Pension Policy as a Pathway to Happiness: Insights from China's New Rural Pension Scheme

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Abstract

The significance of subjective well-being (SWB) in the development agenda has gained growing recognition in both academic and policy discussions. However, the intricate structure of SWB, which includes multiple sub-dimensions, remains insufficiently examined. This study addresses this gap by analysing SWB across three sub-dimensions—cognition, affect, and eudaimonia—as defined by the Organisation for Economic Co-operation and Development (OECD). It focuses on the impact of China's New Rural Pension Scheme (NRPS), introduced in 2009, employing a Regression Discontinuity Design (RDD) to establish a causal link between NRPS participation and SWB. The findings reveal that receiving the pension significantly enhances SWB among rural elderly residents, with particularly strong improvements in the affective and eudaimonic dimensions. Additionally, the study identifies multi-dimensional heterogeneity in the scheme's effectiveness, offering policy insights in educational, family, social-class, and regional inequalities.

Keywords: Subjective Well-Being (SWB), Rural Pension Schemes, Regression Discontinuity Design, Economic Inequality, Aging Population

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1 Introduction

The Chinese government introduced the New Rural Pension Scheme (NRPS) in 2009, making rural residents aged 60 and above eligible for pension benefits. This scheme covers informal rural workers, including those engaged in both agricultural and non-agricultural activities. Existing literature suggests that such schemes can improve both the material and subjective well-being (SWB) of recipients (Bando et al., 2022; Han et al., 2022). Our study focuses on the latter and further explores the heterogeneous effects across gender with its underlying channels.

While the multidimensionality of SWB has been widely recognised, the impacts on each sub-dimension remain underexplored in the literature. Our research delves into the three key sub-dimensions of SWB—cognition, affect, and eudaimonia—following the guidelines set by the Organisation for Economic Co-operation and Development (OECD). By examining these distinct dimensions, we aim to provide a nuanced understanding of how pension receipt influences overall SWB, beyond the commonly studied life satisfaction and the happiness level.

Another contribution of this study is the exploration of the potential heterogeneity in the impact of the NRPS on SWB. We test multi-dimensional factors and find that individuals with certain characteristics derive disproportionately larger gains from pension policies, uncovering potential inequalities in policy outcomes, and offering directions for policy improvements.

To establish causality, we employ a Regression Discontinuity Design (RDD) centred around the NRPS eligibility cutoff at age 60. This methodological approach is particularly well-suited to our study for several reasons. First, the retirement age in rural China does not present a significant confounding factor, as most rural elderly continue to participate in agricultural production and other income-generating activities beyond the age of 60 (Giles et al., 2023). It will also be confirmed through a validity test. Additionally, the 2012 wave of the China Family Panel Studies (CFPS) survey is the only dataset that includes detailed variables for the sub-components of SWB, which precludes the use of dynamic models such as Difference-in-Differences (DID) as adopted by (Huang and Zhang, 2021). Therefore, the RDD approach offers a robust framework to isolate the impact of pension receipt on SWB, while effectively leveraging the available cross-sectional data.

Our findings show that participation in the NRPS significantly enhances subjective

well-being among rural elderly individuals, particularly in the cognitive and eudaimonic dimensions. This suggests that social pensions can play a meaningful role in improving psychological welfare beyond material security. At the same time, we find that these well-being gains are not equally shared: individuals who are more educated, married, of higher social status, or residing in coastal and southern regions benefit disproportionately. These results highlight both the positive impact of the NRPS and the importance of addressing underlying social and regional inequalities in policy implementation.

Overall, our study not only deepens the understanding of the comprehensive effects of pension policies on SWB but also underscores educational, family, social-class, and regional heterogeneity, which can inform more equitable and effective policy designs.

The structure of the paper proceeds as follows: Section 2 reviews the existing literature on subjective well-being (SWB); Section 3 outlines the policy background; Section 4 summarises and describes the data; Section 5 details the estimation strategy; Section 6 presents the main results, validity tests, and robustness checks; Section 7 explores heterogeneous effects; Section 8 concludes.

2 Literature Review

The definition of subjective well-being (SWB) has been continually evolving, with its measures being decomposed into ever finer units by scholars over the last few decades. Generally, SWB refers to the global experience of positive reactions to one's life (Diener, 1994). In the earlier literature, SWB was considered an attitude comprising two basic measurement concepts: cognition (i.e., rational and intellectual aspects) and affect (i.e., emotional aspects) (Ostrom, 1969). These two lower-order concepts were later expanded to include life satisfaction (Campbell et al., 1976) and hedonic perspectives (Veenhoven, 1984). While life satisfaction is a cognitive assessment of one's life as a whole, hedonic well-being refers to the pleasantness minus the unpleasantness of one's emotional life (Diener, 1994). The latter can alternatively be interpreted as a predominance of positive affect (PA) over negative affect (NA) (Bradburn, 1969). It is worth noting that, although happiness is categorised under the overall definition of SWB (Diener, 1984), the term is sometimes used synonymously with other terms such as SWB and life satisfaction, leading to confusion due to its varied popular meanings in both cognitive and affective aspects

(Diener, 1994). In this study, we classify happiness within the affective component. In later literature, beyond life evaluation and emotional state, eudaimonia (or flourishing) has been proposed as the third measurement concept, related to functioning and potential realisation (Huppert et al., 2009; Clark and Senik, 2011; Deci and Ryan, 2008). According to the latest guidelines, cognition, affect, and eudaimonia have been listed as the three main sub-dimensions of SWB according to the OECD definition (OECD, 2013).

Under these three sub-dimensions, further divisions of their sub-components have been discussed. Diener et al. (1999) included domain satisfaction (e.g., satisfaction in specific life domains such as family, marriage, work, or health), which has been empirically proven to form a bottom-up influence structure of SWB (Schimmack, 2008). Li and Zhou (2021) utilised self-confidence as a eudaimonic component within the SWB structure. Huppert and So (2013) characterised ten detailed aspects of eudaimonia: competence, emotional stability, engagement, meaning, optimism, positive emotion, positive relationships, resilience, self-esteem, and vitality.

Meanwhile, the determinants and correlates of SWB have been discussed as influencing factors and potential channels. Das et al. (2020) emphasised factors including health and functioning, social support, and personality. Diener et al. (2018) demonstrated that higher SWB is associated with good health and longevity, better social relationships, work performance, and creativity. Waldinger and Schulz (2023) also confirmed the significant role of trust and human connections based on the long-term Harvard Study of Adult Development. Rowan (2023) listed income, health, having someone to count on, having a sense of freedom to make key life decisions, generosity, and the absence of corruption as six determinants of life evaluations.

This study adheres to the conceptual framework for SWB measurements outlined in the OECD guidelines (OECD, 2013). To provide a clear illustration, the model of the SWB structure is presented in Figure 1.

3 Policy Background

As a result of growing interest in the economics of happiness, economists started to consider Subjective Well-Being (SWB) as a self-reported measure of utility. They aim to identify significant economic factors among all determinants to enhance SWB (Dolan

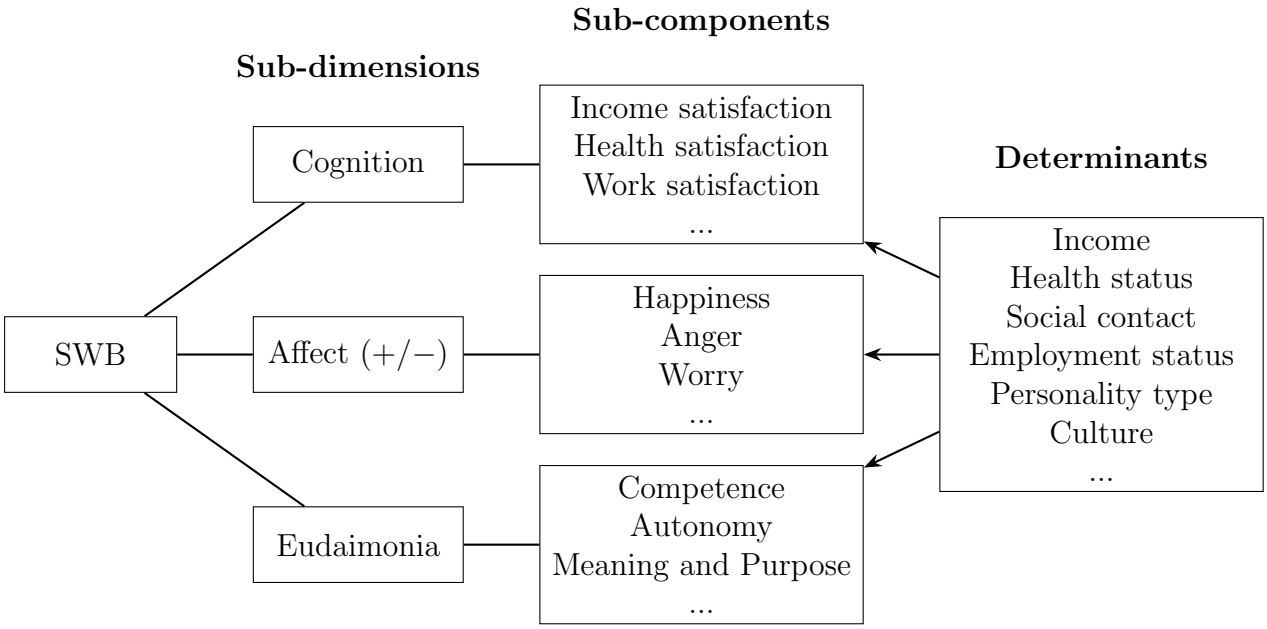

Figure 1: The Model of the SWB Structure

et al., 2008). Beyond income and wealth, welfare policy emerges as one of these factors, demonstrating an overall positive correlation with citizens' SWB (Pacek and Radcliff, 2008; O'Connor et al., 2017; Samuel and Hadjar, 2016). Notably, Andrews and Robinson (1991) highlighted social gerontology as a pivotal field in SWB research, thus drawing considerable attention to social pension schemes, especially in an era characterised by an ageing population (Chand and Jaeger, 1996). The impact of specific pension policies across various countries or regions on SWB has been scrutinised (Pacek and Radcliff, 2008; Etinzock and Kollamparambil, 2019; Bando et al., 2020).

Our analysis concentrates on China's New Rural Pension Scheme (NRPS), which superseded the traditional rural pension established in 1992 (Zhu and Walker, 2018). The conventional rural pension scheme was compromised by the fertility decline resulting from the one-child policy, rendering it less effective in an ageing society (Shen and Williamson, 2010). Specifically, in rural areas, the pension policy experienced considerable instability (Shi, 2006), and the absence of social security coverage for the rural elderly significantly exacerbated the economic disparity between rural and urban areas, hindering poverty reduction efforts (Yang et al., 2010). These factors underscored the inadequacies of the rural pension system and highlighted the necessity for further reforms. In this context, the NRPS was introduced to further enhance the pension system and expand universal coverage, aiming to replace the traditional reliance on children for old-age support, sup-

plement traditional sources of elderly security with family support (Wenjuan and Dan, 2008), alleviate income inequality, bridge the urban-rural divide (Shen and Williamson, 2010), and improve economic sustainability, social justice, and political stability (Leisering et al., 2002).

Chinese Government officials outlined the NRPS implementation plan as follows: initiate as a pilot in 2009, achieve a participation rate of over 50% by 2012, exceed 80% by 2017, and essentially realize full coverage by 2020 (China News, 2009). According to China Statistical Yearbook (2012), 326.4 million rural residents were enrolled in the NRPS, accounting for nearly one-quarter of the total population and half of the rural population, with 89.2 million pension beneficiaries recorded in 2011.

The NRPS is a voluntary social pension that contains both contribution and benefit elements. It comprises a basic flat-rate pension component funded by both local and central governments, and a monthly paid individual-contributed pension account. The central government bears the majority of the cost in relatively poor areas, while the local government contributes more in affluent areas (Shen and Williamson, 2010). The minimum amount of the basic flat-rate pension, primarily sponsored by the central government with potential additional contributions from local governments, varies by region and starts from 55 yuan (around 8 US dollars) a month per retiree, approximating the national average minimum living security level in rural areas (China News, 2009; Shen and Williamson, 2010). Estimated by Oksanen et al. (2010), the flat-rate pension combined with individual accounts based on contributions at 3% of rural wages would result in a total pension equivalent to 15% of rural wages. All rural inhabitants aged 16 and above who are not in school and not registered in an urban pension program are eligible to enroll in the NRPS. A qualified beneficiary must be at least 60 years old and have contributed for at least 15 years. Taking into account some special circumstances, individuals aged between 60 and 64 at the beginning of the pilot are eligible for a reduction in their supplementary payment. The payment period decreases by three years for each additional year of age above 60. Those aged over 65 can directly enjoy the basic pension. Williamson et al. (2017) noted that the NRPS has made advancements in coverage, adequacy, and sustainability.

Regarding the policy efficiency and economic or health benefits of the NRPS in enhancing the overall life quality of rural elderly residents, extensive research has been

conducted. Scholars have demonstrated significant and positive impacts of the NRPS on rural residents' household income (Huang and Zhang, 2021), living arrangements (Cheng et al., 2018b), short-term expenditure and long-term consumption upgrading (Tang, 2022), family-saving behavior (Luo, 2019), farm labor supply (Huang and Zhang, 2021), human capital investment (Tang et al., 2021), fertility decision-making (Shen et al., 2020), nutrition intake and accessibility to healthcare (Cheng et al., 2018a), and intergenerational exchange (Ko and Möhring, 2021). Other research has focused on the cognitive impacts of the NRPS on residents' perceptions, such as SWB (Fang and Sakellariou, 2016; Ding, 2017; Ma and Oshio, 2023; Ko and Möhring, 2021) and political attitudes (Li and Wu, 2018). However, most studies on SWB are limited to a generalised, narrow, and uni-dimensional definition, using only life satisfaction for measurement and overlooking the extensive sub-dimensions in the structure of SWB. Moreover, few studies explore the heterogeneous effects of pension receipt on SWB.

Although we acknowledge that rational expectations regarding future NRPS eligibility could, in principle, influence SWB for individuals just below the cutoff age, several factors suggest that this concern is limited in our setting. First, the gradual and heterogeneous rollout of the NRPS across counties will likely restrict individuals' ability to precisely predict the timing and receipt of benefits. Second, the poor information access to eligibility criteria and implementation procedures in rural China at the early stages of the policy rollout will reduce the salience of the NRPS for near-eligible cohorts. Third, even if some anticipatory effects exist, they would likely bias our estimates downward—attenuating the observed discontinuity—thereby making our estimated treatment effects conservative rather than overstated. Taken together, these considerations suggest that rational-expectation biases, while theoretically possible, are unlikely to substantially undermine the validity of our main findings, which likely represent a lower bound on the true impact of the NRPS.

By investigating whether the NRPS effectively contributes to citizen SWB and identifying the sub-dimensions serving as underlying mechanisms, this study aims to fill this gap and provide a more comprehensive analysis. This will not only help establish a standard academic paradigm for analysing the structure of SWB in empirical studies but will also offer practical policy recommendations for governments on improving rural elderly residents' SWB from various aspects.

4 Data and Descriptive Statistics

The primary data source for this study is the 2012 China Family Panel Studies (CFPS), a nationally representative, biennial longitudinal survey of Chinese communities, families, and individuals initiated in 2010 by the Institute of Social Science Survey (ISSS) at Peking University, China. This survey collects extensive data on both the economic and non-economic well-being of the Chinese populace, encompassing a broad range of demographic and socioeconomic characteristics, including gender, date of birth, ethnicity, residency, educational attainment, economic activities, family dynamics and relationships, migration, health, among others. Specifically, we select the 2012 CFPS wave primarily due to the following two reasons: 1. The CFPS waves after the year 2018 only contain the data of NRPS enrollment instead of NRPS receipt, while the latter is our focus; 2. Among the CFPS waves before the year 2018, the 2012 CFPS wave is the only wave that includes detailed variables for the subcomponents of SWB.

Following the baseline 2010 CFPS, the 2012 iteration continues the survey's data collection efforts. The CFPS sampling, executed with implicit stratification through a multi-stage probability process (county, village, household), aims to minimise operational costs and facilitate the examination of social contexts. Initially, five provinces were selected for oversampling (1,600 families each) to enable regional comparisons, while the remaining 8,000 families were sampled from other provinces using weighting strategies to ensure national representativeness. The 2012 CFPS sample comprises 13,315 households and 35,719 adult respondents.

Subjective Well-being (SWB). Central to our study, respondents answered various questions related to SWB's three sub-dimensions: cognition, affect, and eudaimonia. Given the survey's limitations, we strive to comprehensively incorporate relevant components.

Cognition is assessed through questions on personal and family life satisfaction, rated on a scale of 1 to 5. Affect is evaluated based on responses to statements about positive and negative experiences, with positive affect gauged through happiness and enjoyment of life, and negative affect through a series of thirteen statements reflecting various emotional states, rated on a scale from 1 ("Almost never") to 4 ("Most of the time"). Eudaimonia measures include optimism, self-esteem, competence, meaning, and positive relationships, with response scales varying from 1 to 5 for confidence in the future and similarly to affect

for the other variables.

To examine the overall impact of pension receipt on these sub-dimensions, we construct three SWB indexes (Cognition, Affect, and Eudaimonia) using principal component analysis, adhering to Kaiser's rule by selecting components with eigenvalues greater than 1. An aggregated SWB Index assesses the cumulative effect of pension receipt. Higher index values indicate greater SWB enhancement.

Pension Receipt. We define a treatment variable, $NRPS_i$, based on responses to the question regarding the receipt of the New Rural Social Pension Insurance, assigning 1 to recipients and 0 to non-recipients. This categorises respondents into treatment and control groups.

Predetermined Characteristics. We select thirteen characteristics to contrast the treatment and control groups, including gender, ethnicity, education, marital status, income, social status, health status, retirement status, religion, and residency factors.

Regression Sample. The analysis is limited to rural populations eligible for the NRPS. We exclude individuals under 45 and over 75. Individuals are permitted to enroll in the pension system as early as age 45, but begin receiving benefits only at age 60. This institutional feature defines a natural comparison group—those eligible but not yet receiving benefits (ages 45–59)—against those who are newly eligible for pension disbursements (age 60 and above). Additionally, there is few observations of individuals over 75, so we exclude them to avoid potential biases. The final regression sample includes 11,030 individuals, distinguishing between pension-eligible and ineligible participants, with a pension receipt rate of 45% among the eligible.

Our methodology and analytical approach aim to provide a clear, comprehensive examination of the NRPS's impact on rural residents' SWB, underpinned by robust data from the CFPS. The summary statistics are detailed in Table A.

5 The Model

To address the endogeneity concern that omitted individual and family-level attributes may simultaneously influence an individual's pension receipt and SWB, we employ the Regression Discontinuity (RD) framework. This quasi-experimental design, pioneered by Thistlethwaite and Campbell (1960), serves as our identification strategy to estimate the

causal impact of the NRPS on the SWB of rural residents.

In this context, the age eligibility threshold of 60, as stipulated by the pension scheme, provides a basis for a natural experiment within the RD design. We designate this age threshold as the cutoff point X_0. The core identifying assumption is that individual characteristics are evenly distributed across ages, suggesting that individuals on either side of the discontinuity are similar and thereby comparable. The efficacy of this design hinges on the premise that individuals cannot systematically manipulate the forcing variable (age) around the cutoff point, thereby enabling us to quasi-randomly divide them into treatment and control groups (Lee and Lemieux, 2010).

The pension receipt $NRPS_i$ is identified as our treatment variable T_i. It is important to note that being eligible for a pension does not guarantee access to it, given that enrollment in the NRPS is voluntary, and the actual timing of pension receipt can be influenced by local government enforcement, with a potential delay in processing. Consequently, an eligible individual might opt not to register or might fail to receive the pension. Therefore, the probability of treatment jumps between 0 and 1, leading us to employ a fuzzy RD design to estimate the Local Average Treatment Effects (LATE) in instances where the treatment probability exhibits a discontinuity (i.e., $\lim_{X \to X_0^+} E[T_i|X_i = x] \neq \lim_{X \to X_0^-} E[T_i|X_i = x]$). Those below the age cutoff serve as a robust counterfactual for their counterparts above it. Figure 2 illustrates the quadratic fit for the first-stage regression, demonstrating this relationship.

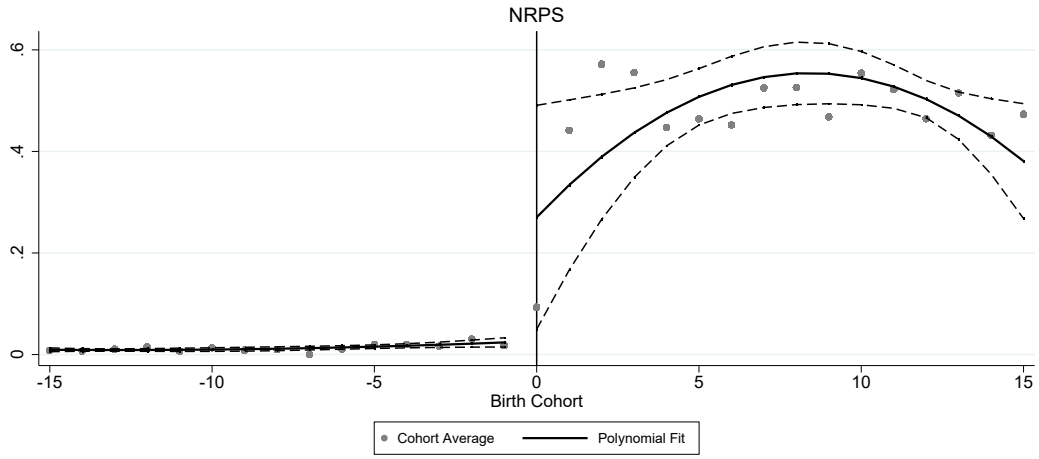

Figure 2: The Quadratic Fit for the First-stage Regression

Let SWB_i denote the outcome variable Y_i (which will be extended to detailed sub-

dimensions in the later empirical analysis) for individual i and $pension_i$ denote the treatment variable indicating whether an individual receives the NRPS pension. With the discontinuity of the receipt probability, we can estimate the local average treatment effects (LATE). Hahn et al. (2001) demonstrates the mathematical expression of the treatment effect β can be identified as follows:

$$\beta = \frac{Y^+ - Y^-}{T^+ - T^-} = \frac{\lim_{X \to X_0^+} E[Y_i|X_i = x] - \lim_{X \to X_0^-} E[Y_i|X_i = x]}{\lim_{X \to X_0^+} E[T_i|X_i = x] - \lim_{X \to X_0^-} E[T_i|X_i = x]} = \frac{\rho_{reduced}}{\gamma_{first}} = \hat{\beta}_{RD}$$

which is interpreted as an instrumental variable (IV) estimator. Lee and Lemieux (2010) further establishes that the fuzzy RD coefficient can be defined as a ratio of the reduced-form coefficient to the first-stage coefficient, employing the location dummy $D(I[X_i \geq X_0])$ as an IV for actual treatment status. In our scenario, the effect of pension on SWB outcomes is essentially quantified by using birth cohort or pension eligibility as an IV for pension treatment.

Lee and Card (2008) advocates for the superiority of the parametric approach over the non-parametric approach in RD designs when the forcing variable is discrete (e.g., birth year and age), as in our case. Moreover, Gelman and Imbens (2019) advises against the use of high-order (third, fourth, or higher) polynomials, recommending the second-order polynomial to optimally balance the trade-off between goodness of fit and model complexity. Following these recommendations, we adopt the parametric approach in our RD design, utilising the quadratic functional form as a benchmark. The econometric expressions for our basic fuzzy RD model setup are specified as Two-Stage Least Square (2SLS) equations. The first-stage, reduced-form, and principal equations are respectively:

$$NRPS_i = f(\tilde{X}_i) + f(\tilde{X}_i) \cdot D_i + \gamma D_i + \epsilon_i \quad (1)$$
$$SWB_i = f(\tilde{X}_i) + f(\tilde{X}_i) \cdot D_i + \rho D_i + \eta_i \quad (2)$$
$$SWB_i = f(\tilde{X}_i) + f(\tilde{X}_i) \cdot D_i + \hat{\beta}_{RD} \cdot \hat{NRPS}_i + \pi_i \quad (3)$$

where i indexes individual i; $f(\tilde{X}_i)$ takes the quadratic functional form of $f(\tilde{X}_i) = \theta_0 + \theta_1 \tilde{X}_i + \theta_2 \tilde{X}_i^2$; ϵ_i, η_i, and π_i denote the idiosyncratic error terms correspondingly.

For robustness checks, we vary the polynomial order in $f(\tilde{X}_i)$ later, by setting $f(\tilde{X}_i) = \theta_0 + \theta_1 \tilde{X}_i$, $f(\tilde{X}_i) = \theta_0 + \theta_1 \tilde{X}_i + \theta_2 \tilde{X}_i^2 + \theta_3 \tilde{X}_i^3$, and $f(\tilde{X}_i) = \theta_0 + \theta_1 \tilde{X}_i + \theta_2 \tilde{X}_i^2 + \theta_3 \tilde{X}_i^3 + \theta_4 \tilde{X}_i^4$, respectively. The non-parametric approach is also conducted with a local linear function:

$$NRPS_i = \theta_{10} + \theta_{11} \tilde{X}_i + \theta_{12} \tilde{X}_i D_i + \theta_{13} D_i + \epsilon_i \quad if \ |\tilde{X}_i| \leq h \quad (4)$$

$$SWB_i = \theta_{20} + \theta_{21}\tilde{X}_i + \theta_{22}\tilde{X}_i D_i + \theta_{23} D_i + \eta_i \quad if \ |\tilde{X}_i| \leq h \tag{5}$$

$$SWB_i = \theta_{30} + \theta_{31}\tilde{X}_i + \theta_{32}\tilde{X}_i D_i + \hat{\beta}_{RD} \cdot \hat{NRPS}_i + \pi_i \quad if \ |\tilde{X}_i| \leq h \tag{6}$$

where h is an optimally selected bandwidth; Equation 4, 5, and 6 are the first-stage, reduced-form, and principal equations for the non-parametric approach, respectively.

Concerning the estimation of standard errors, we follow (Lee and Lemieux, 2010) by using standard errors clustered at the birth cohort level for the RD estimator.

6 Empirical Results

6.1 Main Findings

We investigate the composite SWB index along with the three sub-dimensional indexes in our baseline analyses. The outcomes of these baseline regressions, employing Equations 1, 2, and 3, are presented in Table 1. Columns 1 and 2 detail the number of observations for each regression and the control group mean for each variable, respectively. Column 3 delineates the estimated discontinuities at the cutoff, derived via Ordinary Least Squares (OLS) for both the treatment and outcome variables. Column 5 provides the Instrumental Variable (IV) estimates for all examined outcome variables. Additionally, Figure 3 illustrates the cohort mean, quadratic fit, standard deviation, and discontinuity at the cutoff point for each outcome variable, visually representing the relationships and effects identified in the regression analysis.

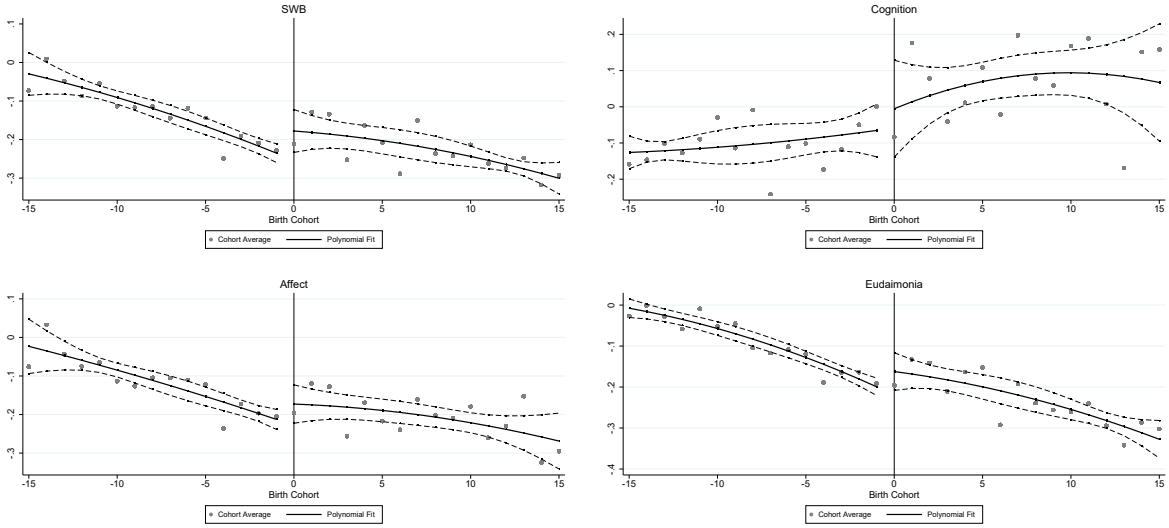

Figure 3: The Quadratic Fit for the Outcome Variables

Row 1 details the first-stage relationship, illustrating the effect of reaching the eligible

Table 1: The Baseline Regression Results of the RD design

VARIABLES	Observations	Control Mean	OLS Estimate	IV Estimate
First Stage				
NRPS	10706	0.013	0.244**	-
			(0.113)	-
Second Stage			**Reduced Form**	**Principal Equation**
SWB Index	10,185	-0.118	0.076**	0.308***
			(0.033)	(0.102)
Sub-dimensions:				
- Cognition Index	10,623	-0.102	0.053	0.217
			(0.084)	(0.287)
- Affect Index	10,459	-0.108	0.055*	0.225**
			(0.031)	(0.108)
- Eudaimonia Index	10,283	-0.086	0.057**	0.232***
			(0.027)	(0.069)

Notes: 1. Standard error in parentheses are clustered at cohort level: *** p<0.01, ** p<0.05, * p<0.1; 2. The coefficient in the second stage presents the estimated impact of NRPS pension receipt on rural elderly residents' SWB; 3. We use second-order polynomial regressions; 4. Control means are the average outcomes for the ineligible sample.

age on the likelihood of receiving NRPS pension. In alignment with Figure 2, eligibility significantly boosts the probability of NRPS pension receipt. The estimated discontinuity at 0.244 indicates that the probability of NRPS receipt increases by 24.4%. The change at the cutoff is statistically significant at the 5% level.

Subsequent rows present the results for all outcome variables, elucidating the second-stage relationships. The OLS estimates are obtained directly from the reduced-form equations, while the IV estimates are derived from the Regression Discontinuity (RD) model to evaluate the impact of the NRPS pension on the SWB of rural elderly residents. The location dummy used in the first stage acts as the IVs.

Overall, the SWB index demonstrates a statistically and economically meaningful increase at the 5% level in the OLS model and at the 1% level in the IV model, indicating that the NRPS positively influences the overall SWB of rural elderly residents. This effect is further dissected to examine the three sub-dimensions. The affect index registers a significant uplift at the 10% level in the OLS model and at the 5% level in the IV model. Similarly, the eudaimonia index records a significant enhancement at the 5% level in the OLS model and at the 1% level in the IV model. However, the cognition index, despite a positive estimate, does not show statistically significant results in our baseline analysis.

To assess the magnitude of these effects, it is useful to compare the estimated coefficients to the control means. The IV estimate for the overall SWB index is 0.308,

relative to a control group mean of –0.118, indicating a substantial improvement in well-being that more than offsets the baseline deficit. Similarly, the estimated effects for the affect and eudaimonia indices—0.225 and 0.232, respectively—represent roughly double the control means (–0.108 and –0.086). These results suggest that NRPS participation yields economically meaningful gains in these SWB dimensions, not merely statistically significant effects.

The affect index result aligns with the findings of Zheng and Fang (2018), which utilised the degree of depression and life satisfaction to assess SWB, with the former showing greater statistical significance. Similarly, Chen et al. (2019) found that depressive symptoms diminish with pension receipt. Nonetheless, various studies have also verified that NRPS enhances life satisfaction in the cognitive dimension (Ko and Möhring, 2021; Ding, 2017). One possible explanation for the insignificant result of the cognitive index could be attributed to the potential misspecification of the model. Our robustness checks (see section 6.3) identified significant results for the cognitive indicators by using the first-order polynomial parametric approach and the non-parametric approach, as well as the 2014 CFPS wave. This effect is particularly pronounced for family life satisfaction, which can be attributed to the fact that Chinese elderly individuals place a higher value on family support as a fundamental component of their well-being. This finding aligns with the cultural emphasis on family and collective welfare over individualistic well-being, which is prevalent in Chinese society (Poulin et al., 2012). Another potential explanation for the lack of significant findings for cognition might be due to the missing dimensions of regarding life satisfaction. In this study, personal and family life satisfaction are the only domains of life satisfaction examined, with a broader spectrum of life satisfaction aspects (e.g., income satisfaction, work satisfaction, marriage satisfaction, health satisfaction) being unavailable due to survey limitations. The outcomes related to the eudaimonia index are seldom addressed. Zheng and Fang (2018) put forward the hypothesis that NRPS could enhance the SWB of residents by boosting self-esteem, a premise that is corroborated in this investigation.

The specific regressions for each sub-component are detailed in Appendix Table B. For the affective components, the NRPS primarily enhances residents' SWB by reducing negative affect (NA). Regarding the eudaimonic components, the NRPS significantly boosts residents' SWB by improving their self-esteem, competence, and sense of meaning.

In summary, our findings demonstrate that reaching the age eligibility threshold substantially increases the likelihood of receiving the NRPS pension, which, in turn, significantly enhances the SWB of rural elderly residents, particularly through improvements in affect and eudaimonia.

6.2 Validity Test

The validity of the RD design is scrutinised to ensure the assumption that individuals do not have full control over the running variable X_i. Should the assignment near the cutoff point effectively constitute a randomised experiment, it then becomes permissible to utilise the average outcomes of units just below the cutoff as a valid counterfactual for units just above it. The presence of a first-stage discontinuity, confirming a fuzzy RD design, has been established in the preceding section 6.1 (refer to section 6.3 for comprehensive robustness checks). In this subsection, we test the smoothness of the density function and examine unobserved predeterminants of individual characteristics.

6.2.1 Density Test

The density test is conducted to check for manipulation of the forcing variable. We construct bins and regress the number of observations in each bin as the outcome variable, as suggested by Lee and Lemieux (2010). Although there are some fluctuations, we do not find any statistically or economically significant discontinuity in the density near the cutoff point. The p-values of the regression is 0.324, which suggests that there is continuity of X_i. Appendix Figure A illustrates the distribution of each cohort and the polynomial fit. From the graph, the distribution of the assignment variable appears continuous, and one cannot observe any significant differences on the two sides of the cutoff point. Therefore, we cannot reject the assumption that there is no complete manipulation of X_i.

6.2.2 Smoothness of Predetermined Characteristics

In this study, thirteen predetermined covariates are selected for analysis. Fitted values from OLS estimation are used to assess discontinuities at the cutoff. Appendix Table C reports the estimated discontinuities. Notably, none of the variables exhibits statistical significance. Furthermore, the magnitudes of most variables are economically negligible and proximate to zero, indicating these determinants are unlikely to have a causal

relationship with the outcome variables.

For a graphical demonstration, we calculate the average outcome of predetermined variables within bins on both sides of the cutoff and depict the quadratic fit. Appendix Figure B visually evaluates the smoothness of these predetermined covariates, revealing that they are virtually identical and exhibit similar patterns immediately to the left and right of the cutoff. This balanced distribution lends credibility to the validity of our research design.

A potential concern among the twelve factors is the continuity of the retirement rate, especially given that the cutoff at age 60 coincides with the mandatory retirement age for men in China. This could imply that retirement status, as a predetermined characteristic, might display discontinuity at the cutoff, potentially confounding the effects of the NRPS and challenging the validity of our RD design. However, this concern is mitigated in our context. According to Cheng et al. (2023), over 90% of the elderly in rural China remain engaged in agricultural activities, often continuing to work as long as they are physically capable. Our sample's job type distribution aligns with this, showing 50.66% unemployed, 36.82% in agricultural work, 3.83% self-employed, and only 6.36% in formal employment. This distribution, and the OLS estimate, aligns with findings by Giles et al. (2011), indicating a smooth transition in rural workers' employment rates at age 60. Consequently, our sample does not exhibit a distinct retirement age cutoff at 60 as observed in urban employment scenarios, thereby maintaining the RD design's validity.

6.3 Robustness Check

To minimise the influence of methodological selection, variations in functional forms, or other predetermined factors, we conduct a comprehensive series of robustness checks. These checks scrutinise the results' sensitivity to the inclusion of county-level fixed effects or predetermined socioeconomic covariates, variations in polynomial orders within the parametric approach, employment of a non-parametric approach, and adjustments in kernel weights. Both the OLS estimate for the first stage and the IV estimate for the second stage in principal equations are reported.

The regression outcomes from these robustness checks are documented in Appendix Table D. Regarding the first stage results, the increase in NRPS receipt remains robust across all equations and is notably more pronounced in the parametric approach,

affirming the advisability of the recommendations made by Lee and Card (2008). For the SWB, affect, and eudaimonia indexes, the findings demonstrate considerable robustness in the first-to-third-order polynomial parametric approach and the non-parametric approach, irrespective of the specific model and included controls, thus reinforcing our initial observations. The fourth-order polynomial parametric approach, however, does not produce significant outcomes, aligning with the caution advised by Gelman and Imbens (2019). For cognition, significant results are confined to lower-order polynomial parametric approaches and the non-parametric approach. Nonetheless, the robustness of these significant findings is highly sensitive to the choice of functional forms, particularly when a linear fit is applied. This indicates that drawing firm conclusions in this area should be approached with caution.

Additionally, among the 2010, 2012, 2014, and 2016 CFPS waves where the data for NRPS receipt is available, we note that the 2014 CFPS wave contains a more comprehensive variable set of the cognitive measures, although it still lacks affect and eudaimonia. Beyond personal and family life satisfaction, the 2014 wave also includes questions on marriage and work satisfaction. While not exhaustive, this inclusion nonetheless represents a more comprehensive assessment than earlier waves. Re-estimating the NRPS effect on this expanded cognition index, we continue to find statistically significant impacts both in our nonparametric specifications and in higher-order parametric models at 10% significance level, indicating a degree of robustness—albeit a limited one. Future work should seek to enrich the cognitive dimension to fully capture pension impacts across all facets of SWB.

7 Heterogeneity Analysis

In this subsection, we delve into the variance in the impact of the NRPS on the SWB of rural elderly residents by examining specific individual characteristics. We test the heterogeneous effects across multiple demographic, geographic, and socio-economic features in the predetermined characteristics by incorporating interaction terms into IV regressions to estimate the differential impacts, and we specifically find the significant heterogeneous effects across education years, marital status, social status, and residential status.

Table 2 details the coefficients of the interaction terms between pension receipt and

Table 2: Heterogenous Effects

	VARIABLES						
	Gender-Male	Ethnicity-Han	Education Year	marital Status	Income Level	Social Status	Health Status
ESTIMATE	[1]	[2]	[3]	[4]	[5]	[6]	[7]
SWB Index	-0.018	0.138	0.024**	0.170***	0.055	0.075*	0.017
	(0.075)	(0.098)	(0.011)	(0.062)	(0.041)	(0.041)	(0.027)
	Whether have Retired	Whether have Religion	Lived in Coastal Areas	Lived in Southern Areas	Lived in Birth Place at Age 3	Lived in Birth Place at Age 12	
ESTIMATE	[8]	[9]	[10]	[11]	[12]	[13]	
SWB Index	0.976	0.028	0.177*	0.166**	0.183	0.147	
	(0.817)	(0.100)	(0.094)	(0.075)	(0.140)	(0.121)	

Notes: 1. Standard error in parentheses are clustered at cohort level: *** p<0.01, ** p<0.05, * p<0.1; 2. We use second-order polynomial IV regressions. 3. Heterogeneous effects are examined using interaction terms. 4. We include the county-level fixed effects.

these characteristics, showcasing the estimated heterogeneous effects. Our heterogeneous-effects analysis reveals that the NRPS does not benefit all rural elders equally. Specifically, each additional year of education amplifies the pension's SWB boost by roughly 2.4%. Married individuals enjoy an extra 17% gain relative to their unmarried peers. Higher social-status seniors also capture larger well-being returns (an additional 7.5% points). Regionally, living in coastal or southern provinces raises the pension's impact on happiness by approximately 17.7% and 16.6%, respectively. By contrast, we find no significant variation by gender, ethnicity, income level, retirement, religion, health status, or birthplace, indicating that the scheme most powerfully narrows gaps along educational, marital, social-class, and geographic lines.

Our finding that more educated individuals derive larger SWB gains from the NRPS underscores the role of human capital not only in financial literacy but also in broader civic awareness. Educated retirees often enjoy higher lifetime incomes and career opportunities, and they tend to understand pension entitlements and social-welfare systems more clearly. This awareness fosters confidence in the policy and a more sanguine outlook on future life once pensions begin (Lusardi and Mitchell, 2014; Van Rooij et al., 2011; Xu and Zia, 2012). The pronounced "marriage premium" in our estimates could be caused by the fact that married retirees often gain from shared consumption, collaborative financial decision-making, and mutual caregiving within households, all of which enhance the utility of pension income, as documented by Waite and Gallagher (2001); Lillard and Waite (1995). Unmarried or widowed elders, lacking these economies of scale, may realize smaller well-being returns. Individuals with higher social status may benefit from broader networks that facilitate access to credit, healthcare, and recreational opportunities—resources that magnify the positive effects of pension on SWB (Bourdieu, 2018;

Bowling, 2001). Those of lower status face informational and relational barriers that limit their returns. Coastal and southern provinces generally possess stronger social-security infrastructures and better access to complementary services such as mobile healthcare units, transportation networks, and leisure markets, which reinforce the effectiveness of pension income in promoting lasting well-being (Kanbur and Zhang, 2005; Salditt et al., 2007; Fan et al., 2002).

Overall, our results demonstrated pre-existing inequalities in education, marital status, social class, and regional development. More educated, married, socially connected, and regionally advantaged individuals are able to derive disproportionately larger SWB gains, while disadvantaged groups continue to experience significantly smaller improvements. These findings underscore the necessity of complementary interventions to mitigate the widening gaps in SWB among rural elderly populations.

To mitigate the unequal distribution of NRPS benefits, several targeted policy interventions are necessary. First, pension-education modules should be integrated into rural adult-education programs and community centers, offering instruction on benefit entitlements, digital financial management, and retirement planning. This would enable less-educated pensioners to better understand and utilize their rights and resources. Second, community-based co-housing models and shared-meal programs should be developed to replicate the resource-pooling advantages enjoyed by married households, thereby improving the well-being of single and widowed seniors. Third, a "senior ambassador" initiative should be launched, pairing socially connected retirees with isolated peers to promote mentorship, expand social networks, and democratize access to community resources. Finally, to address regional disparities, policymakers should introduce differentiated pension supplements targeted at inland and northern provinces, accompanied by expanded investment in infrastructure, mobile healthcare units, and affordable transportation services. Strengthening local service ecosystems is essential to ensuring that NRPS benefits generate equitable well-being improvements across all regions and populations.

8 Conclusion

This study explores the causal effects of the New Rural Pension Scheme (NRPS) on the subjective well-being (SWB) of rural elderly residents, leveraging a Regression Disconti-

nuity (RD) design based on an age-based eligibility cutoff. In line with the OECD definition, our analysis encompasses a SWB model comprising three sub-dimensions, alongside various sub-components, to thoroughly assess and quantify SWB.

Our results indicate a generally positive correlation between the NRPS pension policy and the SWB of rural elderly residents, with significant enhancements in SWB primarily observed through affective and eudaimonic improvements. Although positive, the outcomes related to the cognitive dimension are less consistent. Heterogeneity analysis reveals more pronounced effects among educated, married, higher-class, coastal and southern residents. These findings suggest that addressing educational, family, social-class, and regional inequalities can further improve the SWB of rural elderly residents, which is particularly important for countries experiencing an aging population.

Echoing Layard and Ward (2020)'s perspective, this research underscores that while economic advancement is essential, it does not encompass the entirety of societal well-being, thus positioning happiness enhancement as a critical governmental objective. Hence, our study reinforces the notion that government initiatives, particularly welfare policies, can significantly elevate citizens' subjective well-being.

Notwithstanding the contributions of this research, several limitations are acknowledged. The use of cross-sectional data restricts our analysis to a static framework, precluding the exploration of dynamic responses to the pension scheme. Additionally, the limited range of cognitive variables examined may account for the non-significant findings associated with the cognitive index.

Future research directions include applying this study's methodology to subsequent CFPS waves for additional robustness checks and to accommodate temporal variations. Incorporating panel data by amalgamating CFPS waves could facilitate a dynamic investigation into the NRPS policy's effects, employing the Dynamic Regression Discontinuity design introduced by Cellini et al. (2010). Further exploration could also benefit from an expanded selection of cognitive sub-components, enhancing the depth and breadth of our understanding of SWB determinants. Moreover, another valuable direction is to compare the well-being effects of the NRPS with those of earlier or parallel pension schemes. While our study focuses on the NRPS in isolation, understanding how its impacts differ from traditional systems would offer deeper policy insight. This comparison, though empirically challenging due to differences in eligibility and coverage, could help evaluate

the relative effectiveness of competing pension models. Lastly, the importance of pension amount—specifically, whether the mere receipt of a pension or the actual amount received drives improvements in well-being—warrants further exploration. Understanding whether the extensive margin (receiving any pension) or the intensive margin (how much is received) matters more is crucial for informing the design and targeting of pension policies.

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Appendices of Tables

Table A: Summary Statistics

	Treatment ($NRPS = 1$)			Control ($NRPS = 0$)			Difference ($T - C$)	
VARIABLES	Obs	Mean	Std.Dev.	Obs	Mean	Std.Dev.	Diff.	Std.Err.
Panel A: Assignment Variable								
X_i (Distance to the Age 60)	1885	5.786	5.018	8821	-4.996	7.483	10.782***	(0.140)
Panel B: Outcome Variables								
Panel B1: Overall Index								
SWB Index	1728	-0.156	0.810	8457	-0.152	0.831	-0.003	(0.021)
Panel B2: Sub-dimensional Index								
Cognition Index	1854	0.082	1.345	8769	-0.069	1.376	0.151***	(0.035)
Affect Index	1806	-0.131	0.905	8653	-0.144	0.914	0.013	(0.023)
Eudaimonia Index	1759	-0.184	0.526	8524	-0.121	0.551	-0.063***	(0.014)
Panel B3: Sub-Components								
- Overall: Personal life satisfaction	1856	3.409	1.062	8777	3.279	1.099	0.130***	(0.027)
- Domain: Family satisfaction	1859	3.494	1.065	8780	3.398	1.094	0.096***	(0.027)
- PA: I was happy	1870	2.693	1.03	8800	2.687	1.034	0.006	(0.026)
- PA: I enjoyed life	1870	2.827	0.999	8790	2.820	1.015	0.008	(0.026)
- NA: I was bothered by things that usually don't bother me	1871	1.639	0.825	8795	1.764	0.845	-0.125***	(0.021)
- NA: I did not feel like eating; my appetite was poor	1878	1.654	0.834	8807	1.640	0.791	0.015	(0.021)
- NA: I felt I could not shake off the blues even with help from my family and friends	1850	1.422	0.717	8762	1.483	0.748	-0.061***	(0.018)
- NA: I had trouble keeping my mind on what I was doing	1858	1.734	0.886	8763	1.717	0.858	0.016	(0.022)
- NA: I felt depressed	1857	1.679	0.842	8771	1.699	0.802	-0.020	(0.021)
- NA: I felt that everything I did was an effort	1871	1.963	0.998	8792	1.831	0.924	0.132***	(0.025)
- NA: I felt fearful	1873	1.297	0.628	8799	1.336	0.657	-0.038**	(0.016)
- NA: My sleep was restless	1877	1.840	0.968	8807	1.770	0.904	0.069***	(0.024)
- NA: I talked less than usual	1867	1.686	0.871	8790	1.675	0.867	0.011	(0.022)
- NA: I felt lonely	1863	1.493	0.809	8786	1.450	0.773	0.043**	(0.020)
- NA: I had crying spells	1874	1.313	0.642	8800	1.333	0.638	-0.019	(0.016)
- NA: I felt sad	1876	1.429	0.703	8797	1.448	0.703	-0.019	(0.018)
- NA: I could not get going	1859	1.245	0.589	8787	1.251	0.611	-0.006	(0.015)
- Optimism: Confidence in future	1820	3.345	1.174	8694	3.458	1.194	-0.113***	(0.030)
- Optimism: I felt hopeful about the future	1846	2.376	1.104	8720	2.596	1.101	-0.220***	(0.028)
- Self-esteem: I felt that I was just as good as other people	1844	1.933	1.031	8752	2.039	1.053	-0.105***	(0.027)
- Competence/Meaning: I thought my life had been a failure	1849	1.529	0.840	8751	1.549	0.818	-0.019	(0.021)
- Positive Relationships: People were unfriendly	1862	1.327	0.635	8786	1.382	0.659	-0.055***	(0.016)
- Positive Relationships: I felt that people dislike me	1862	1.303	0.580	8761	1.356	0.616	-0.052***	(0.015)
Panel C: Demographic Covariates								
Gender-Male	1885	0.491	0.500	8821	0.484	0.500	0.007	(0.013)
Ethnic-Han	1884	0.807	0.395	8804	0.805	0.396	0.001	(0.010)
Education Year	1884	2.545	3.559	8819	4.294	4.388	-1.749***	(0.094)
marital Status	1680	2.405	1.040	7763	2.175	0.719	0.230***	(0.027)
Income Level	1633	2.086	1.030	8233	2.201	1.004	-0.115***	(0.028)
Social Status	1831	2.836	1.023	8706	2.843	1.034	-0.007	(0.026)
Health Status	1885	4.676	1.359	8821	4.965	1.248	-0.289***	(0.034)
Whether have Retired	1885	0.012	0.107	8821	0.019	0.136	-0.007**	(0.003)
Whether have Religion	1885	0.140	0.347	8810	0.116	0.321	0.024***	(0.009)
Lived in Coastal Areas	1885	0.268	0.443	8821	0.318	0.466	-0.050***	(0.011)
Lived in Southern Areas	1885	0.427	0.495	8821	0.423	0.494	0.004	(0.013)
Lived in Birth Place at Age 3	1875	0.877	0.328	8806	0.866	0.341	0.011	(0.008)
Lived in Birth Place at Age 12	1885	0.864	0.343	8818	0.853	0.354	0.010	(0.009)

Notes: 1. Standard error in parentheses are clustered at cohort level: *** p<0.01, ** p<0.05, * p<0.1.

Table B: The Regression Results of SWB Sub-components

VARIABLES	Observations	Control Mean	OLS Estimate	IV Estimate
Panel A: Cognitive Components				
- Overall: Personal life satisfaction	10,633	3.248	0.045	0.180
			(0.071)	(0.247)
- Domain: Family satisfaction	10,639	3.380	0.039	0.162
			(0.054)	(0.178)
Panel B: Affective Components				
- PA: I was happy	10,670	2.703	0.064	0.255
			(0.053)	(0.206)
- PA: I enjoyed life	10,660	2.826	0.055	0.228
			(0.044)	(0.194)
- NA: I was bothered by things that usually don't bother me	10,666	1.772	0.048*	0.199*
			(0.028)	(0.119)
- NA: I did not feel like eating; my appetite was poor	10,685	1.621	-0.037	-0.150
			(0.032)	(0.167)
- NA: I felt I could not shake off the blues even with help from my family and friends	10,612	1.467	-0.054**	-0.222**
			(0.024)	(0.106)
- NA: I had trouble keeping my mind on what I was doing	10,621	1.689	0.029	0.122
			(0.028)	(0.156)
- NA: I felt depressed	10,628	1.683	-0.045	-0.187**
			(0.031)	(0.087)
- NA: I felt that everything I did was an effort	10,663	1.786	-0.046	-0.188
			(0.032)	(0.174)
- NA: I felt fearful	10,672	1.327	-0.012	-0.051
			(0.047)	(0.185)
- NA: My sleep was restless	10,684	1.741	0.017	0.072
			(0.026)	(0.109)
- NA: I talked less than usual	10,657	1.652	-0.015	-0.066
			(0.031)	(0.131)
- NA: I felt lonely	10,649	1.421	-0.064*	-0.264**
			(0.035)	(0.124)
- NA: I had crying spells	10,674	1.321	-0.030	-0.124
			(0.021)	(0.094)
- NA: I felt sad	10,673	1.425	-0.010	-0.040
			(0.026)	(0.102)
- NA: I could not get going	10,646	1.227	-0.035	-0.142**
			(0.021)	(0.066)
Panel C: Eudaimonic Components				
- Optimism: Confidence in future	10,514	3.521	0.049	0.196
			(0.093)	(0.313)
- Optimism: I felt hopeful about the future	10,566	2.670	0.038	0.157
			(0.050)	(0.208)
- Self-esteem: I felt that I was just as good as other people	10,596	2.049	0.080**	0.331**
			(0.030)	(0.163)
- Competence/Meaning: I thought my life had been a failure	10,600	1.541	-0.075**	-0.310***
			(0.028)	(0.109)
- Positive Relationships: People were unfriendly	10,648	1.366	0.005	0.020
			(0.030)	(0.123)
- Positive Relationships: I felt that people dislike me	10,623	1.339	-0.042	-0.172
			(0.035)	(0.138)

Notes: 1. Standard error in parentheses are clustered at cohort level: *** p<0.01, ** p<0.05, * p<0.1; 2. The coefficient in the second stage presents the estimated impact of NRPS pension receipt on rural elderly residents' SWB; 3. We use second-order polynomial regressions; 4. Control means are the average outcomes for the ineligible sample.

Table C: Smoothness of Predetermined Socioeconomic Characteristics

	VARIABLES						
	Gender-Male	Ethnicity-Han	Education Year	marital Status	Income Level	Social Status	Health Status
ESTIMATE	[1]	[2]	[3]	[4]	[5]	[6]	[7]
$D(I[X_i \geq X_0])$	-0.002	0.012	0.320	-0.010	-0.027	0.026	-0.247
	(0.023)	(0.017)	(0.276)	(0.022)	(0.040)	(0.039)	(0.243)
Observations	11,028	11,012	11,019	9,469	9,867	10,541	10537
Control Mean	0.485	0.791	4.958	2.109	2.230	2.838	4.965
	Whether have Retired	Whether have Religion	Lived in Coastal Areas	Lived in Southern Areas	Lived in Birth Place at Age 3	Lived in Birth Place at Age 12	
ESTIMATE	[8]	[9]	[10]	[11]	[12]	[13]	
$D(I[X_i \geq X_0])$	-0.000	-0.012	0.016	-0.009	-0.008	-0.007	
	(0.004)	(0.011)	(0.024)	(0.021)	(0.010)	(0.015)	
Observations	11,029	11,019	11,030	11,030	11,005	11,027	
Control Mean	0.007	0.150	0.312	0.413	0.853	0.842	

Notes: 1. Standard error in parentheses are clustered at cohort level: *** p<0.01, ** p<0.05, * p<0.1; 2. The coefficient in the second stage presents the estimated discontinuity in the predetermined characteristics using reduced form regressions; 3. We use second-order polynomial regressions; 4. Control means are the average outcomes for the ineligible sample.

Table D: Robustness Checks

	Parametric Approach Polynomial Order							
VARIABLES	1st Order				2nd Order			
First Stage								
NRPS	0.349***	0.356***	0.355***	0.363***	0.244**	0.253**	0.262**	0.270**
	(0.102)	(0.104)	(0.101)	(0.102)	(0.113)	(0.116)	(0.111)	(0.113)
Second Stage								
SWB Index	0.209***	0.338***	0.195***	0.294***	0.308***	0.275***	0.372***	0.380***
	(0.071)	(0.110)	(0.075)	(0.096)	(0.102)	(0.103)	(0.136)	(0.132)
Sub-dimensions:								
- Cognition Index	0.245*	0.310**	0.245*	0.338***	0.217	0.263	0.337	0.430***
	(0.141)	(0.123)	(0.132)	(0.114)	(0.287)	(0.200)	(0.225)	(0.165)
- Affect Index	0.165**	0.317***	0.157**	0.265**	0.225**	0.222*	0.297**	0.333**
	(0.077)	(0.117)	(0.079)	(0.105)	(0.108)	(0.116)	(0.146)	(0.150)
- Eudaimonia Index	0.137***	0.231***	0.133**	0.223***	0.232***	0.239***	0.273***	0.305***
	(0.044)	(0.054)	(0.052)	(0.051)	(0.069)	(0.060)	(0.085)	(0.071)
	Parametric Approach Polynomial Order							
VARIABLES	3rd Order				4th Order			
First Stage								
NRPS	0.172*	0.180*	0.179*	0.186**	0.125***	0.128***	0.117***	0.123***
	(0.090)	(0.090)	(0.088)	(0.089)	(0.045)	(0.042)	(0.042)	(0.042)
Second Stage								
SWB Index	0.313**	0.362**	0.400**	0.469**	0.551	0.548	0.653	0.614
	(0.125)	(0.143)	(0.158)	(0.182)	(0.352)	(0.383)	(0.430)	(0.449)
Sub-dimensions:								
- Cognition Index	-0.517	-0.061	-0.042	0.289	-1.353	-0.765	-0.926	-0.420
	(0.698)	(0.444)	(0.500)	(0.320)	(1.157)	(0.793)	(1.180)	(0.841)
- Affect Index	0.321**	0.448***	0.381**	0.559***	0.623	0.742*	0.619	0.779
	(0.139)	(0.163)	(0.155)	(0.216)	(0.444)	(0.429)	(0.495)	(0.482)
- Eudaimonia Index	0.065	0.146	0.196	0.242**	0.000	0.124	0.202	0.271
	(0.127)	(0.106)	(0.150)	(0.121)	(0.236)	(0.254)	(0.336)	(0.296)
	Non-parametric Approach Kernel Weight							
VARIABLES	Rectangle				Triangular			
First Stage								
NRPS	0.146	0.153*	0.145*	0.164*	0.119*	0.126*	0.117*	0.134*
	(0.076)	(0.076)	(0.073)	(0.078)	(0.052)	(0.052)	(0.053)	(0.056)
Second Stage								
SWB Index	0.254***	0.305***	0.218***	0.298***	0.254***	0.319***	0.285***	0.339***
	(0.069)	(0.110)	(0.077)	(0.104)	(0.069)	(0.100)	(0.086)	(0.109)
Sub-dimensions:								
- Cognition Index	-0.086	0.244	0.337**	0.438***	-0.086	0.134	0.239	0.370**
	(0.429)	(0.183)	(0.169)	(0.116)	(0.429)	(0.281)	(0.275)	(0.175)
- Affect Index	0.224***	0.252**	0.185**	0.293**	0.224***	0.313***	0.277***	0.361**
	(0.070)	(0.119)	(0.086)	(0.128)	(0.070)	(0.102)	(0.097)	(0.142)
- Eudaimonia Index	0.172***	0.246***	0.162***	0.248***	0.172***	0.236***	0.195***	0.260***
	(0.042)	(0.056)	(0.052)	(0.054)	(0.042)	(0.053)	(0.056)	(0.058)
Predetermined Socioeconomic Control	No	Yes	No	Yes	No	Yes	No	Yes
County-level Fixed Effect	No	No	Yes	Yes	No	No	Yes	Yes

Notes: 1. Standard error in parentheses are clustered at cohort level: *** p<0.01, ** p<0.05, * p<0.1; 2. The coefficient in the second stage presents the estimated impact of NRPS pension receipt on rural elderly residents' SWB in the IV principal equations; 3. The control variable is a matrix including all twelve predetermined characteristics; 4. The non-parametric approach uses the first-order local linear fit with the optimal bandwidth selected by the IK method (Imbens and Kalyanaraman, 2012).

Appendices of Figures

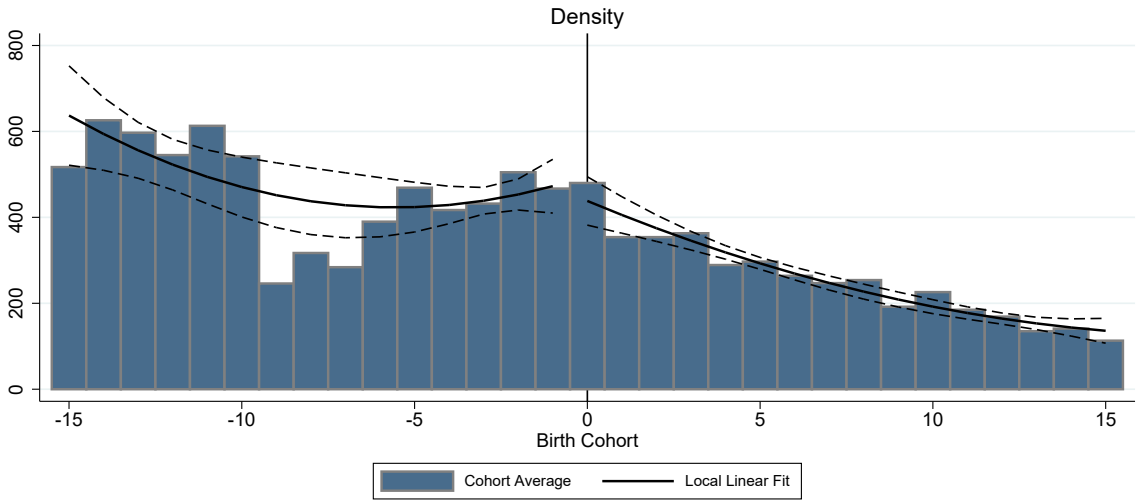

Figure A: The Histogram and Quadratic Fit for the Density Regression Test

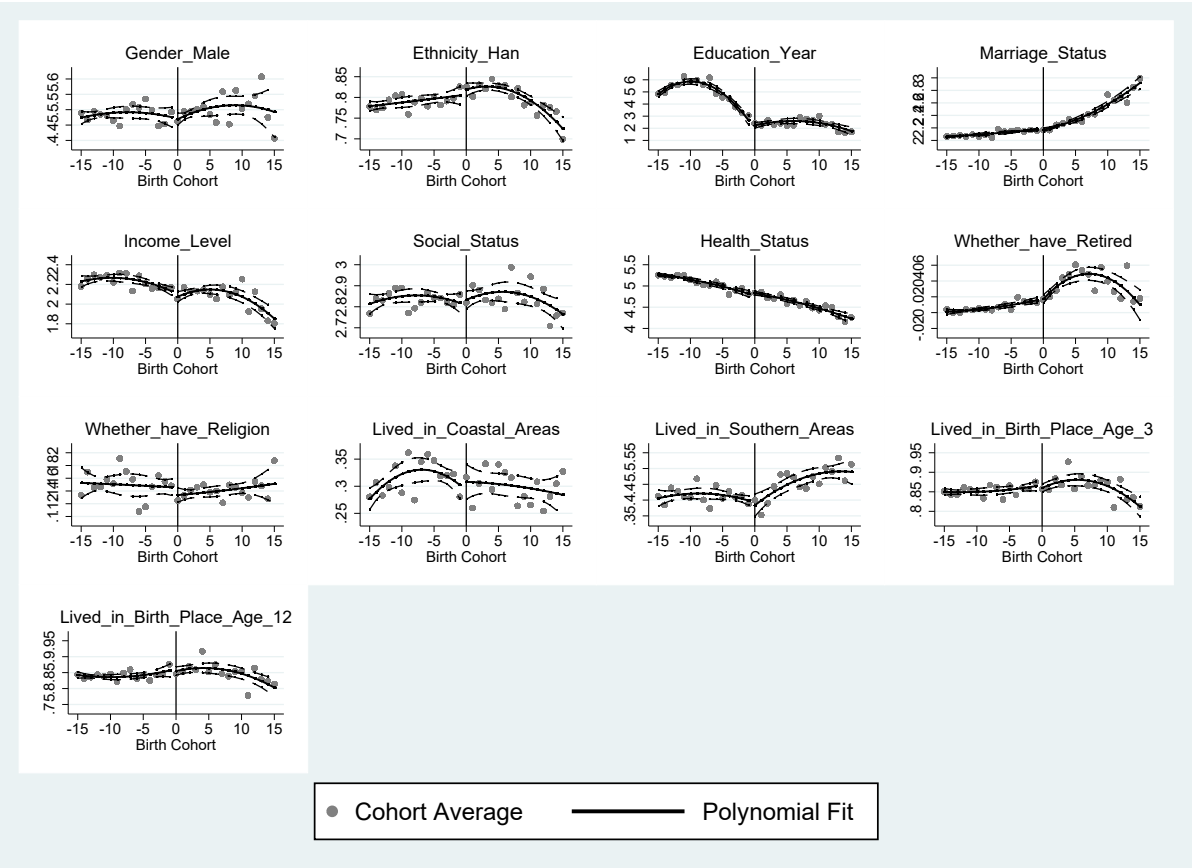

Figure B: Smoothness of Predetermined Characteristics