positively correlated with happiness whilst absolute income is less so in the rural setting [19]. On a rural–urban migration perspective, research shows expected income to be a very important determinant of LS in relation to current income [21]. High aspirations have thus been identified as one of the causes of dissatisfaction with life among majority of rural–urban migrants [22]. With the example of income alone, it is evident that there is indeed diversity of life satisfaction across categories even in one country hence the need for the study on life satisfaction across groups.

Apart from the general determinants of LS previously stated, factors relating to public policies and social interaction have piqued the interest of researchers. Findings from research stipulating that economic growth does not promote happiness of citizens have sparked up rising concern of governments in recent years [2]. Focus has therefore been directed towards safety net policies and intergenerational interaction as these emerging factors have been found to have a significant impact on life satisfaction.

Social safety net policies such as public old-age support, medical insurance, and social inclusion schemes have generally been found to have a positive effect on happiness [2,23,24]. In a study on life satisfaction, economic growth and public policy, Easterlin found that people in countries with more social welfare policies tend to be happier than countries with less [2]. Studies that considered the effect of specific safety net policies on life satisfaction realized similar outcomes. For example, Tran et al. found a positive relationship between health insurance and life satisfaction among a sample of respondents in the US with medical insurance whilst respondents with no medical insurance, showed a lower likelihood of being “very content” or “content” with life [3]. Similarly, public old-age support in the form of pension funds has also been found to increase life satisfaction during old age [25]. Social inclusion in the form of intergenerational exchange in its varied facets also affects life satisfaction significantly [26]. However, intergenerational exchange especially in terms of financial support is likely to reduce in response to public policies such as medical insurance and pension funds [27].

Findings from research on specific social safety net policies in China were similar to the aforementioned. A study on the effects of China’s New Rural Pension Program (NRPP) on SWB showed that the rural pension program does improve the LS of rural residents. Hence a poorly structured rural pension program is likely to reduce its patronage and even ripple down to low LS in nonparticipants [28]. A similar study also discovered that the NRPP has an overall positive effect on self-reported levels of wellbeing with a higher impact on respondents in poor health conditions [29]. Medical insurance policies in both rural and urban China have also been the focus of recent literature. Research on the effect of medical insurance on both rural and urban elderly residents using the 2013 China Health and Retirement Longitudinal Survey (CHARLS), found medical insurance to be positively correlated with health status and life satisfaction [30]. Another study comparing the effect of the major governmental medical insurance policies on the equity of quality of life pointed out that the rural and urban medical insurance schemes were vastly different. These schemes were not consolidated and ran based on the same policies hence the question of fairness and equality has been raised in most cases [31]. With respect to the various aspects of intergenerational interaction—namely, co-residence, emotional interaction, and financial supports—Qian and Qian found that urban residents who live with both parents and younger children are the least happy compared to other residents [32]. Similarly, a comparative analysis of LS among elderly urban residents in three Chinese societies (China, Hong Kong and Taiwan) with varied development levels found lower levels of LS among urban elderly who live with their children [33]. Akin to the comparative study conducted on the urban elderly,

a study on the determinants of LS among rural elderly discovered that living with grandchildren and children had an adverse effect on LS [34]. On the other hand, financial and emotional support have been found to have a positive effect on the reported life satisfaction of parents [11].

From literature on the dynamics of life satisfaction with respect to social welfare policies and social interaction, it is clear that the effect of the various social safety net schemes must be examined independently to ascertain their true effect on LS across various categories of respondents. This paper therefore intends to focus on one side of the coin, i.e., the effect of medical insurance and intergenerational exchange on LS among rural residents to get a clearer picture on the specific nature of this policy on rural dwellers, rural to urban migrants as well as across age groups.

## *2.2. Background of the New Rural Cooperative Medical Scheme*

The NCMS is a rural health insurance system, which subsidizes health care for rural residents. Before its establishment, most farmers in rural China were not covered by any official form of medical insurance since the collapse of the previous Cooperative Medical Scheme (CMS) initiated in the 1950s [35]. In 2003, the central government of China made significant efforts to improve the medical care system in rural areas hence the establishment of the NCMS. Such an interdependent system was established from multiple funding channels such as the local, central government and contributions from rural residents themselves. A high percentage of funding for the scheme however came from the local and central government. The subsidy for the NCMS has also increased year on. The NCMS first started as a pilot scheme across about 300 counties and villages in 2003. It then spread across China and realized its target to cover all rural residents in 2010. Though the scheme continues to be operational, there still remain some drawbacks in its execution, which hamper the NCMS from reaching its full potential. These drawbacks have been outlined in a plethora of literature [6,30,35–38].

For instance, only inpatient medical costs are covered in all attending counties. Some counties, nonetheless, do not cover outpatient medical costs. Furthermore, some participating counties only cover catastrophic expenses [7]. The rate of reimbursement against catastrophic illness continues to be quite low due to lack of funding in some rural areas.

Secondly, there are also constraints of accessibility to the NCMS leading to a relatively low rate of benefit by its recipients [39]. As explained in the introduction, recipients can only benefit from the scheme at counties where 'Hukou' is located. Rural–urban migrants thus benefit less as compared to non-migrants due to the inconveniences associated with going back to the rural area of registered residency for reimbursement of health expenses.

Finally, reimbursement procedures remain complex [37]. A beneficiary who wants reimbursement must provide proof of all medical expenses incurred, identification card and 'Hukou' registration card. If the beneficiary switches between hospitals, evidence should also be provided. These documents are provided to designated personnel who check its validity and either issue or deny reimbursement. These complexities vary from county to county and also depend on the nature of the health condition. Due to low literacy rate of most rural dwellers and the outlined intricacies associated with reimbursement, some beneficiaries simply give up along the way. A study on the complexities of the NCMS in nine counties in Shandong province and one county each in Hebei and Jiangsu province reported that 12.6% of respondents regarded the reimbursement procedure to be very complicated. Additionally, 60% of these respondents held the opinion that there were too many documents needed and procedures to be carried out before reimbursement was granted [40]. In view of these impediments, the reimbursement procedure for the NCMS must undoubtedly be simplified in order for its beneficiaries to enjoy the full benefits of the scheme.

### 3. Materials and Methods

#### 3.1. Data and Variables

This paper uses a panel data including two waves, 2011 and 2013, collected from households and individuals in China aged 45 and over provided by the China Health and Retirement Longitudinal Survey (CHARLS) [41]. The CHARLS poll collects data on individual and household demographics, family structure, income and social welfare schemes such as medical insurance and pension just to name a few. The response rate and data quality of CHARLS lie at the forefront of similar projects in the world widely used and recognized in academia. CHARLS has accumulated experience in pilot surveys conducted in Gansu and Zhejiang province in 2008 and 2010. In 2011, the CHARLS National Baseline Survey was launched covering 28 provinces, 150 county-level units, 450 village-level units, and about 1000 households. After this baseline survey, CHARLS tracks its respondent every two years. Though Wave 3, the CHARLS survey, which was conducted in 2015, was made public in 2017, this wave does not include data on the reimbursement method of the NCMS, one of the major variables under consideration in this study. Thus, our sample only consists of two-year panel data of 11,395 respondents aged 45 and above who were documented under the rural household registration in 2011 and 2013 with 3882 having their current residency different from the place of household registration. Further information can be found in a cohort profile by Zhao et al. [42].

##### 3.1.1. Dependent Variable

In the 2011 and 2013 CHARLS survey, respondents were to rate their level of life satisfaction on a scale of 1 to 5 with 1 representing completely satisfied and 5 representing not at all satisfied. We generate our dependent variable by reversing the scale with 1 representing not at all satisfied and 5 representing completely satisfied to be on a similar measuring scale as the explanatory variables.

Table 1 provides details on the summary statistics and distribution of the respondents' self-reported level of life satisfaction. Table 1 shows a slight increase in average life satisfaction from 3.04 in 2011 to 3.10 in 2013. There is also a slight increase in variance by 0.07 (i.e., 0.72–0.65) from 2011 to 2013. Among all respondents, more than 18% asserted to be very satisfied or completely satisfied in 2011, which increased by about 4% in 2013. On the other hand, about 14% of the sample reported not very satisfied or not at all satisfied in 2011 and fell to about 13% two years after. This is an indication that rural elderly in China has benefited from the country's economic growth over these years; however, the distribution of life satisfaction has shown a sign of polarization with percentage of people who feel completely satisfied as well as not at all satisfied both increasing in 2013.

**Table 1.** Distribution of personal life satisfaction.

Self-rated Life Satisfaction	Year 2011		Year 2013	
	Freq.	Percent	Freq.	Percent
5 Completely satisfied	150	1.32	326	2.86
4 Very satisfied	1953	17.14	2260	19.83
3 Somewhat satisfied	7713	67.69	7281	63.90
2 Not very satisfied	1330	11.67	1208	10.60
1 Not at all satisfied	249	2.19	320	2.81
Total	11,395	100.00	11,395	100.00
Average life satisfaction		3.04		3.10
Variance		0.65		0.72

### 3.1.2. Explanatory Variables

#### Demographic and Economic Variables

Previous literature widely includes a number of demographic variables such as age, gender, marital status, level of education, and its square to serve as controls and also to provide a clearer picture of the general scope of the sample in question. Our sample ranges between the ages of 45 and 102 years. The sample is therefore divided into three groups: the middle-aged group consisting of respondents from 45 to 59 years, the younger elderly consisting of respondents from 60 to 74, and finally the senior elderly who are 75 years and above. For gender, respondents were required to indicate whether they were male or female with 1 representing male and 0 otherwise. A dummy variable was also generated for marital status with 1 representing currently married and 0 representing either single, widowed or divorced. The highest level of education attained by respondent was categorized on a scale of 1 (illiterate) to 9 (bachelor's degree). The residence status of respondents (migrants or non-migrants) was also assessed using a dummy variable with 1 representing migrants, i.e., respondents living in a city different from counties their Hukou is located and 0 representing otherwise.

Income and wealth are widely seen to be important indicators of a better life in rural areas. To test for the effect of income on the self-reported wellbeing of rural residents, this study took into consideration various streams of income such as annual wages, agricultural income, self-employment income, and governmental economic transfer of respondents. Wealth is also measured by the size of the respondent's household and the sum of cultivated land, forestland, pasture, and pond area. To access how time trend contributes to the variation of life satisfaction, we introduce a year dummy '2013' where the value '1' represents the year 2013 and '0', represents the reference year, 2011.

#### Health and NCMS Variables

Health has been found to have a significant effect on life satisfaction [43,44]. The CHARLS survey uses the respondents' ability to perform activities of daily living (ADL), instrumental activities of daily living (IADL) and whether the respondent suffers from any chronic disease as a measure overall health status. The ADL and IADL approach rates respondents' capacity to carry out various instrumental daily activities and other day-to-day activities. Respondents were required to select the difficulty or ease of carrying out such activities from options: 1 = 'Cannot do it', 2 = 'Have difficulty and need help', 3 = 'Have difficulty but can still do it' and 4 = 'Do not have any difficulty' this is denoted by DL\_Health\_Status. The CHARLS survey also asks respondents whether they have been diagnosed with any physical, mental and cognitive diseases such as hypertension, diabetes, chronic lung diseases, memory-related diseases etc. We construct a dummy variable, 'Chr\_Disease\_Health\_status', where response category '1' denotes 'been diagnosed of at least one of the specified diseases' and '0' otherwise. Further details on the diseases specified by the CHARLS survey can be found on page 61 and 69 of the 2011 and 2013 questionnaire respectively [41].

Though the NCMS is likely to provide a sense of health security for all rural beneficiaries who receive medical care, it centers more on relieving and hedging inpatients from catastrophic disbursement of hospital expenses. The four models of NCMS reimbursement as elucidated by Lei and Lin [45] provides evidence that while the inpatient reimbursement policy is relatively similar in all counties, the outpatient reimbursement policy varies. Although outpatient reimbursement is given to NCMS beneficiaries in some counties, other counties either reimburse outpatient costs for only severe ailments or do not render outpatient reimbursement at all [46]. Reimbursement of outpatient medical expenses is thus comparatively limited [7,14,47,48]. This study therefore focuses on the effect of respondents who received inpatient medical care in the previous year on life satisfaction, the degree of inpatient benefit from the NCMS and the method of reimbursement. To test the effect of receiving inpatient medical care on life satisfaction, we generate a dummy variable "Inpatient\_Care" with 1 representing respondents who have received inpatient medical care in the previous year and 0 otherwise. The degree of inpatient benefit from the NCMS i.e., the amount of reimbursement

received based on inpatient cost incurred in the previous year is the ratio of the amount of inpatient medical expenses reimbursed and total cost of inpatient medical care incurred in the previous year. The reimbursement method also assesses whether beneficiaries receive reimbursement of medical costs immediately, i.e., subsidies deducted prior to payment of medical expenses or receive reimbursement at a later date after submitting all prerequisite documents. A dummy variable, 'Reim' is thus generated with 1 representing reimbursement at a later time and 0 representing reimbursement immediately.

### Intergenerational Interaction

This study also explores the effect of intergenerational interaction on the life satisfaction of rural residents from three aspects namely, respondents cohabiting with children, number of co-habiting and non-cohabiting children and frequency of communication and financial assistance from non-cohabiting children.

The dummy variable "Child\_Yes" was generated to test whether respondents either had children or not: with 1 representing having at least a child and 0 otherwise. Based on the respondents who had children, we created another variable "Child\_Cohab" to measure the number of children who lived with the respondents ranging from 0 to 9: with 0 representing respondents who had no cohabiting children and the maximum, 9 for respondents who had nine children living with them. For respondents who had at least one non-cohabiting child, we created another variable "Child\_Contact" to measure the degree of communication between these respondents and their non-cohabiting children within a year. In the survey, respondents were asked how often they saw or contacted their non-cohabiting children. The frequency of communication was grouped under five categories for each non-cohabiting child: with 5 representing communication in less than a month, 4 representing more than 1 month to 3 months, 3 representing within 3 to 6 months, 2 representing more than 6 months to a year, and 1 representing more than a year. The frequency of communication between each non-cohabiting child was summed up to arrive at the total frequency of communication with all non-cohabiting children for each respondent. The variable "Child\_Transfer" was also generated to represent the total monetary support received from non-cohabiting children in the past year measured in RMB1000. Table 2 provides further details on the aforementioned dependent and explanatory variables.

**Table 2.** Description and summary statistics of variables.

Variables	Definitions	Mean	SD	Min	Max
Life satisfaction	1 = 'not at all satisfied'; 2 = 'not very satisfied'; 3 = 'some what satisfied'; 4 = 'very satisfied'; 5 = 'completely satisfied'	3.07	0.69	1	5
Age	Age of the respondents	60.03	9.61	45	102
Gender	A dummy variable, 1 = male, 0 = female	0.47	0.50	0	1
CEdu	The highest level of education attained by respondent; 1 = 'illiterate'; 9 = 'bachelor degree'	0.86	0.99	0.06	6.07
CEdu2	The square of education level	3.08	2.51	0.004	36.8
Marital_Status	A dummy variable; 1 = 'married'; 0 = 'otherwise'	0.87	0.34	0	1
Child_Yes	A dummy variable describing whether or not respondents have children; 1 = 'has children'; 0 = 'does not have children'	0.97	0.16	0	1
Child_Cohab	Number of respondents' children who live with respondents ranging between 0–9 with 0 representing no child and 9 representing 9 children	0.57	0.87	0	9
Child_Contact	Frequency of communication with non-cohabiting children within a year.	14.74	11.85	0	87
Child_Transfer	Financial support from non-cohabiting children with in a year. (Unit = 1000 RMB)	1.97	6.44	0	288

Table 2. Cont.

Variables	Definitions	Mean	SD	Min	Max
Income	Individual income including wages, agriculture income, income from self-employed activities and government transfer (Unit = 1000 RMB)	12.64	27.18	−195	561.4
House_Size	The size of respondents' residence (Unit: meter square)	123.82	67.65	2	1400
Land_Area	The area of cultivated land, forest land, pasture and pond possessed by the household (Unit=meter square)	0.01	0.11	0	13
Migrants	A dummy variable; 1 = 'living in a city different from county of Hukou registration'; 0 = 'otherwise'	0.34	0.47	0	1
DL_Health_Status	Health status measured by ADL and IADL ranging from 1 to 4.	2.58	0.59	1	4
Chr_Disease_Health_Status	A dummy variable of whether the respondent suffers from any chronic disease (physical, mental and cognitive) with 1 denoting 'suffers from a chronic disease' and 0 'otherwise'	0.34	0.47	0	1
Inpatient_Care	A dummy variable; 1 = 'received inpatient care in the last year'; 0 = 'otherwise'	0.35	0.48	0	1
IC_NCMS	A ratio of the amount of inpatient medical expenses reimbursed and total cost of inpatient medical care incurred in the previous year.	0.05	0.19	0	1
Reim	A dummy variable; 1 = receiving reimbursement after submitting all the necessary documents for reimbursement; 0 receiving reimbursement during payment of medical expenses.	0.39	0.49	0	1
2013	A time trend variable; 1 = the year 2013 and 0 = reference year, 2011.	0.5	0.5	0	1

Note: Number of observations from panel are 22,790, number of individual respondents are 11,395. The mean, standard deviation, minimum, and maximum of each variable are measured by pooling the two-year panel data.

### 3.2. Analysis

There are numerous statistical models that can be used to analyze the relationship between life satisfaction (LS) and various determinants. However, dependent variables in life satisfaction research are most often measured on an ordinal scale which makes the use of ordered response models (e.g., ordered logit) as compared to cardinal models such as an ordinary least square (OLS) regression [49]. Though some researchers argue that cardinal or ordinal model specifications make little difference to results [50], concerns have been raised about using an OLS regression model in the event of an ordered dependent variable arguing that doing this violates the Best Linear Unbiased Estimation (BLUE) assumption of the OLS estimator [48]. Though other researchers argue that in practice, the disparities as well as the effect of violating the BLUE assumption are minor, most agree that taking into account the categorical nature of the dependent variable and using an ordered response model gives better results than models that do not consider the ordinality of the dependent variables [49]. Additionally, the “floor and ceiling effects” associated with categorical variables may not be well accounted for in an OLS regression which may give misleading results [51,52]. In the midst of these rising debates, this study uses an ordered logit regression model since the dependent variable (LS\*) is ordered, assumed to be of discrete distribution and of linear relationship with the explanatory variables. We however confirm the argument that both ordinal and cardinal models make little difference to results by using a generalized least square regression as a robust check. Depending on the focus of the study, researchers measure the effect of selected determinants on life satisfaction using a general ordered logit model analogous to the one below [53]. The logit model in this study is measured with robust standard errors clustered by individual.

$$LS_{(ID,t)(ID,t)}^* = u_i + X'_{(ID,t)}\beta + \varepsilon_{(ID,t)} \quad (1)$$

The life satisfaction of an individual is latent and therefore difficult if not impossible to ascertain, alternatively, data on self-reported level of satisfaction, which is measured using an ordinal scale ( $LS = 1, 2, \dots, J$ ), serves as a good proxy [49]. Respondents therefore choose a category which best fits their perceived level of satisfaction with life ( $LS^*$ ) considering an optimal cut-point ( $\kappa_j$ ) for each category of life satisfaction provided. With 1, 2, to  $J$  number of response categories, the observed levels of life satisfaction will be

$$LS_{(ID,t)} = \begin{cases} 1 & \text{if } LS_{(ID,t)}^* \leq \kappa_1 \\ 2 & \text{if } \kappa_1 < LS_{(ID,t)}^* \leq \kappa_2 \\ \dots & \\ J & \text{if } LS_{(ID,t)}^* > \kappa_J \end{cases} \quad (2)$$

The conditional probabilities of the ordered responses are given by the Equation (3), where  $\Lambda$  denotes the distribution function of the logistic distribution.

$$P(LS_{(ID,t)} = j | X_{(ID,t)}, \beta) = \Lambda(\kappa_{j+1} - u_i - X'_{(ID,t)}\beta) - \Lambda(\kappa_j - u_i - X'_{(ID,t)}\beta), \quad j = 0, \dots, J \quad (3)$$

$\varepsilon_{ID}$  is an error term that has a logistic distribution and varies with time.  $X'_{ID}$  is a set of explanatory variables which are unrelated with  $\mu_i$  and  $\varepsilon_{ID}$  respectively shown by Equation (4).

$$\text{cov}(X'_{(ID,t)} \mu_i) = 0 \text{ and } \text{cov}\{X'_{(ID,t)} \varepsilon_{(ID,t)}\} = 0 \quad (4)$$

## 4. Results and Discussions

As aforementioned, this study uses an ordered response model due to the categorical nature of the dependent variable, LS. To relax the assumption of homoscedasticity, robust standard errors are used for the ordered response model. A generalized least square regression is also used as a robust check (see Appendix A, Tables A1 and A2). Prior to the regression analysis, we tested for multicollinearity. The variance inflation factor (VIF) detected the existence of multicollinearity with the variables 'Edu' and 'Edu'. This is not a problem in our case since a variable and its squared are obviously highly correlated. To avoid the extremely high standard errors as a result of the existing multicollinearity, we proceed to correct this by centering the variable 'Edu' around a measure of central tendency by adopting the method,  $CEdu_i = Edu_i - \overline{Edu}_i$ ,  $CEdu_{(ID,t)} = Edu_{(ID,t)} - \overline{Edu}_{(ID,t)}$ , i.e., subtracting the variable 'Edu' from its mean and applying the deviation, 'CEdu' and its squared term 'CEdu2' to the model as proposed by Weissfeld and Sereika [54]. Details on the test for multicollinearity can be found in Tables A3 and A4 of the Appendix B.

### 4.1. Determinants of Life Satisfaction among the Rural Elderly (Full Sample and by Age Groups)

In this section, we discuss Table 3, i.e., the results of the full sample and age groups. To clearly address the main objectives of the study in our discussion, we first analyze the effect of the demographic and economic determinants of life satisfaction. We further discuss the effect of health and the NCMS on life satisfaction of the rural elderly making comparison between the full sample and among age groups. Finally, the effect of intergenerational interaction on life satisfaction of both the full sample and among age groups (45 to 59, 60 to 74, and over 75) is analyzed.

#### 4.1.1. Demographic and Economic Variables

With respect to the demographic variables, Table 3 shows that age has a significantly positive effect on life satisfaction in the full sample. In the sub-samples the relationship between age and life satisfaction is positive and increasing from respondents aged 45–59 years to 60–74 years. However,

among respondents aged 75 and above, age is positively correlated with life satisfaction but not statistically significant. The positive and increasing effect between age and life satisfaction from respondents aged 45–59 years to 60–74 years is consistent with previous literature, which depicts a U-shaped effect on personal life satisfaction with life satisfaction increasing towards old age [28,55–57]. Gender is positively correlated with the life satisfaction of the rural elderly aged 45–59 at a 5% level of significance. The positive relationship between gender and life satisfaction is however not statistically significant across the full sample and other age sub-samples. The relationship between gender and personal life satisfaction is varied in literature. While some studies report high levels of self-reported wellbeing for women [58], others find no gender differences in reported life satisfaction [59]. With regard to level of education, our findings depict a statistically significant U-shaped relationship between life satisfaction and level of education in the full sample, among age groups between 45 to 59, 60 to 74, as well as 75 years and above. With respect to marital status, we find a statistically significant positive relationship between being married and life satisfaction in the full sample as well as among rural residents aged 45–59 and 60–74. Being a migrant has a statistically significant negative effect on the life satisfaction of only the middle-aged group. One possible explanation is that being a migrant may result in spending less time with family and having limited access to certain welfare policies non-migrants are likely to enjoy.

In Table 3, this paper finds that income has a significantly positive effect on personal life satisfaction of the rural elderly in the full sample including all age samples. In addition to income, house size and land area are also important indicators of wealth for rural residents. Having a big house improves the life satisfaction of the full sample, middle-aged and younger elderly. For the senior elderly sample, house size does not have a statistically significant effect on life satisfaction.

It is interesting that land area owned by rural residents has a statistically significant positive relationship with life satisfaction among age group from 60–74 while the effect is negative in the senior elderly group (74 year and above). The differences in the relationship between land owned and its effect on life satisfaction with respect to age groups could be attributed to the fact that while owning a land is beneficial to the younger elderly who need to financially support themselves, owning and maintaining a large area of land may be a burden on the senior elderly. The time trend in Table 3 confirms that, with reference to 2011, 2013 has a positive significant effect on the life satisfaction of the rural elderly in the full sample as well as all age sub-sample.

#### 4.1.2. The Effect of Health and NCMS on Life Satisfaction

The effect of health and the NCMS on life satisfaction is analyzed in four aspects: (1) overall health status of respondent measured by (DL\_Health\_Status and Chr\_Disease\_Health\_Status), (2) whether or not the respondent has received inpatient care within the past year (Inpatient\_Care), (3) the method of reimbursement (Reim), and (4) the degree of benefit from inpatient NCMS reimbursement (IC\_NCMS).

As shown in the regression results in Table 3, health status based on activities of daily living (ADL and IADL) has a significantly positive relationship with life satisfaction in the full sample as well as all age groups. This means being able to carry out activities of daily living improves life satisfaction significantly. On the other hand, suffering from a chronic disease, as another measure of health status, has a statistically significant negative effect on life satisfaction. Conversely, respondents who received inpatient medical care within the past year, denoted by “Inpatient\_Care”, is negatively correlated with reported life satisfaction across all samples. Receiving reimbursement at a later date instead of immediately affects life satisfaction negatively in the full sample, middle aged and younger elderly sub-samples. On the other hand, the degree of benefit from inpatient NCMS reimbursement is positively significant for the full sample, middle-aged and younger elderly sub-sample. This means a higher degree of inpatient NCMS reimbursement can reduce the financial burden and enhance the life satisfaction of rural residents specifically among the middle-aged and the younger elderly who have received inpatient medical care in the past year. These findings are evident of the benefits of the NCMS for rural residents especially those who have received inpatient medical care over the past year.

Comparing across groups, this research demonstrates that being in good health is beneficial to life satisfaction while receiving inpatient medical care is detrimental to life satisfaction across all age groups. Though the effect of the NCMS on the rural elderly who have received inpatient care over the past year is beneficial to life satisfaction among the middle-aged and younger elderly, the effect is however not statistically significant among the senior elderly.

#### 4.1.3. Effect of Intergenerational Interaction on Life Satisfaction

Parent–child relationship in the form of living arrangement, financial and emotional support is used as a proxy for intergenerational interaction in this study. Table 3 indicates that having at least one child is beneficial to life satisfaction while co-habiting with adult children is detrimental to life satisfaction of rural elderly in general and especially among the middle-aged sub sample.

Communication denoted by “Child\_Contact” and financial assistance denoted by “Child\_Transfer” from non-cohabiting children have a positive effect on life satisfaction of rural elderly in both the full samples and all age sub-samples. The more respondents communicate with their non-cohabiting children and receive financial assistance from them, the higher their level of life satisfaction. Communication with non-cohabiting children is however not statistically significant among rural residents between 45 to 59 years.

Therefore, we can conclude that parent–child relationship is a relevant determinant of life satisfaction among rural residents. The effect of intergenerational interaction on life satisfaction goes beyond merely having a child or cohabiting with children. Frequent communication and financial assistance also have a major role to play in enhancing the life satisfaction of the rural elderly in China.

From a comparison of the three age groups, this research finds that the effect of frequent communication on life satisfaction increases as a rural residence advances from younger elderly to older elderly. Similarly, the effect of financial assistance on life satisfaction increases as rural elderly age from middle-aged to senior elderly. This indicates that as rural elderly age, frequent communication with non-cohabiting children and financial assistance becomes of more importance to life satisfaction.

**Table 3.** Ordered logit estimation results of personal life satisfaction for the full sample and three age groups.

Variables	Full Sample	Age 45 to 59	Age 60 to 74	Age 75 and Above
Age	0.0247 *** (0.0027)	0.0163 ** (0.0068)	0.0367 *** (0.0070)	0.0101 (0.0151)
Gender	0.0661 (0.0446)	0.1437 ** (0.0636)	0.0650 (0.0658)	−0.2051 (0.1587)
CEdu	−0.0304 ** (0.0137)	−0.0319 (0.0199)	−0.0373 * (0.0196)	−0.0471 (0.0623)
CEdu2	0.0218 *** (0.0078)	0.0185 * (0.0103)	0.0240 * (0.0133)	0.0855 ** (0.0427)
Marital_Status	0.1941 *** (0.0647)	0.3997 *** (0.1397)	0.1443 * (0.0872)	0.1636 (0.1410)
Income	0.0045 *** (0.0006)	0.0045 *** (0.0007)	0.0044 *** (0.0013)	0.0082 *** (0.0028)
House_Size	0.0011 *** (0.0003)	0.0011 *** (0.0004)	0.0015 *** (0.0004)	0.0000 (0.0009)
Land_area	0.2018 (0.2090)	0.1344 (0.1798)	1.2129 ** (0.5159)	−0.5680 ** (0.2409)
Migrants	−0.0334 (0.0423)	−0.1263 ** (0.0606)	0.0376 (0.0612)	0.2125 (0.1473)
DL_Health_Status	0.5570 *** (0.0512)	0.5329 *** (0.0992)	0.4898 *** (0.0769)	0.7983 *** (0.1008)
Ch_Disease_Health_Status	−0.3578 *** (0.0674)	−0.2600 ** (0.1157)	−0.2984 *** (0.1048)	−1.1049 *** (0.1870)
Inpatient_Care	−0.3905 *** (0.0369)	−0.3833 *** (0.0528)	−0.4410 *** (0.0573)	−0.3328 *** (0.1216)

Table 3. Cont.

Variables	Full Sample	Age 45 to 59	Age 60 to 74	Age 75 and Above
Reim	−0.0958 *** (0.0344)	−0.1458 *** (0.0476)	−0.1570 *** (0.0548)	0.0086 (0.1100)
IC_NCMSratio	0.2144 ** (0.1088)	0.3381 ** (0.1654)	0.2711 * (0.1597)	0.0100 (0.2980)
Child_Yes	0.2552 ** (0.1107)	0.2932 * (0.1527)	0.1486 (0.1889)	0.0666 (0.3573)
Child_Cohab	−0.0526 ** (0.0205)	−0.0868 ** (0.0296)	−0.0168 (0.0331)	0.0102 (0.0687)
Child_Contact	0.0057 *** (0.0019)	0.0001 (0.0035)	0.0067 *** (0.0027)	0.0107 ** (0.0049)
Child_Transfer	0.0111 *** (0.0030)	0.0102 ** (0.0041)	0.0126 *** (0.0042)	0.0225 ** (0.0093)
2013	0.1278 *** (0.0307)	0.1125 ** (0.0447)	0.1494 *** (0.0486)	0.3222 *** (0.1111)
Observations	22,790	11,972	8756	2062
Number of ID	11,395	5986	4378	1031
Wald chi2 (19)	582.73	256.32	244.07	124.78
Prob > chi2	0.00	0.00	0.00	0.00

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ; displayed are the robust standard errors clustered by individual ID.

#### 4.2. Determinants of Life Satisfaction among Rural Migrants and Non-migrants

To further understand the determinants of life satisfaction among rural elderly, we discuss the differences between the determinants of life satisfaction among migrants and non-migrants in this section. The regression estimation for the determinants of life satisfaction among migrants and non-migrants is shown in Table 4.

Similar to the findings from the full sample in Table 3, there is a positive correlation between age and life satisfaction at a less than 1% level of significance for both migrants and non-migrants. With regard to the effect of the level of education on the life satisfaction of rural elderly, Table 4 suggests a u-shaped relationship with respect to the quadric term 'Cedu2' in both the migrant and non-migrant sub-sample. Hence, the higher the level of education attained, the stronger its effect on life satisfaction among migrants and non-migrants. Similar to the findings from the full sample in Table 3; being married is associated with higher levels of life satisfaction as compared to being single, divorced or widowed among both resident status sub-samples. Additionally, as compared to 2011, 2013 has a positive significant effect on the life satisfaction of both the migrant and non-migrant sample, similar to the time trend in Table 3.

With regard to the economic determinants considered, findings from both resident status sub-samples showed a positive correlation between life satisfaction and income. Similarly, land area owned is positively correlated to life satisfaction. The larger the house size owned by non-migrants, the higher the level life satisfaction and vice versa. This could be because migrants hardly reside in rural areas where they are likely to own large areas of land thus; their level of life satisfaction cannot be strongly attributed to the land they own in rural areas.

Similar to the full sample, health status measured by ADL, IADL and suffering from a chronic disease all had a statistically significant effect on life satisfaction with being able to carry out ADL and IADL having a positive effect on life satisfaction while suffering from a chronic disease has a negative effect on life satisfaction among both migrants and non-migrants. Receiving inpatient medical care within the past year has a negative effect on the life satisfaction of both migrants and non-migrants. Additionally, receiving reimbursement at a later date instead of immediately affects life satisfaction of both migrants and non-migrants negatively. However, this effect is statistically significant only among non-migrants. Considering the degree of benefit from inpatient NCMS reimbursement, a higher ratio can reduce the financial burden and enhance the life satisfaction of non-migrants as compared to

migrants. Due to the ‘Hukou’ system of health insurance and associated limitations, migrants do not benefit much from a higher reimbursement ratio.

Having at least one child has a statistically significant positive effect on the life satisfaction of migrants. On the other hand, cohabiting with children is negatively correlated to life satisfaction among non-migrants. Financial assistance from non-cohabiting children has a strong positive effect on life satisfaction among both migrants and non-migrants. The effect of frequent communication with non-cohabiting children on the life satisfaction of rural elderly is also positive but only statistically significant among non-migrants. This shows the importance of frequent communication with non-cohabiting children to the life satisfaction of the rural elderly who reside permanently in rural areas.

It is evident from the above analysis that migrants and non-migrants are affected differently by the analyzed determinants of life satisfaction especially with respect to the various facets of the NCMS and intergenerational interaction. For this reason, it is important for these varying effects to be considered in order to ensure that social welfare policies such as the NCMS are equitable and beneficial to all.

**Table 4.** Estimation results for migrants and non-migrants.

Variables	Migrants	Non-migrants
Age	0.0280 *** (0.0045)	0.0228 *** (0.0034)
Gender	0.0162 (0.0827)	0.0830 (0.0530)
CEdu	−0.0417 * (0.0245)	−0.0249 (0.0166)
CEdu2	0.0255 ** (0.0121)	0.0211 ** (0.0105)
Marital_Status	0.2437 ** (0.1130)	0.1567 ** (0.0797)
Income	0.0037 *** (0.0010)	0.0050 *** (0.0008)
House_Size	0.0010 ** (0.0004)	0.0012 *** (0.0003)
Land_Area	0.0370 (0.1150)	0.6100 ** (0.2653)
DL_Health_Status	0.3981 *** (0.0925)	0.6250 *** (0.0610)
Chr_Disease_Health_Status	−0.2645 ** (0.1196)	−0.3858 ** (0.0815)
Inpatient_Care	−0.44343 *** (0.0644)	−0.3731 *** (0.0449)
Reim	−0.0289 (0.0594)	−0.1304 *** (0.0423)
IC_NCMSratio	0.1708 (0.1663)	0.2958 ** (0.1323)
Child_Yes	0.4809 *** (0.1835)	0.1022 (0.1413)
Child_Cohab	−0.0239 (0.0344)	−0.070 *** (0.0262)
Child_Contact	0.0014 (0.0033)	0.0079 *** (0.0024)
Child_Transfer	0.0127 *** (0.0051)	0.0101 *** (0.0035)
2013	0.1958 *** (0.0535)	0.0945 ** (0.0375)
Observations	7764	15,026
Number of _ID	3,882	7513
Wald chi2(18)	199.64	413.37
Prob > chi2	0.00	0.00

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ; displayed are the robust standard errors clustered by individual's ID.

## 5. Conclusions and Policy Implication

In the past decades, China has made significant strides in the areas of economic development and social welfare. The aging population has become a major concern, as they are one of the vulnerable groups in the midst of social changes. Ensuring equitable health care provision and coverage as well as promoting wellbeing for the aging population is crucial to achieving sustainable development in China. Using a panel data from the China Health and Retirement Longitudinal Survey, this study, on one hand examines the importance of China's rural health insurance scheme and intergenerational interaction on the life satisfaction of rural elderly in China. On the other hand, this study brings to light the actual beneficiaries of the NCMS as well highlights the drawbacks, which impedes the scheme from achieving its full potential.

Findings relating to health and NCMS demonstrate that being able to carry out ADL and IADL is favorable to the life satisfaction of rural residents in China, whereas suffering from a chronic disease is detrimental to life satisfaction. Also, receiving inpatient care adversely affects life satisfaction. Though the NCMS has a positive effect on life satisfaction, there are certain drawbacks, which make it less beneficial to certain groups of rural elderly. For the NCMS to be beneficial to all categories of rural residents, there is the need for the government and policy makers to consider the special needs of rural residents more specifically migrants and senior elderly. The treatment of reimbursement should be consistent and not vary across counties. The complexities associated with administering reimbursement should also be addressed. Though it is important for the scheme to cater to the special health needs of each county or locality, there is also the need for an equitable and fair execution of the scheme across the various categories of rural residents such as age groups and residence status. The reimbursement procedure should also be made less stringent for beneficiaries.

We also discover that the effect of intergenerational interaction on life satisfaction goes beyond merely having children or living with children. As children mature and become independent, thus do not live with parents, frequent communication, and financial support from these non-cohabiting children becomes very necessary with the degree of importance varying across different categories of rural elderly. For instance, as rural residents get older, communication with non-cohabiting children, and financial assistance from non-cohabiting children becomes of more importance than socio-economic factors such as house size and land area owned.

In spite of the relevant findings made in this study, there are however some limitations that were identified. Firstly, due to the nature of the data used, the analysis could only be conducted on rural residents above the age of 45. The effect of intergenerational interaction and NCMS can therefore not be generalized for all rural residents. Secondly, financial support in this study was only one-sided focusing on the effect of financial assistance from non-cohabiting children on parents. There could however be a situation where rural elderly remit their non-cohabiting children. The effect of this situation was however not considered in this study. We therefore recommend future research to consider the effect of all age categories and the two-sided nature of financial assistance on life satisfaction in order to establish the true nature of happiness among rural residents.

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## Appendix A

**Table A1.** Generalized least square estimation results of personal life satisfaction of full sample and age group.

Variables	Full Sample	Age 45 to 59	Age 60 to 74	Age 75 and Above
Age	0.0068 *** (0.0007)	0.0043 ** (0.0018)	0.0107 *** (0.0020)	0.0039 (0.0037)
Gender	0.0126 (0.0119)	0.0417 ** (0.0164)	0.0195 (0.0182)	−0.0439 (0.0386)
Cedu	−0.0061 * (0.0035)	−0.0059 (0.0052)	−0.0111 ** (0.0054)	−0.0106 (0.0153)
CEdu2	0.0054 *** (0.0021)	0.0041 * (0.0026)	0.0064 * (0.0039)	0.0211 * (0.0109)
Marital_Status	0.0557 *** (0.0158)	0.1063 *** (0.0368)	0.0508 ** (0.0245)	0.0381 (0.0345)
Income	0.0012 *** (0.0002)	0.0011 *** (0.0002)	0.0011 *** (0.0004)	0.0019 *** (0.0007)
House_Size	0.0003 *** (0.0001)	0.0003 *** (0.0001)	0.0005 *** (0.0001)	0.0001 (0.0002)
Land_Area	0.0556 (0.0403)	0.0372 (0.0449)	0.3518 ** (0.1487)	−0.1271 *** (0.0628)
Migrants	−0.0062 (0.0117)	−0.0316 ** (0.0157)	0.0166 (0.0170)	0.0476 (0.0364)
Health_Status	0.1581 *** (0.0136)	0.1529 *** (0.0273)	0.1543 *** (0.0221)	0.1910 *** (0.0243)
Chro_Disease	−0.1034 *** (0.0180)	−0.0781 ** (0.0314)	−0.1053 *** (0.0296)	−0.2590 *** (0.0447)
Inpatient_Care	−0.1019 *** (0.0097)	−0.0964 *** (0.0137)	−0.1221 *** (0.0159)	−0.0881 *** (0.0296)
Reim	−0.0250 *** (0.0091)	−0.0386 *** (0.0124)	−0.0393 *** (0.0152)	0.0066 (0.0269)
IC_NCMSratio	0.0647 ** (0.0274)	0.0863 ** (0.0426)	0.0915 ** (0.0447)	0.0061 (0.0719)
Child_Yes	0.0782 *** (0.0300)	0.0881 ** (0.0408)	0.0446 (0.0544)	0.0286 (0.0834)
Child_Cohab	−0.0125 ** (0.0055)	−0.0193 ** (0.0077)	−0.0056 (0.0092)	0.0006 (0.0172)
Child_Contact	0.0013 *** (0.0005)	0.0001 (0.0009)	0.0016 *** (0.0007)	0.0024 ** (0.0011)
Child_Transfer	0.0029 *** (0.0007)	0.0027 ** (0.0011)	0.0033 *** (0.0012)	0.0058 ** (0.0024)
2013	0.0326 *** (0.0081)	0.0275 ** (0.0117)	0.0415 *** (0.0135)	0.0698 ** (0.0272)
Constant	1.0955 *** (0.0652)	1.1995 *** (0.1215)	0.8565 *** (0.1574)	1.2537 *** (0.3238)
Observations	22,790	11,972	8756	2062
Number of_ID	11,395	5986	4378	1031

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ; displayed are the robust standard errors clustered by individual's ID.

**Table A2.** Generalized least square estimation results of personal life satisfaction for migrants and non-migrants.

Variables	Migrants	Non_migrants
Age	0.0073 *** (0.0011)	0.0066 *** (0.0009)
Gender	0.0046 (0.0207)	0.0149 (0.0143)

Table A2. Cont.

Variables	Migrants	Non_migrants
Cedu	−0.0107 * (0.0061)	−0.0033 (0.0045)
CEdu2	0.0056 ** (0.0030)	0.0054 * (0.0029)
Marital_Status	0.0632 ** (0.0284)	0.0492 ** (0.0219)
Income	0.0008 *** (0.0002)	0.0013 *** (0.0002)
House_Size	0.0003 ** (0.0001)	0.0003 *** (0.0001)
Land_Area	0.0139 (0.0316)	0.1607 ** (0.0722)
Health_Status	0.1139 *** (0.0241)	0.1791 *** (0.0173)
Chro_Disease	−0.0776 ** (0.0306)	−0.1126 *** (0.0226)
Inpatient_Care	−0.1103 *** (0.0160)	−0.0992 *** (0.0122)
Reim	−0.0054 (0.0149)	−0.0360 *** (0.0115)
IC_NCMSratio	0.0615 (0.0416)	0.0796 ** (0.0360)
Child_Yes	0.1464 *** (0.0466)	0.0274 (0.0396)
Child_Cohab	−0.0054 (0.0086)	−0.0182 ** (0.0072)
Child_Contact	0.0001 (0.0008)	0.0020 *** (0.0006)
Child_Transfer	0.0033 ** (0.0013)	0.0027 *** (0.0010)
2013	0.0504 *** (0.0135)	0.0234 ** (0.0103)
Constant	1.1124 *** (0.1073)	1.1085 *** (0.0906)
Observations	7764	15,026
Number of_ID	3882	7513

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ; displayed are the robust standard errors clustered by individual's ID.

## Appendix B

Table A3. Variance Inflation factor before centering "Edu" and "Edu2".

Variables	VIF	1/VIF
Age	1.87	0.53
Gender	1.42	0.70
Edu	24.47	0.04
Edu2	23.68	0.04
Marital_Status	1.22	0.82
Income	1.12	0.89
House_Size	1.05	0.96
Land_Area	1.01	0.99
Migrants	1.22	0.82
Health_Status	3.30	0.30
Chro_Disease	3.15	0.32
Inpatient_Care	1.11	0.90

Table A3. Cont.

Variables	VIF	1/VIF
Reim	1.01	0.99
IC_NCMSratio	1.07	0.93
Child_Yes	1.11	0.90
Child_Cohab	1.16	0.87
Child_Contact	1.68	0.60
Child_Transfer	1.06	0.94
2013	1.09	0.91
Mean VIF	3.83	

Table A4. Variance Inflation factor after centering “Edu” and “Edu2”.

Variables	VIF	1/VIF
Age	1.87	0.53
Gender	1.42	0.70
CEdu	1.53	0.65
CEdu2	1.14	0.87
Marital_Status	1.22	0.82
Income	1.12	0.89
House_Size	1.05	0.96
Land_Area	1.01	0.99
Migrants	1.22	0.82
Health_Status	3.30	0.30
Chro_Disease	3.15	0.32
Inpatient_Care	1.11	0.90
Reim	1.01	0.99
IC_NCMSratio	1.07	0.93
Child_Yes	1.11	0.90
Child_Cohab	1.16	0.87
Child_Contact	1.68	0.60
Child_Transfer	1.06	0.94
2013	1.09	0.91
Mean VIF	1.44	

## References

1. Easterlin, R.; Morgan, R.; Switek, M.; Wang, F. China’s life satisfaction, 1990–2010. *Proc. Natl. Acad. Sci. USA* **2012**, *109*, 9775–9780. [CrossRef]
2. Easterlin, R. Happiness, growth, and public policy. *Econ. Inq.* **2013**, *51*, 1–15. [CrossRef]
3. Tran, N.L.T.; Wassmer, R.W.; Lascher, E.L. The Health Insurance and Life Satisfaction Connection. *J. Happiness Stud.* **2017**, *18*, 409–426. [CrossRef]
4. Wang, Y. The Development of China’s Social Welfare System. In *Social Security in China: On the Possibility of Equitable Distribution in the Middle Kingdom. Research Series on the Chinese Dream and China’s Development Path*; Springer International Publishing: Singapore, 2017; pp. 1–17. ISBN 9789811056437.
5. Hammond, D. Social Welfare in China. Available online: <http://www.oxfordbibliographies.com/view/document/obo-9780199920082/obo-9780199920082-0144.xml> (accessed on 24 April 2018).
6. Yi, H.; Zhang, L.; Singer, K.; Rozelle, S.; Atlas, S. Health insurance and catastrophic illness: A report on the new cooperative medical system in rural China. *Health Econ.* **2009**, *18*, 119–127. [CrossRef] [PubMed]
7. Wagstaff, A.; Manus, L.; Gao, J.; Xu, L.; Qian, J. Extending health insurance to the rural population: An impact evaluation of China’s new cooperative medical scheme. *J. Health Econ.* **2009**, *28*, 1–19. [CrossRef]
8. Pal, S. *Effects of Intergenerational Transfers on Elderly Coresidence with Adult Children: Evidence from Rural India*; Institute of Labor Economics: Bonn, Germany, 2007.
9. Campbell, C. The changing population of China. *J. Asian Stud.* **2001**, *60*, 535–537. [CrossRef]
10. Brasher, M.S. Living arrangements of older adults in China: The interplay among preferences, realities, and health. *Res. Aging* **2011**, *33*, 172–204.

11. Hao, S. Family Function, the Change of Living Mode and Happiness of the Wrinkly and the Elderly—Empirical Analysis Based on CGSS (2006). *J. Hubei Univ. Econ.* **2015**, *13*, 1–11.
12. Bai, X.; Yang, S.; Knapp, M. Sources and directions of social support and life satisfaction among solitary Chinese older adults in Hong Kong: The mediating role of sense of loneliness. *Clin. Interv. Aging* **2018**, *13*, 63–71. [[CrossRef](#)]
13. Xu, L.; Chi, I. Life satisfaction among rural Chinese grandparents: The roles of intergenerational family relationship and support exchange with grandchildren. *Int. J. Soc. Welf.* **2011**, *20*, 9–11. [[CrossRef](#)]
14. Cheng, L.; Liu, H.; Zhang, Y.; Shen, K.; Zeng, Y. The impact of health insurance on health outcomes and spending of the elderly: Evidence from China's new cooperative medical scheme. *Heal. Econ.* **2015**, *24*, 672–691. [[CrossRef](#)]
15. Dolan, P.; Peasgood, T.; White, M. Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *J. Econ. Psychol.* **2008**, *29*, 94–122. [[CrossRef](#)]
16. Smith, C.; Sorsa, P. *Exploring Determinants of Subjective Wellbeing in OECD Countries—Evidence from the World Values Survey*; Organisation for Economic Co-Operation and Development: Paris, France, 2011.
17. Ngamaba, K.H. Determinants of subjective well-being in representative samples of nations. *Eur. J. Public Health* **2017**, *27*, 377–382. [[CrossRef](#)]
18. Liang, Y.; Shen, J. Subjective Well-being and Its Determinants in China: An Empirical Study Based on Survey Data. *Res. Appl. Econ.* **2016**, *8*. [[CrossRef](#)]
19. Knight, J.; Song, L.; Gunatilaka, R. Subjective well-being and its determinants in rural China. *China Econ. Rev.* **2009**, *20*, 635–649. [[CrossRef](#)]
20. Song, L.; Appleton, S. Life Satisfaction in Urban China: Components and Determinants. *World Dev.* **2008**, *36*, 2325–2340.
21. Gao, W.; Smyth, R. What keeps China's migrant workers going? Expectations and happiness among China's floating population. *J. Asia Pac. Econ.* **2011**, *16*, 163–182. [[CrossRef](#)]
22. Knight, J.; Gunatilaka, R. Great Expectations? The Subjective Well-being of Rural-urban Migrants in China. *World Dev.* **2010**, *38*, 113–124. [[CrossRef](#)]
23. Olaroiu, M.; Alexa, I.D.; Van Den Heuvel, W.J.A. Do Changes in Welfare and Health Policy Affect Life Satisfaction of Older Citizens in Europe? *Curr. Gerontol. Geriatr. Res.* **2017**, *2017*, 7574040. [[CrossRef](#)]
24. Propp, J. *Life Satisfaction in Welfare States*; Humboldt University: Berlin, Germany, 2009.
25. Hye-Won Kim, E. *Public Support, Family Support, and Life Satisfaction of the Elderly: Evidence from a New Government Old-Age Pension in Korea*; Duke University: Durham, NC, USA, 2012.
26. National Academy of Sciences Intergenerational Transfers. *Preparing for an Aging World*; National Academies Press: Washington, DC, USA, 2001; pp. 1–34.
27. Arbor, A. *The Well-Being of the Elderly in Asia: A Four-Country Comparative Study*; The University of Michigan Press: Ann Arbor, MI, USA, 2002.
28. Ding, Y. Personal Life Satisfaction of China's Rural Elderly: Effect of the New Rural Pension Programme. *J. Int. Dev.* **2017**, *29*, 52–66. [[CrossRef](#)]
29. Zhang, C.; Giles, J.; Zhao, Y. Policy Evaluation of China's New Rural Pension Program: Income, Poverty, Expenditure and Labor Supply. *China Econ. Q.* **2014**, *14*, 203–230. (In Chinese)
30. Gu, L.; Feng, H.; Jin, J. Effects of Medical Insurance on the Health Status and Life Satisfaction of the Elderly. *Iran. J. Public Health* **2017**, *46*, 1193–1203.
31. Su, M.; Zhou, Z.; Si, Y.; Wei, X.; Xu, Y.; Fan, X.; Chen, G. Comparing the effects of China's three basic health insurance schemes on the equity of health-related quality of life: Using the method of coarsened exact matching. *Health Qual. Life Outcomes* **2018**, *16*, 1–12. [[CrossRef](#)]
32. Qian, Y.; Qian, Z. Work, Family, and Gendered Happiness Among Married People in Urban China. *Soc. Indic. Res.* **2015**, *121*, 61–74. [[CrossRef](#)]
33. Miao, J.; Wu, X. *Subjective Well-being of Chinese Elderly: A Comparative Analysis among Urban China, Hong Kong, and Taiwan*; University of Michigan Population Studies Center: Ann Arbor, MI, USA, 2016.
34. Chyi, H.; Mao, S. The Determinants of Happiness of China's Elderly Population. *J. Happiness Stud.* **2012**, *13*, 167–185. [[CrossRef](#)]
35. Liu, H.; Sun, Q.; Zhao, Z. Social learning and health insurance enrollment: Evidence from China's New Cooperative Medical Scheme. *J. Econ. Behav. Organ.* **2014**, *97*, 84–102. [[CrossRef](#)]

36. Yang, W. China's new cooperative medical scheme and equity in access to health care: Evidence from a longitudinal household survey. *Int. J. Equity Health* **2013**, *12*. [[CrossRef](#)]
37. Liang, X.; Guo, H.; Jin, C.; Peng, X.; Zhang, X. The effect of new cooperative medical scheme on health outcomes and alleviating catastrophic health expenditure in China: A systematic review. *PLoS ONE* **2012**, *7*. [[CrossRef](#)] [[PubMed](#)]
38. Chu, K.; Zhang, N.; Chen, Z. The efficiency and its determinants for China's medical care system: Some policy implications for Northeast Asia. *Sustainability* **2015**, *7*, 14092–14111. [[CrossRef](#)]
39. Chen, L.; de Haan, A.; Zhang, X.; Warmerdam, W. Addressing vulnerability in an emerging economy: China's New Cooperative Medical Scheme (NCMS). *J. Dev. Stud.* **2011**, *32*, 1–16. [[CrossRef](#)]
40. Xuiliang, Z.; Shaobin, S. Analysis of Satisfaction with the Reimbursement System in New Rural Cooperative Medicare. *Collect. Essays Financ. Econ.* **2009**, *147*, 25–30.
41. China Health and Retirement Longitudinal Study CHARLS. Available online: <http://charls.pku.edu.cn/en> (accessed on 8 May 2018).
42. Zhao, Y.; Hu, Y.; Smith, J.P.; Strauss, J.; Yang, G. Cohort profile: The China health and retirement longitudinal study (CHARLS). *Int. J. Epidemiol.* **2014**, *43*, 61–68. [[CrossRef](#)]
43. Chen, J. Perceived discrimination and subjective well-being among rural-to-urban migrants in China. *J. Soc. Welf.* **2013**, *40*, 131–156.
44. Graham, C.; Zhou, S.; Zhang, J. Happiness and Health in China: The paradox of progress. *Glob. Econ. Dev.* **2017**, *96*, 231–244. [[CrossRef](#)]
45. Lei, X.; Lin, W. The New Cooperative Medical Scheme in Rural China: Does more coverage more servives and better health? *Health Econ.* **2009**, *46*, 25–46. [[CrossRef](#)]
46. Ma, X.; Cen, Y. Public Health Insurance System Reform and Its Impact on Health Service Utilization in Rural China: Evidence from CHNS 2000 and 2011. *Chin. Stud.* **2017**, *6*, 76350. [[CrossRef](#)]
47. Yan, J.; Ren, Y.; Zhou, Z.; Xu, T.; Wang, X.; Du, L.; Si, Y. Research on the horizontal equity of inpatient benefits among NCMS enrollees in China: Evidence from Shaanxi Province. *BioMed Cent. Heal. Serv. Res.* **2018**, *18*, 1–23. [[CrossRef](#)]
48. Gwatkin, E.A.D.R.; Ergo, A. Universal health coverage: Friend or foe of health equity? *Lancet* **2011**, *377*, 2160–2161. [[CrossRef](#)]
49. Hajdu, T. Income and Subjective Well-Being: How Important is the Methodology? *Hung. Stat. Rev.* **2014**, *92*, 110–128.
50. Van Praag, B.M.S.; Frijters, P.; Ferrercarbonell, A. The Anatomy of subjective Well-being. *J. Econ. Behav. Org.* **2003**, *51*, 29–49. [[CrossRef](#)]
51. Winship, C.; Mare, R.D. Regression models with ordinal variables. *Am. Soc. Rev.* **1984**, *49*, 512–525. [[CrossRef](#)]
52. Agresti, A. *Analysis of Ordinal Categorical Data*; Wiley: Hoboken, NJ, USA, 2012.
53. Stata, M.U. *Regression Models for Categorical Dependent Variables Using Stata*, 2nd ed.; Stata Press: College Station, TX, USA, 2014; ISBN 1-881228-62-2.
54. Weissfeld, L.A.; Sereika, S.M. A multicollinearity diagnostic for generalized linear models. *Commun. Stat. Theory Methods* **1991**, *20*, 1183–1198. [[CrossRef](#)]
55. Blanchflower, D.G.; Oswald, A.J. Money, sex and happiness: An empirical study. *Scand. J. Econ.* **2004**, *106*, 393–415. [[CrossRef](#)]
56. FerreriCarbonell, A.; Gowdy, J.M. Environmental degradation and happiness. *Ecol. Econ.* **2007**, *60*, 509–516. [[CrossRef](#)]
57. Gana, K.; Bailly, N.; Saada, Y.; Joulain, M.; Alaphilippe, D. Does life satisfaction change in old age: Results from an 8-year longitudinal study. *J. Gerontol. Ser. B* **2013**, *68*, 540–552. [[CrossRef](#)]
58. Alesina, A.; Di Tella, R.; MacCulloch, R. Inequality and happiness: Are Europeans and Americans different? *J. Public Econ.* **2004**, *88*, 2009–2042. [[CrossRef](#)]
59. Louis, V.V.; Zhao, S. Effects of family structure, family SES, and adulthood experiences on life satisfaction. *J. Fam. Issues* **2002**, *23*, 986–1005. [[CrossRef](#)]

