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ABSTRACT

China's distinctive demographic landscape, early retirement policies, and deeply ingrained gender norms provide a unique backdrop for investigating gender disparities in retirement and subjective well-being. Drawing upon data from the China Family Panel Studies and leveraging the variation around the pensionable age cutoff, we find substantial increases in retirement rates, surging by 19 percentage points for males and 13 percentage points for females in proximity to this age threshold. Notably, retirement manifests significant gender heterogeneity in its influence on life satisfaction, leading to an enhancement among males while not yielding statistically significant improvements among females. Furthermore, this study probes multiple dimensions of subjective well-being and objective health behaviors, laying bare gender disparities in health, behaviors, perceptions of income and social status, and confidence about the future. Males showcase improvements in healthy behaviors, report enhanced self-perceived health, perceive higher relative income and social status, and exude greater confidence about their future. In stark contrast, females show no statistically significant changes along these dimensions. In fact, they tend to engage in health-compromising behaviors, such as increased smoking, and exhibit higher rates of obesity. These findings underscore the imperative of recognizing gender disparities in the consequences of retirement on subjective well-being. They highlight the need for targeted policies aimed at enhancing social and economic opportunities for women, ultimately striving for greater gender equality in the post-retirement phase.

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"When a son is born, let him sleep on the bed, clothe him with fine clothes, and give him jade to play... When a daughter is born, let her sleep on the ground, wrap her in common wrappings, and give broken tiles to play."

The Book of Songs, 1000-700 BC

1. Introduction

Gender inequality has persistently permeated societies across the globe for centuries, leaving an indelible mark on various aspects of life, from education and the workforce - including compensation, roles, entrepreneurship, and career advancement – to political representation and prevailing social norms. However, the impact of gender inequality does not diminish with retirement; rather, this transition often accentuates, perpetuates, or, in some cases, ameliorates existing disparities in well-being. Surprisingly, despite extensive literature on gender inequality throughout the life course, there remains a conspicuous gap in research, particularly in the context of subjective well-being after retirement. This study endeavors to address this void by investigating gender differences in subjective well-being following retirement, focusing on the unique case of China.

Retirement, as a significant life transition, exerts a profound influence on individuals' economic well-being, social relationships, and overall quality of life (Hurd, 1990; Blau, 2008; Cornwell, Laumann, and Schumm, 2008; Love, Palumbo, and Smith, 2009; Bonsang and Klein, 2012). In a country like China, retirement can become a period marked by heightened gender-related inequalities, for several compelling reasons.

First, retirement represents a stage where individuals often aspire to reap the rewards of their labor, relax, and relish their later years. However, particularly in the case of Asian women who have traditionally shouldered caregiving responsibilities for their grandchildren or elderly parents, retirement may introduce additional roles and responsibilities. These roles may encompass an increased share of household chores and heightened expectations to manage domestic duties (Zuo and Bian, 2001; Stancanelli and Soest, 2012). These added responsibilities, along with perceptions of inequity in household work distribution, have been demonstrated to detrimentally impact marital satisfaction or quality (Dew and Wilcox, 2011; Hochschild and Machung, 2012). Consequently, these factors can potentially contribute to personal distress (Bird, 1999; Claffey and Mickelson, 2009), which, in turn, may result in diminished life satisfaction.

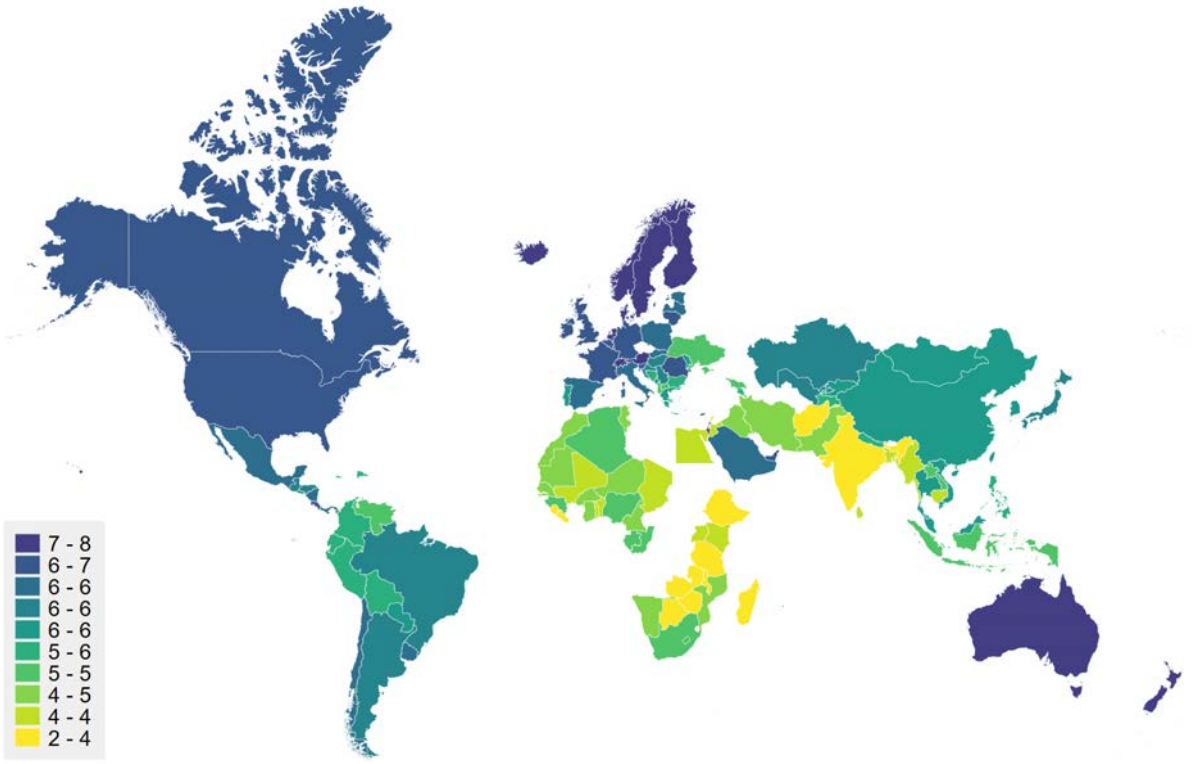
Second, retirement can lead to a loss of self-identity and self-worth, a phenomenon that might be particularly pronounced among Asian women who have long been influenced by the concept of "feminine ethics" (Gao, 2003). Gao (2003) describes the gender roles in Confucianism, highlighting three seemingly assigned roles for women in Chinese society: "the sexual object and possession of the man, the child-bearing tool to carry on her

husband's name, and the servant to the whole family." Additionally, these contrasting perceptions of gender are evident in the *Yin* and *Yang*, with the former signifying shade, associated with females and symbolizing weakness, darkness, and passivity, while the latter signifies the sun, associated with males and often symbolizing strength, brightness, and activity. Importantly, Gao (2003) notes that "one cannot expect to easily erase the Confucian concept of women and view China as a women's paradise, since the traditional ideas, which have dominated society for over two thousand years, cannot be expected to be eradicated overnight." These enduring traditional notions of gender roles may become particularly noticeable following the transition from a career-focused woman to retirement, influencing their perception of purpose and their societal value.

Third, the earlier retirement age requirement for women in China can leave them more economically vulnerable during their post-retirement years. China's retirement age regulations differ between urban and rural areas, with urban females having a lower retirement age compared to males. Specifically, men have a retirement age of 60 in urban areas, while urban women employees retire and start collecting pension benefits five to ten years earlier than their male counterparts. While the primary goal of this early retirement policy is to allow women to access public pension benefits and enjoy leisure earlier than men, recent research conducted by Lee, Zhao, and Zou (2022) has highlighted a crucial aspect of the system: public pensions in China are only partially indexed to wage growth. Consequently, this partial indexing system, as opposed to full indexation, results in reduced pension benefit increases from economic growth for those who retire early. As a result, Chinese women, who retire earlier than men, are exposed to a heightened risk of experiencing a reduced lifetime income due to decreased labor income, contributing to their economic vulnerability in retirement.

We have chosen to focus on subjective well-being as a primary outcome because it is increasingly recognized as a valuable indicator of how individuals perceive and experience their lives. Subjective well-being has garnered considerable attention in the rapidly expanding field of economics research (e.g., Blanchflower and Oswald, 2004, 2008; Oswald and Wu, 2011; Horner, 2014) and has even been endorsed by organizations such as the OECD as a national goal to improve the well-being of citizens (e.g., OECD, 2014). Subjective well-being encompasses an individual's holistic assessment of their own life, covering both their emotional responses to life events and their cognitive judgments of satisfaction and contentment. This concept spans a broad spectrum, including the experience of positive emotions, minimal negative moods, and high levels of life satisfaction (Diener, Lucas, and Oishi, 2002). In line with most studies on happiness, we measure subjective well-being based on survey responses, primarily through questions related to life satisfaction. While life satisfaction has been steadily increasing over time, China's average scores in this regard still trail those of other major economies, indicating the potential for further enhancements (refer to Figure 1 for a visual representation).

Figure 1: World Self-Reported Life Satisfaction



Notes: A higher value (darker color) refers to a higher level of self-perceived life satisfaction.
Data Source: World Happiness Report, Gallup World Poll and Our World in Data, 2021

To accomplish our research objectives, we leverage data from the China Family Panel Studies (CFPS), a valuable resource for exploring the dynamics of retirement and well-being in the context of a rapidly evolving society. Our investigation centers on the effects of reaching pensionable age on retirement patterns and overall life satisfaction within both male and female samples. We employ a rigorous regression discontinuity design (RDD) approach, capitalizing on the pronounced shifts in outcomes that occur as individuals traverse the pensionable age threshold. Through RDD, we identify causal effects and gain invaluable insights into the nexus between reaching pensionable age, retirement rates, and ensuing life satisfaction for both genders.

Our examination reveals a significant upsurge in retirement rates for both males and females upon reaching the pensionable age cutoff, albeit with a more substantial increase observed among males. Furthermore, we delve into the ramifications of reaching pensionable age on life satisfaction, parsing various levels of life satisfaction to capture nuanced effects. Our findings unveil a substantial 10% increase in life satisfaction among males following retirement. In stark contrast, we detect no statistically significant changes in life satisfaction among females. These results underscore the existence of gender disparities in life satisfaction outcomes.

Recognizing that the assessment of overall life satisfaction is a complex cognitive

process for individuals, we expand our investigation to explore gender disparities in specific dimensions of subjective well-being, including perceived health, social status, relative income, and confidence about the future. Our analysis reveals notable gender disparities across these dimensions. Specifically, males report improved self-perceived health and perceive their relative income and social status as higher compared to the local area, along with an elevated confidence in their own future. Markedly different, we observe no statistically significant effects for females. These results align with our findings regarding the presence of gender disparities in life satisfaction outcomes.

This paper makes a contribution to the broader discourse on gender equality, underscoring that the pursuit of equitable outcomes extends well beyond the confines of the workplace and into the realm of retirement. Existing studies that have examined the relationship between retirement and subjective well-being often either disregard gender disparities (e.g., Gorry, Gorry, and Slavov, 2018; Bonsang and Klein, 2012; Barrett and Kecmanovic, 2013; Heybroek, Haynes, and Baxter, 2015) or limit their focus to one gender (e.g., Zhu and He, 2015; Zhang, Zhang, and Tao, 2022).[1] In instances where gender differences are considered, these studies generally fail to identify significant disparities. One possible explanation for this could be the tendency of such studies to concentrate on higher-income countries with higher levels of self-reported life satisfaction, as seen in Australia (e.g., Atalay and Barrett, 2022) or the United Kingdom (e.g., Kesavayuth, Rosenman, and Zikos, 2016, 2020). For instance, Atalay and Barrett (2022) discovered that retirement significantly improved life satisfaction for both men and women who voluntarily retired, but not for those who were forced into retirement. Kesavayuth, Rosenman, and Zikos (2016) and (2020) found that retirement elevated leisure satisfaction but had no discernible impact on overall life satisfaction or income satisfaction for individuals of both genders. The sole gender difference detected in Kesavayuth, Rosenman, and Zikos (2016) emerges when considering the interaction with personality traits. Among female retirees, those who exhibited higher levels of openness or lower levels of conscientiousness tended to experience greater overall life satisfaction compared to their female counterparts. However, personalities did not have a similar effect on post-retirement life satisfaction for men.

The rest of the paper is organized as follows. Section 2 briefly describes the background of pensionable and retirement age in China and our data for empirical analysis. Section

[1]To our knowledge, there is only one other paper exploring the relationship between retirement and subjective well-being in China (see Zhang, Zhang, and Tao, 2022). However, this paper focuses solely on urban males, omitting useful variations in rural areas and excluding females from the analysis. Additionally, their study employs a different data set, with a much smaller sample compared to ours. Furthermore, the previous study does not provide first stage estimates and uses high order polynomial approximations to estimate the reduced form effects. Therefore, our study also differs in terms of the application of regression discontinuity analysis: (i) we provide first stage estimates using a wide range of specifications; and (ii) we avoid using high order global polynomials around the age cutoff, as such an approach may yield biased estimates (Gelman and Imbens, 2019). Consequently, our well-being estimates for urban males are significantly smaller than those reported in Zhang, Zhang, and Tao (2022).

3 discusses our empirical strategy. In Section 4, we present the empirical results. We explore other dimension of subjective well-being in Section 5 and extend our basic analysis in Section 6. Section 7 concludes.

2. Background and Data

China, as a swiftly developing nation, boasts a distinctive pension system and is home to one of the world's most substantial aging populations. Over recent decades, it has experienced profound social and economic transformations, necessitating the adaptation of retirement policies to align with these shifts. An article in The Wall Street Journal underscores China's status as having "the lowest retirement ages among major economies" and highlights the financial challenges it faces as a significant wave of retirees emerges, compelling Beijing to contemplate the prospect of raising the retirement age (Qi, 2023).

In China, the mandatory retirement ages vary for men and women. The mandatory pensionable retirement age for urban male employees is 60, while the pensionable retirement age for urban female employees is 50.[2] However, there are exceptions to these rules. For instance, qualified females and males in certain occupations, such as doctors, teachers, and engineers, have the possibility to postpone retirement until the age of 60 and 65, respectively.[3] Similarly, male and female workers in physically hazardous environments can retire up to 5 years earlier than the mandatory pensionable age cutoff. Additionally, female cadres, who are public officials holding responsible or managerial positions in the Chinese Communist Party or the government, have a pensionable retirement age of 55.[4] All urban employees, including the self-employed, are mandated to enroll in the Basic Endowment Insurance (BEI), as officially stipulated by the Chinese State Council in 2005.[5] Individuals receive monthly pension benefits after reaching the pensionable retirement age and formally retiring. As mentioned previously, these pension benefits are not fully indexed to wage growth, which results in fewer gains in pension benefits for those who retire early, such as urban females, as they cannot fully leverage economic growth in their pension benefits.

In contrast, the rural population in China has a pensionable retirement age of 60 for

[2]This policy, which established distinct retirement age criteria for males and females, was formally articulated in the "State Council Temporary Measures on Workers' Retirement and Resignation," promulgated by the Chinese State Council in 1978, and it remains unchanged to the present day.

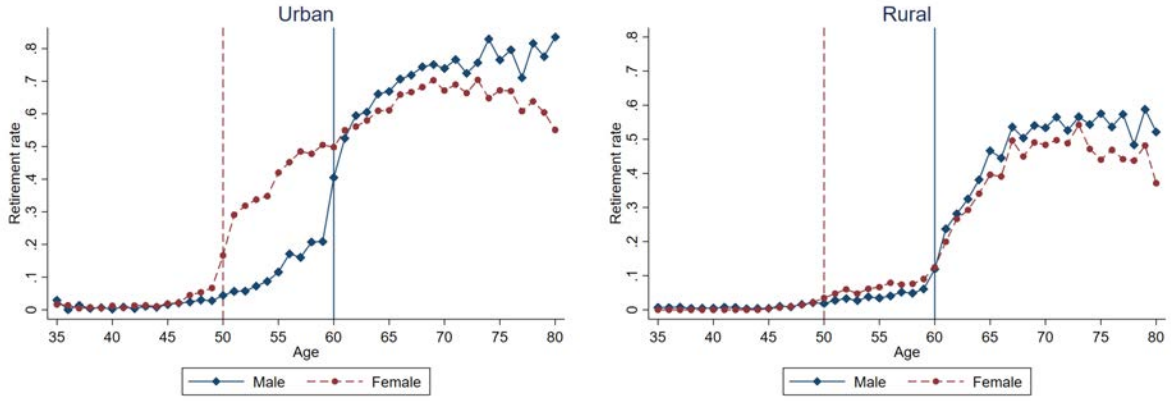
[3]While such options do exist, specific guidelines must be adhered to. As initially outlined in the 1983 "State Council Notice on Extending the Retirement Age for Certain Key Teachers, Doctors, and Technological Personnel," key personnel in these aforementioned occupations are eligible to apply for government approval to delay retirement only under the conditions of necessity, good health, and a willingness to continue working.

[4]This policy was established and articulated in the "State Council Temporary Measure on Providing for Old, Weak, Sick, and Handicapped Cadres," by the Chinese State Council in 1978.

[5]This policy was articulated in the "State Council Decision on Improving the Basic Pension Insurance System for Enterprise Employees."

both men and women. Unlike urban employees, who are required to retire at a specific age, most rural citizens, who mainly work in the agricultural sector, are not subject to formal retirement requirements. Instead, they have the option to participate in the New Rural Social Insurance (NRSI), which was introduced in 2009 to establish a revamped pension system for rural residents. Participants of the NRSI make monthly contributions to their individual pension accounts, supplemented by a fixed amount from the government. In some cases, local authorities, such as the participant's village, may also contribute to the NRSI account if feasible. Rural citizens who are not part of the BEI, which is designed for urban citizens, are encouraged and eligible to join the NRSI. Upon reaching the age of 60, rural citizens who have participated in the NRSI receive a monthly pension.

Figure 2: Retirement Rates in Urban and Rural Settlements



Notes: This figure presents the retirement rates of males and females in both urban and rural populations in China. The data used in this analysis are extracted from the China Family Panel Studies.

This paper utilizes data from the China Family Panel Studies (CFPS), a nationally representative survey conducted biennially since 2010 by the Institute of Social Science Survey (ISSS) of Peking University, China. The CFPS data provide comprehensive information on respondents' demographic characteristics, perceptions, as well as economic and non-economic well-being. We analyze all 6 waves of CFPS data from 2010 to 2020, covering 25 provinces/municipalities and both urban and rural areas in China.[6] We restrict our sample to respondents aged between 35 and 80, ensuring a relevant age range for our analysis.[7]

CFPS includes a consistent survey question that asks respondents whether they have

[6]The ISSS conducted a follow-up wave in 2011 after conducting the first main wave in 2010. However, we exclude data from the 2011 wave due to inconsistencies in available variables. Additionally, we drop observations from six provinces, including Inner Mongolia, Hainan, Tibet, Qinghai, Ningxia, and Xinjiang due to very small sample sizes. We exclude less than 0.3% of the raw sample.

[7]By applying this sample restriction, we exclude less than 3% of survey respondents who have available information on retirement in the data. Importantly, including these observations does not affect the results.

formally retired from their main job.[8] Figure 2 provides a visual representation of retirement rates based on gender and location (urban and rural). In the left sub-figure, we observe a clear and distinct increase in retirement rates for urban males at the age of 60. In contrast, urban females experience a relatively larger increase at the age of 50, with another smaller increase at 55. This difference is due to the majority of female employees retiring at age 50, while only a small proportion of female cadres are eligible to retire at 55 or later.[9] Notably, we do not observe any discontinuity at age 60 for urban females. The retirement rates shown in the figure align closely with the pensionable retirement age regulations for urban males and females. Similarly, the right sub-figure depicts retirement rates for rural males and females. This figure confirms that reaching the pensionable cutoff at age 60 has a notable impact on retirement rates among rural individuals, regardless of gender.

Table 1: Summary Statistics

	Male			Female		
	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.
Retired	0.276	0.447	11524	0.182	0.386	12397
Life satisfaction	0.597	0.491	12544	0.569	0.495	21420
Age	59.802	3.300	12544	54.237	6.791	21420
Urban	0.447	0.497	12491	0.527	0.499	21420
Minority	0.065	0.246	12544	0.063	0.243	21420
Married	0.931	0.254	12544	0.905	0.293	21420
High school diploma	0.774	0.418	12544	0.818	0.385	21420
Bachelor's degree	0.041	0.197	12544	0.045	0.208	21420
Communist party member	0.112	0.315	12544	0.026	0.159	21420
Father Bachelor's degree	0.014	0.117	12544	0.017	0.130	21420
Mother Bachelor's degree	0.002	0.047	12544	0.005	0.070	21420

Notes: The samples presented in this table correspond to those employed in our main analysis for Figures 3a and 3b. *Life satisfaction* is an indicator that takes a value of one if a survey respondent rates their life satisfaction as "satisfied" or "very satisfied".

In all 6 waves of the CFPS, the surveys include a standard question regarding life satisfaction. Life satisfaction plays a central role in shaping individuals' subjective well-being, offering valuable insights into their emotional state and cognitive assessment of their overall contentment. Survey respondents rate their level of life satisfaction using a scale that ranges from 1 ("very unsatisfied") to 5 ("very satisfied"). In our main analysis, we define the dependent variable as an indicator of life satisfaction. The indicator takes a value of one if a survey respondent answers "satisfied" or "very satisfied," and zero

[8] In our study, we define retirement status based on an individual's retirement from their previous and main job, thereby avoiding ambiguity in the definition of retirement.

[9] In our analysis, we do not differentiate between ordinary female employees and cadres due to two reasons: (i) the lack of consistent and precise information on cadre status in the available data, and (ii) the relatively small proportion of female employees who are cadres.

otherwise.[10] Following the existing literature (see, e.g., Clark et al., 2008), we further treat life satisfaction as a cardinal construct in alternative specifications. Importantly, our overall findings regarding disparities remain robust and are not qualitatively sensitive to variations in how life satisfaction is constructed.[11]

Table 1 presents the summary statistics of the key variables used in this study, disaggregated by gender.[12] The retirement rates for males and females are 27.6% and 18.2%, respectively. Additionally, the average age of male respondents in our sample is approximately 5 years higher than that of females. Among the male respondents, around 45% are urban citizens, while females in our sample consist of a relatively larger proportion of the urban population. Males and females exhibit similar demographic characteristics in terms of ethnicity, marital status, educational attainment, and parents' education level. However, there is a notable difference in the proportion of Communist party members, with males being approximately four times more likely to be members compared to females.

3. Identification

3.1. Regression Discontinuity Design

Our identification strategy is based on the quasi-random assignment of pensionable retirement near the age cutoff for males and females in China. As we discuss in Section 2, men are eligible for pensionable retirement above the age cutoff of 60 years in both urban and rural settlements, while women are eligible above the age cutoffs of 50 and 60 years, respectively, in urban and rural settlements. Using a regression discontinuity design (RDD), we estimate the effects of pensionable retirement eligibility on the likelihood of retirement, which is our first stage, as well as the reduced form effects of pensionable retirement eligibility on life satisfaction. We use the following specification to obtain the first stage estimates:

$$y_{1g} = \alpha_1 + f_l(a-c) + \mathbf{1}[a > c](f_r(a-c) + \pi_{1g}) + \mathbf{X}'\tau + \epsilon_{1g}, \tag{1}$$

[10] We also create alternative outcomes that are assigned a value of one if a survey respondent selects an answer ranging from 3 ("somewhat satisfied") to 5 ("very satisfied"), or if they choose 5 ("very satisfied") alone. The results for these alternative outcomes are presented in the Appendix and are consistent with the main findings.

[11] Existing studies also provide evidence that there is not much difference in the estimates when using a cardinal and ordinal analysis of subjective well-being (Ferrer-i Carbonell and Frijters, 2004; Riedl and Geishecker, 2014).

[12] The working samples in Table 1 correspond to those used in our main analysis in Figures 3a and 3b. The difference in the number of observations in retirement and life satisfaction outcomes for males and females is due to varying optimal bandwidths, which we discuss in Section 4. We also have some missing values in the retirement measure and urban status.

where y_{1g} is the likelihood of retirement for group $g \in \{men, women\}$, a is age, c is the pensionable age cutoff for men and women in urban and rural areas, $\mathbf{1}[a > c]$ is an indicator variable determining retirement eligibility for men and women near the age cutoff,[13] and $f_l(.)$ and $f_r(.)$ are unknown functions. Note that we have separate pensionable retirement age cutoffs based on urban status and gender. We additionally control for a vector of covariates, $\mathbf{X}$, including marital status, own educational attainment, father's educational attainment, mother's educational attainment, Communist party affiliation, as well as minority status. We estimate our parameter of interest, π_{1g}, separately for men and women to identify potential heterogeneity.[14]

In our estimation, we avoid using global polynomials, as they may be influenced by trends away from the age cutoff. In other words, global polynomial approximations, including both low and high order polynomials, may lead to biased estimates, and researchers are likely to over-reject the null hypothesis of no treatment effects (Gelman and Imbens, 2019). To alleviate concerns about the effect of outliers, we use a linear local regression to estimate π_{1g}, using bandwidths of varying sizes, including the optimal bandwidth, and triangular kernel for weighting. Specifically, we follow the data-driven mean-squared error (MSE)-optimal bandwidth selection procedure in Calonico et al. (2017).

We implement our reduced form analysis using the following specification:

$$y_{2g} = \alpha_2 + g_l(a - c) + \mathbf{1}[a > c](g_r(a - c) + \pi_{2g}) + \mathbf{X}'\tau + \epsilon_{2g}, \tag{2}$$

where y_{2g} captures the likelihood of various levels of life satisfaction (or treats life satisfaction as a cardinal construct). The remaining variables mirror those in Equation (1). Our parameter of interest is π_{2g}, which is the "intention-to-treat" (ITT) effects of pensionable retirement eligibility on life satisfaction for men and women, respectively. In both regression models, we cluster standard errors at the age level to account for the correlation in retirement and life satisfaction across individuals of the same age (Lee and Card, 2008).[15]

The advantage of reduced form analysis is its reliance on fewer identifying assumptions. By accounting for continuous changes in observable and unobservable factors and the absence of manipulation in the running variable, we can consistently estimate the effects of policy assignment on individuals near the age cutoff.

[13] Because we do not know the exact birth month of men and women, we exclude those at the cutoff ($a = c$). Note that these individuals might not necessarily be eligible for pensionable retirement, and hence may bias our estimates downward.

[14] In Section 4, we further check the robustness of our estimates by pooling the sample of men and women.

[15] Although the intervention is at the national level for men, pensionable age differs for women in urban and rural regions. Therefore, we check the sensitivity of our inference to clustering standard errors at the age × urban level.

It is possible to leverage the fuzzy RDD structure to recover the local average treatment effect (LATE) among compliers, using a Wald estimator. To obtain LATE, we can scale the ITT effects by our first-stage estimates ($\hat{\pi}_{2g}$ / $\hat{\pi}_{1g}$), but this requires additional assumptions. These additional assumptions include exclusion restriction and monotonicity under essential heterogeneity (Heckman, Urzua, and Vytlacil, 2006). The exclusion restriction asserts that pensionable age should influence life satisfaction only through its impact on retirement. For instance, other local or national policy changes around the age cutoff may violate both continuity and exclusion restriction assumptions. The monotonicity assumption further implies that there are no individuals at the pensionable age who are less likely to retire. Ex ante, it seems implausible to have defiers, as all individuals who reach the pensionable retirement age are eligible to retire independent of policymakers' discretion. Therefore, this nationwide policy is unlikely to push some eligible individuals out of pensionable retirement due to certain unobservable factors, which is often a common problem in leniency designs (Frandsen, Lefgren, and Leslie, 2023).

3.2. Threats to Identification

In this section, we focus on potential threats to the estimation of our parameter of interest in the reduced form model. To validate our RDD, we conduct two standard tests for potential manipulation and covariate smoothness, respectively, near the pensionable age cutoff (Imbens and Lemieux, 2008). We further discuss potential threats to the continuity assumption which may not be necessarily picked up by these tests.

Manipulation. – A potential concern for our identification is sorting near the pensionable age cutoff. If individuals misreport (or manipulate) their age in a systematic way to be eligible for pensionable retirement, this may confound our causal interpretation of reduced form effects. Although this type of sorting is not common in programs where treatment assignment is based on age (see, e.g., Huh and Reif, 2021; Altindag, Erten, and Keskin, 2022), we nonetheless test for it. Following McCrary (2008), we test for the null hypothesis of no discontinuity in the density of pensionable age at the policy cutoff. In Figure A.1, we find a log difference of -0.0179 in the height of the age density function, with a standard error of 1.213. Taken together, we do not find any evidence of sorting above the pensionable age cutoff.

Covariate Balance. – For our identification strategy to be credible, the pensionable age cutoff should not be endogenous to factors that may independently shift potential outcomes. Any discontinuous changes in predetermined characteristics would pose a threat to the continuity assumption. The idea is that predetermined characteristics

should be invariant to changes in pensionable age. We provide evidence for this in Table A.1, where we carefully chose predetermined covariates available in our survey that may be correlated with the likelihood of retirement and life satisfaction. For instance, parents' educational attainment may impact retirement decisions and life satisfaction through wealth transfer, such as inheritance receipt (Brown, Coile, and Weisbenner, 2010). Additionally, being a member of the Chinese Communist Party may confer a monetary or non-monetary premium, e.g., an "identity premium"(Appleton et al., 2009; McLaughlin, 2017; Lu, Bao, and Zhuang, 2022). Using these predetermined covariates and others, we show no significant discontinuous changes for the sample of males and females, respectively, around the pensionable age cutoff.

Other threats. — The two standard checks we conducted above provide compelling evidence to validate our research design. These checks, however, fall short of capturing any other local or national policy changes around the pensionable age cutoff. In the presence of such policies, the changes in potential outcomes cannot be solely attributable to retirement eligibility. Consequently, we explore the possibility of other policies in China that may have coincided with our treatment assignment. One such policy that has the potential to overlap with pensionable age is the provision of public health insurance.

In China, urban residents with formal jobs have access to public health insurance through the Urban Employee Basic Medical Insurance (UEBMI). Those who do not have access to UEBMI, such as children, students, or adults without formal jobs, obtain coverage through the Urban and Rural Residents Basic Medical Insurance. Although access to public coverage is invariant with respect to age, patients' shared costs in health insurance may differ above the pensionable age cutoff. Feng, Song, and Wang (2020) show that the reduction in cost sharing at the age cutoff of 60 years has been applied only in Shanghai. Using this variation at the age cutoff in an RD setting, they find an increase in hospital utilization among the elderly.

To ensure the validity of our identification strategy against this policy and other potential policy changes, we use a flexible and transparent empirical approach. In Section 4, we assess the robustness of our estimates by including province fixed effects, province-specific linear trends, and province-by-year fixed effects. As the cost-sharing policy has already been implemented during our sample period, province fixed effects may suffice to control for it. Nonetheless, to be more conservative, we further control for potential policy changes that may vary across provinces over time.

4. Results

In the context of RDD, it is frequent to observe a sudden shift (or lack thereof) in the expected outcomes as the running variable surpasses a certain threshold imposed by a

policy. This abrupt change is usually manifested as a discontinuity in the underlying conditional expectation function. Thus, RD plots are instrumental in conducting visual inference and facilitating the identification of estimates in a more transparent way. In this section, we employ both visual and regression-based inference to present statistical information on retirement and life satisfaction around the pensionable age threshold.

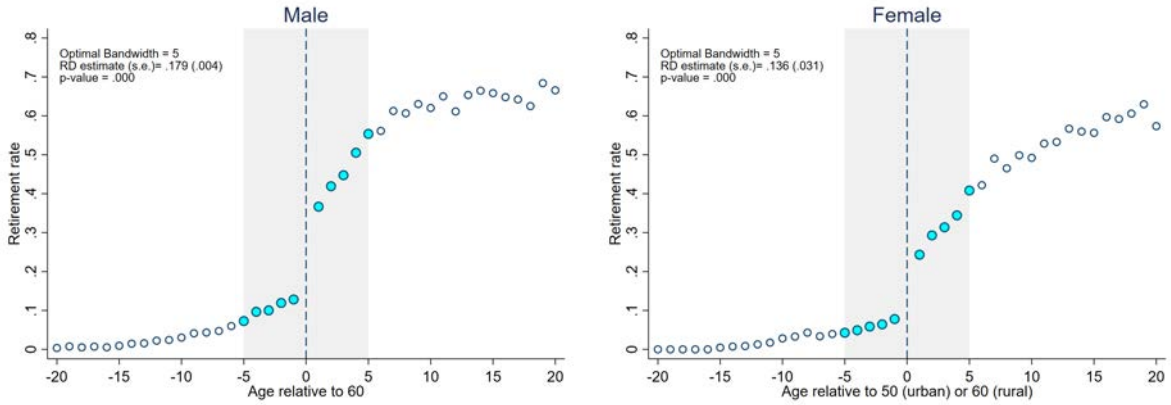
4.1. First Stage

In China, males in both urban and rural areas are eligible for pensionable retirement at the age of 60, while females in urban and rural areas are eligible at 50 and 60 years of age, respectively. Figure 3a provides graphical illustrations of the likelihood of retirement at the pensionable age threshold for both males and females. All graphs normalize the running variable to zero relative to the pensionable age threshold. The scatter plot displays the unrestricted averages of the outcome variable within each age bin, and highlights average outcomes around an optimal bandwidth, while shading the corresponding region in each graph. Note that we use the smallest bin width to calculate bin averages. Adhering to the RD graph guidelines recommended in Korting et al. (2023), we avoid imposing fit lines, as they may increase the likelihood of false positives (or Type I error rates) when visually identifying discontinuities. Our visual assessment suggests a sharp increase in the retirement rate for both males and females at the pensionable age threshold.

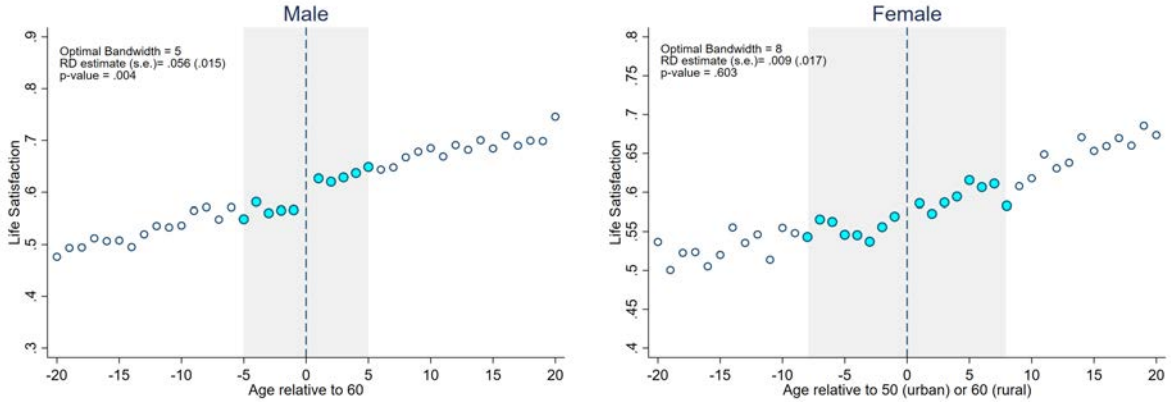
To identify the impact of reaching pensionable age on retirement rates, we shift our attention to econometric inference. Specifically, we estimate the discontinuity at the age cutoff using the regression model outlined in Equation (1). Our regression analysis employs an optimal bandwidth, as in Calonico et al. (2017), and applies a triangular kernel for weighting. We report the RD estimates and the corresponding p-values in the upper left corner of each RD graph. Our econometric analysis reveals a 1.8 percentage points increase in the retirement rate for males ($p < 0.01$) and a 1.4 percentage points increase in the retirement rate for females ($p < 0.01$), which is consistent with our visual inference.

Given our interest in exploring the gender gap in retirement and life satisfaction, we present the RD estimates separately for males and females in our benchmark analysis. As an alternative analysis, we also assess the RD treatment effects using a pooled sample of both genders. We present the retirement rate around the age cutoff for our pooled sample in Figure A.2. Consistent with our benchmark results, which estimate the RD effects separately for males and females, we find a 1.6 percentage points increase in the retirement rate (the average of the point estimates for males and females) at the age cutoff for the pooled sample ($p < 0.01$).

Figure 3: Retirement and Life Satisfaction Around the Pensionable Age Cutoff



(a) Retirement Rate by Gender



(b) Life Satisfaction (Very Satisfied or Satisfied) by Gender

Notes: Figures 3a and 3b depict the discontinuity in retirement rates and life satisfaction, respectively, for males and females. We estimate the discontinuity using MSE-optimal bandwidths and employ a triangular kernel for weighting. The upper left corner of each sub-figure reports the corresponding RD estimate, optimal bandwidth, and p-value. The shaded area represents the optimal bandwidth utilized in the estimation. The dashed vertical line indicates the pensionable age cutoff, normalized to zero. In our estimation, we control for a full set of individual covariates as described in Equations (1) and (2). Standard errors are clustered at the age level.

4.2. Life Satisfaction

We examine the impact of reaching the pensionable age on life satisfaction using a reduced-form approach. Our primary measure of life satisfaction is the indicator for individuals who report being either *very satisfied* or *satisfied* with their lives. We also perform robustness checks to address potential variations in effects across different levels of life satisfaction. This involves considering both the specific category of *very satisfied* and the broader category encompassing *very satisfied* through *somewhat satisfied* to define life satisfaction.

In Figure 3b, we observe that life satisfaction among males increases at the pensionable

age cutoff, while it trends continuously around the cutoff for females. Our econometric inference supports these findings, as males who reach the pensionable age report a 5.6 percentage points increase in life satisfaction ($p < 0.01$), equivalent to a 10% rise from the baseline mean of 0.561 below the age cutoff. Conversely, we did not find any statistically significant changes in life satisfaction among females. Based on a mean of 0.547, our analysis for females rules out an effect size smaller than -2 percentage points or larger than 4 percentage points with 95% confidence.

Next, we explore the impact of reaching the pensionable age on alternative measures of life satisfaction. In Figure A.3a, we represent life satisfaction by a binary variable, where one denotes *very satisfied* and zero denotes otherwise. Our results qualitatively align with our benchmark findings. Specifically, there is a 4.5 percentage points increase in the proportion of males reporting the highest level of life satisfaction ($p < 0.01$), which represents a 16.8% improvement in life satisfaction compared to the baseline mean. This suggests that the increase in life satisfaction for males is primarily driven by individuals who perceive themselves to be very satisfied with their lives. However, we find no significant change in the level of life satisfaction for females upon reaching the pensionable age. This is indicated by the statistically insignificant point estimate, which is very similar to the benchmark estimate.

In Figure A.3b, we broaden the category of life satisfaction to include individuals who report being very satisfied, satisfied, or somewhat satisfied, and denote them as one, while others are denoted as zero. Our findings show a 2.5 percentage points increase in life satisfaction among males ($p < 0.01$), which corresponds to a 2.8% increase relative to the baseline mean. However, the effect size is smaller for this broader category of life satisfaction. Consistent with our previous results, we find no significant changes in life satisfaction among females. In fact, we can rule out an effect size smaller than -2 percentage points or larger than 1 percentage point with 95% confidence.

Figure A.4 presents our pooled sample analysis for different levels of life satisfaction. Using the category of *very satisfied* in Figure A.4a, we find a significant increase in life satisfaction for the sample of both males and females. Specifically, reaching pensionable age increases life satisfaction by 2.8 percentage points ($p < 0.10$), corresponding to a 10.4% increase relative to the baseline mean of 0.269. This finding indicates that the effects on high levels of satisfaction for males are salient enough to emerge in the pooled sample analysis. When using the categories of very satisfied or satisfied in Figure A.4b, we find marginally insignificant increases in life satisfaction upon reaching pensionable age. We also do not find any statistically significant changes when using a wider range of satisfaction levels in Figure A.4c. However, given that females show no significant improvements in life satisfaction, particularly for broader satisfaction categories, it is not surprising that the aggregate analysis masks meaningful heterogeneity in life satisfaction between males and females. This highlights the importance of examining

gender disparities in life satisfaction.

4.3. Robustness Checks

Alternative bandwidths. – Our analysis of retirement and life satisfaction uses MSE-optimal bandwidths based on Calonico et al. (2017). In Figure A.5, we test the sensitivity of our first stage and reduced form estimates to alternative bandwidths. Using a flexible approach, we adjust the bandwidth by one year and plot the resulting patterns in point estimates, along with confidence intervals. Optimal bandwidths are indicated by hollow diamond markers in each plot.

For males, Figure A.5a shows a consistent increase in retirement as they reach pensionable age. While the effect size slightly increases with larger bandwidths, the point estimates remain statistically significant at the 0.05 level, ranging from 1.8 to 2.3 percentage points. For females, we find a similar pattern of significant retirement increase at the pensionable age cutoff, regardless of the bandwidth choice. Notably, the retirement rate for females is generally lower than for males.

We now examine life satisfaction in Figure A.5b. Our findings show that the estimates for both males and females are virtually insensitive to bandwidth choice. We consistently observe statistically significant increases in life satisfaction for males, while point estimates for females indicate no significant effects on life satisfaction. These results increase our confidence in the benchmark findings and suggest that the observed relationships are not influenced by bandwidth selection.

Alternative specifications. – As discussed in Section 3.2, province-level policy changes at the age cutoff pose a threat to our causal inference. In particular, changes in health insurance cost sharing at the age cutoff have only been implemented in Shanghai but could confound our identification. To address this potential issue, we progressively control for province fixed effects, survey wave fixed effects, province-by-wave fixed effects (or province-specific linear trends) in our analysis. These controls allow us to assess the robustness of our results by accounting for policy changes that vary across provinces and over time.

For comparison, column (1) reports our benchmark first-stage estimates for males and females in Table A.2. We find that our benchmark estimates are robust across alternative specifications. More precisely, in our most inclusive specification in column (5), we find a 17.8 percentage point increase in the likelihood of retirement ($p < 0.01$), which is consistent in magnitude and statistical significance with our benchmark estimate of a 17.9 percentage point increase in the likelihood of retirement ($p < 0.01$) for males. Similarly, we observe a 12.5 percentage point increase in the likelihood of retirement for females ($p < 0.01$) in column (5), which is only slightly smaller in magnitude than our benchmark estimate.

We examine the robustness of our results by repeating our analysis using life satisfaction as the outcome in Table A.3. In addition to checking the robustness of the effect of reaching pensionable age across alternative specifications for males and females, we replicate the analysis for different levels of life satisfaction in Panels A through C. In short, our findings demonstrate that reaching pensionable age leads to an improvement in life satisfaction for males at all levels, with a moderate decrease in effect size across specifications.[16] In contrast, we consistently find null effects for females across all specifications and levels of life satisfaction, indicating that reaching pensionable age does not have a statistically significant effect on their life satisfaction.

As a natural follow-up to the analysis above, we further treat life satisfaction as a cardinal construct and repeat our analysis using alternative specifications in Table A.4. This approach allows for a comprehensive analysis when considering life satisfaction as a cardinal measure. Our estimates reveal a similar story across the board: life satisfaction improves among males who reach the pensionable age cutoff, while we observe no improvements among females.

Alternative clustering. — Our regression model follows the clustering approach recommended by Abadie et al. (2023) to determine if and at what level standard errors should be clustered. The authors suggest that clustering should be guided by "the design component that accounts for between-cluster variation in treatment assignments." In our case, treatment assignment is based on age clusters, which motivates clustering at the age level. However, our treatment assignment is not perfectly clustered since individuals in the same age cluster may have different treatment assignments depending on whether they live in urban or rural settlements, particularly for females. Therefore, there is still variation in treatment assignment within age clusters. Even if we include urban/rural fixed effects in the regression model, conventional clustered standard errors could be overly conservative.

Abadie et al. (2023) also note that under perfect clustering, their proposed variance correction, the causal cluster variance (CCV) correction, may not necessarily improve upon conventional clustered standard errors. Therefore, we alternatively cluster standard errors at the urban-age level in Figure A.6 to achieve perfect clustering.[17] This alternative inference is particularly relevant for the analysis among females. Figure A.6 shows that the standard errors are exceptionally robust to alternative clustering for the female sample. For males, the age cutoff for pensionable retirement does not depend on the urban versus rural distinction, resulting in unnecessarily conservative standard errors.

[16] This decline after adding wave fixed effects seems natural as certain mediating factors that correlate with life satisfaction, such as economic and non-economic factors (e.g., access to higher quality care, as well as infrastructural changes such as the development of public parks for exercise), may change over time.

[17] Note that urban/rural data are missing for some individuals in the sample (0.2%), which may slightly change the point estimates.

Nonetheless, even in the most conservative case, we still observe statistically significant retirement estimates for males.

5. Additional Dimensions of Subjective Well-being

Although overall life evaluation scores, a standard metric in previous studies including ours, are the primary measure of subjective well-being, questions have emerged regarding their accuracy in genuinely capturing individuals' sentiments about life, particularly in the context of gender equality. For instance, an individual's evaluation of their own life may be influenced by momentary feelings, the extent to which their judgment is shaped by the opinions of others, their beliefs about happiness, and the weight they assign to the average level of satisfaction across different moments and various aspects of life. Men and women may differ in how they seek and weigh information at the moment when forming their life satisfaction judgments.

To validate gender differences in our assessment of overall life evaluation, we explore alternative cognitive measures: perceptions of income and social status relative to the local area and perceived health. These measures manifest thought processes related to holistic self-perceptions and provide additional insights into gender-related variations in how individuals perceive and evaluate their lives.

5.1. Perceived Health

Perceived health is an individual's subjective evaluation of their current physical, mental, and emotional well-being, representing a more straightforward assessment compared to overall life satisfaction. Those who perceive themselves as being in good health tend to report higher life satisfaction. Moreover, an enhanced sense of happiness and contentment can motivate individuals to invest more in their health, contributing to a more positive evaluation of their well-being. In essence, perceived health involves a less complex cognitive process yet maintains a strong correlation with subjective well-being. Therefore, if we observe similar gender differences in perceived health after retirement, it provides validation for the gender disparity in how individuals feel, not just in the intricate cognitive processes they employ to evaluate their lives.

Previous research provides support for the relationships between perceived health and life satisfaction. A seminal study by Palmore and Luikart (1972) highlights that perceived health accounts for two-thirds of the variation in life satisfaction, corroborating Edwards and Klemmack (1973)'s identification of perceived health as a potent predictor of life satisfaction. Additionally, Gorry, Gorry, and Slavov (2018), utilizing data from the Health and Retirement Study, reveal that retirement enhances life satisfaction and immediately improves perceived health, with continued health enhancements over time.

These findings suggest that alterations in subjective health measures may explain shifts in life satisfaction following retirement, while improvements in life satisfaction may also influence changes in overall health status.

Table 2 reveals notable distinctions in perceived health measures between genders as they approach the pensionable retirement age. For males, there is an improvement in self-reported health (column 1) after retirement, and they also express a sense of improved health compared to the previous year (column 3). In contrast, there are no significant changes observed for females in these measures. These findings align with our earlier results, indicating that men tend to report higher life satisfaction after retirement compared to women.

Table 2: Objective and Subjective Health Around the Pensionable Age Cutoff

	Self-reported health (Good, quite good, very good) (1)	Felt sick in the past two weeks (2)	Have better health compared with last year (3)
		Male	
Above Pensionable Age	0.018*	0.003	0.022**
	(0.008)	(0.007)	(0.009)
Baseline mean of DV	0.558	0.285	0.099
Percentage change	3.2%	1.1%	22.2%
Bandwidth	5	5	5
Observations	12570	12502	12504
		Female	
Above Pensionable Age	-0.035	0.037	-0.014
	(0.033)	(0.038)	(0.009)
Baseline mean of DV	0.510	0.389	0.106
Percentage change	-6.9%	9.5%	-13.2%
Bandwidth	8	8	8
Observations	21526	21441	21444

Notes: This table presents the changes in objective and subjective health measures, respectively, as males and females reach the pensionable age. Each regression includes a full set of individual controls as described in Equations (1) and (2). In all regressions, standard errors are clustered at the age level and reported in parentheses.

5.2. Perceptions of Relative Income, Social Status and Confidence in the Future

Financial and social well-being have consistently held a central role in various disciplines when examining the determinants of subjective well-being. Employing specific interview questions, such as those probing relative income within local communities, assessing social standing in the local community, and gauging confidence in the future, is likely to elicit responses tied to clear components that are closely related to life satisfaction, as opposed to a weighted average of evaluations across different life aspects at various

stages. Therefore, if we observe similar gender disparities in these aspects, it will bolster our confidence in our previous findings regarding overall life satisfaction.

Previous studies have consistently shown that higher relative income, whether objectively measured or subjectively perceived, is linked to greater happiness and satisfaction (e.g., Card et al., 2012; Clark, Frijters, and Shields, 2008; Clark and Oswald, 1996; Ferrer-i Carbonell, 2005; McBride, 2001; Yu, 2019). Notably, Yu (2020) finds a strong positive correlation between self-perceived income and both happiness and life satisfaction in China. A meta-analysis by Tan et al. (2020), which synthesized estimates across 357 studies, shows that subjective measures of social status have a stronger association with subjective well-being than objective measures of social status. By combining a literature overview and empirical study, Pleeging, Burger, and van Exel (2021) conclude that greater hopes go hand-in-hand with higher levels of subjective well-being.

Table 3 reveals noteworthy gender disparities in the impact of reaching the pensionable age cutoff on perceived social status, confidence about the future, and perceived relative income. Among males above the cutoff, there is a significant increase in the likelihood of having above-average perceived social status relative to the local area (13.7%, $p < 0.01$), high or very high confidence about their own future (4.9%, $p < 0.01$), and perceived relative income at average or above (5.3%, $p < 0.01$ in column (1)). However, no significant improvements are found in higher levels of perceived relative income among males in columns (2) and (3). In contrast, females show no improvements in perceived relative income or social status, with only a marginally significant increase in the likelihood of having very high confidence.

These findings highlight the gender disparities in the relationship between retirement and individual perceptions. They suggest that retirement has a more pronounced positive impact on perceived social status, confidence about the future, and perceived relative income among males compared to females. Importantly, our findings are not necessarily at odds with the a priori plausible theory that income may decrease at retirement. It is worth noting that retirement can alter individuals' reference groups, resulting in improvements in perceived relative income despite an actual decline in income. Conversely, in the context of China, reearch by Zhang, Salm, and van Soest (2018), for instance, does not find a significant income decline at retirement for individuals with varying levels of educational attainment, including those with low education. These results strongly align with our earlier findings that men, but not women, reported higher life satisfaction after retirement.

Table 3: Perceptions and Confidence Around the Pensionable Age Cutoff

	Compared within local area, self-perceived relative income is...			Compared within local area, self-perceived relative social status is...			Level of confidence about one's own future is...		
	at average, high, very high	high, very high	very high	at average, high, very high	high, very high	very high	at average, high, very high	high, very high	very high
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Male									
Above Pensionable Age	0.030***	-0.006	0.000	0.039**	0.023**	0.013***	0.018*	0.030***	0.018
	(0.008)	(0.011)	(0.006)	(0.013)	(0.010)	(0.004)	(0.009)	(0.005)	(0.013)
Baseline mean of DV	0.566	0.153	0.071	0.726	0.259	0.095	0.879	0.615	0.336
Percentage change	5.3%	-3.9%	0%	5.4%	8.9%	13.7%	2.0%	4.9%	5.4%
Bandwidth	5	5	5	5	5	5	5	5	5
Observations	12570	12570	12570	12570	12570	12570	12570	12570	12570
Female									
Above Pensionable Age	-0.007	-0.008	-0.003	0.015	0.018	0.012	0.001	0.022	0.022*
	(0.025)	(0.027)	(0.019)	(0.027)	(0.033)	(0.025)	(0.022)	(0.022)	(0.013)
Baseline mean of DV	0.538	0.165	0.099	0.706	0.242	0.097	0.888	0.628	0.348
Percentage change	-1.3%	-4.8%	-3.0%	2.1%	7.4%	12.4%	0.1%	3.5%	6.3%
Bandwidth	8	8	8	8	8	8	8	8	8
Observations	21526	21526	21526	21526	21526	21526	21526	21526	21526

Notes: This table presents the changes in perceptions of income and social standing, as well as confidence, respectively, as males and females reach the pensionable age. Each regression includes a full set of individual controls as described in Equations (1) and (2). In all regressions, standard errors are clustered at the age level and reported in parentheses.

6. Extension

Our current findings indicate that men experience a significant increase in life satisfaction after retirement, whereas women's life satisfaction appears to remain unchanged. Despite the complexity of evaluating overall life satisfaction, our results from simpler subjective measures in Section 5 consistently support this conclusion, indicating a significant gender disparity in subjective well-being following retirement. In this section, we expand our analysis in two key ways. First, to account for the possibility that our results may be influenced by different gender-based reference groups affecting men and women in distinct ways, we examine the influence of retirement on objective health behaviors. Second, we delve into the impact of retirement on life satisfaction in urban and rural areas, considering both men and women, to evaluate how varying retirement age requirements may affect our overall conclusions.

6.1. Objective Health Behaviors

Subjective evaluations face a challenge in that they depend on the reference groups individuals choose. Research, such as that conducted by Fumagalli and Fumagalli (2022) and Stevenson and Wolfers (2009), has indicated that in the past, women primarily compared themselves to other women. However, in contemporary times, women have expanded their comparisons to include men, while men have generally maintained their reference groups. Given that men often enjoy advantages across various aspects of life, this shift means that when women perceive a higher level of outcomes within their reference group, it can lead to lower self-evaluations among women. To ensure that our previous findings regarding subjective outcomes are not solely attributed to a mechanical change resulting from the shift in reference groups, we examine objective health behaviors that are connected to subjective well-being but do not depend on self-evaluation.

We examine various outcomes, including obesity (defined as BMI$\geq$30), daily noon naps, frequency of physical exercise in the last week, recent smoking habits, and consumption of three or more alcoholic drinks per week in the past month. Retirement may lead to increased investments in health due to a reduced marginal value of time and an increased marginal utility of leisure. This, in turn, may result in the adoption of healthier behaviors and improved health outcomes (see, e.g., Eibich, 2015).

Engaging in regular physical activity, making mindful choices about alcohol consumption, maintaining a balanced diet, refraining from smoking, and establishing a routine for regular naps can all contribute positively to an individual's overall sense of happiness and life satisfaction following retirement. For instance, an insightful study by Müller and Shaikh (2018) examined data from 19 European countries and revealed that retirement had a positive impact on engaging in moderate and vigorous physical

activities. Engaging in physical activities can lead to the release of endorphins, which lift mood naturally, and alleviate symptoms of depression and anxiety, boost self-esteem, and enhance overall life satisfaction. The study also found an increase in the frequency of alcohol intake among retirees. Moderate alcohol consumption may lead to relaxation and increased social interaction, potentially enhancing life satisfaction. A review article by Milner and Cote (2009) highlights that current research consistently shows improvements in cognitive performance and overall well-being in older adults as a result of napping. Furthermore, there is compelling evidence to suggest that when napping is combined with moderate physical activity, it can improve sleep quality. Enhanced sleep quality has been established as a significant predictor of life satisfaction (Shin and Kim, 2018).

Conversely, unhealthy behaviors in these areas can lead to physical health issues and negatively affect mental well-being. It is important to recognize that subjective well-being can also influence the adoption of healthy or unhealthy behaviors. Our objective is not to establish a causal relationship between these health domains. Instead, if retirement leads to the adoption of healthier behaviors among men but results in less healthy behaviors among women, these findings would support our earlier finding that retirement positively impacts the subjective well-being of men but not women.

Table 4: Objective Health Behaviors Around the Pensionable Age Cutoff

	Obesity (BMI≥30) (1)	Take noon naps everyday (2)	Number of physical exercise last week (3)	Ever smoked last month (4)	Had three drinks per week last month (5)
			Male		
Above Pensionable Age	-0.003	0.029	0.344***	-0.008	0.001
	(0.003)	(0.032)	(0.063)	(0.005)	(0.010)
Baseline mean of DV	0.028	0.564	3.10	0.622	0.346
Percentage change	-10.7%	5.1%	11.1%	-1.3%	-0.3%
Bandwidth	5	5	5	5	5
Observations	10324	12494	9965	12495	12495
			Female		
Above Pensionable Age	0.011**	0.013	-0.310	0.013*	-0.006
	(0.005)	(0.010)	(0.364)	(0.007)	(0.005)
Baseline mean of DV	0.032	0.528	2.605	0.032	0.032
Percentage change	34.2%	2.5%	-11.9%	40.6%	-18.8%
Bandwidth	8	8	8	8	8
Observations	16905	21429	17373	21434	21433

Notes: This table presents the changes in risky and healthy behaviors, respectively, as males and females reach the pensionable age. Each regression includes a full set of individual controls as described in Equations (1) and (2). In all regressions, standard errors are clustered at the age level and reported in parentheses.

In Table 4, we observe distinct behavioral patterns between males and females after retirement. Notably, women exhibit a higher likelihood of obesity (significant at the 5% level) and are more prone to smoking (significant at the 10% level) beyond the pensionable age cutoff. However, they do not significantly engage in any health-promoting behaviors, such as increased physical exercise. Conversely, men beyond the pensionable age cutoff

notably increase their level of physical exercise by approximately 11% ($p<0.01$), but they do not engage in any health-compromising behaviors, such as obesity or smoking, in a statistically significant manner.

These outcomes, derived from objective health behaviors, are consistent with our primary findings that retirement enhances life satisfaction among men but not among women. The life satisfaction responses, even if influenced by gender-based reference groups, effectively capture subjective well-being.

6.2. Impacts of Retirement Age Requirements: A Comparison of Urban and Rural Areas

Another factor that could influence our gender disparity estimates is the variation in retirement age requirements. As detailed in Section 2, women in urban areas are mandated to retire approximately ten years earlier than men, whereas both men and women share the same retirement age in rural settings. To assess the influence of retirement age on our estimations, we conduct a comparative analysis between urban and rural areas. In rural areas, where both men and women share identical retirement age requirements, any gender disparity that emerges, if present, may more accurately capture the "pure" effect of retirement on life satisfaction.

Studies that examine variations in retirement age due to policy changes, such as making early retirement more attractive or increasing the pensionable age, yield mixed findings regarding their impact. Some studies indicate that retiring at an earlier age is associated with certain positive outcomes, including a lower mortality rate (Hallberg, Johansson, and Josephson, 2015; Bloemen, Hochguertel, and Zweerink, 2017), reduced inpatient care (Hallberg, Johansson, and Josephson, 2015), improved mental health (Carrino, Glaser, and Avendano, 2020; Grip, Lindeboom, and Montizaan, 2012), enhanced physical health (Shai, 2018), or increased job satisfaction (Montizaan and Vendrik, 2014). However, other studies find that retirement age has no significant impact on mortality or healthcare utilization (Hernaes et al., 2013; Hagen, 2018). Conversely, there are studies suggesting potential negative effects of early retirement. For instance, Bertoni, Brunello, and Mazzarella (2018) discovered that when workers had an extended residual working horizon, men responded by increasing their regular exercise, resulting in positive outcomes for obesity and self-reported satisfaction with health. Angelini, Brugiavini, and Weber (2009) found that early retirement could lead to long-term financial hardship, especially in countries with imperfect financial and insurance markets. These studies raise the possibility that our earlier findings may be influenced by the disparities in retirement age requirements between men and women.

Table 5 presents the first-stage and reduced-form estimates for males and females residing in both urban and rural areas. In both urban and rural settings, retirement

rates at pensionable age exhibit a positive and statistically significant association at the 1% level for both males and females, indicating robust first-stage results.

We observe a notable disparity in life satisfaction between males and females after reaching the pensionable retirement age in both urban and rural areas. Specifically, males in urban areas experience a substantial increase in life satisfaction of approximately 14% ($p < 0.01$), while their counterparts in rural areas also report a significant increase of approximately 10% ($p < 0.01$).[18] In contrast, our analysis reveals statistically insignificant estimates for life satisfaction among females in both urban and rural areas. These findings suggest that gender disparity in life satisfaction persists, even when retirement age requirements are the same, as is the case in rural areas.

Table 5: Heterogeneous Effects by Urban and Rural Settlements

	Male		Female	
	Retirement	Life Satisfaction	Retirement	Life Satisfaction
	(1)	(2)	(3)	(4)
Urban				
Above Pensionable Age	0.260***	0.079***	0.187***	0.013
	(0.021)	(0.022)	(0.011)	(0.011)
Baseline mean of DV	-	0.568	-	0.536
Percentage change	-	13.9%	-	2.4%
Bandwidth	5	5	5	8
Observations	5030	5030	6614	9727
Rural				
Above Pensionable Age	0.113***	0.055***	0.080***	0.008
	(0.017)	(0.016)	(0.014)	(0.011)
Baseline mean of DV	-	0.569	-	0.580
Percentage change	-	9.7%	-	1.4%
Bandwidth	5	5	5	8
Observations	6363	6363	5726	9154

Notes: This table presents the changes in retirement rates and life satisfaction as males and females reach the pensionable age, respectively, in urban and rural settlements. Columns (1) and (3) report the RD estimates from our first stage. Columns (2) and (4) present the reduced form effects of reaching pensionable age on life satisfaction ("satisfied" or "very satisfied"). Each regression includes a full set of individual controls as described in Equations (1) and (2). In all regressions, standard errors are clustered at the age level and reported in parentheses.

Crucially, gender disparities in life satisfaction remain consistent across alternative classifications of life satisfaction, albeit with slightly weaker effects, as illustrated in Table A.5. These findings suggest that gender disparities are more pronounced among

[18]Please note that it is not appropriate to directly compare gender differences across urban and rural areas to approximate the effects of retirement age differences. This is because social and economic conditions vary significantly between urban and rural areas in China (Sicular et al., 2007; Molero-Simarro, 2017), introducing confounding factors that can influence the observed disparities.

individuals who report higher levels of life satisfaction (i.e., those who are very satisfied or satisfied with their life).

7. Conclusion

The influence of retirement on gender disparities in subjective well-being is a complex and multifaceted phenomenon. By analyzing data from the China Family Panel Studies, our analysis has shed light on several key aspects of this relationship.

First and foremost, retirement can elicit diverse effects on the well-being of men and women. Our findings indicate that retirement increases life satisfaction for males, whereas it does not yield significant improvements for females. This disparity may be attributed to various factors, including shifts in gender roles, caregiving responsibilities, and societal expectations. Additionally, our results offer insights into the "paradox of declining female happiness" (Stevenson and Wolfers, 2009; Blanchflower and Oswald, 2004). Despite considerable advancements in social and economic opportunities for women, there may be a lack of sustained support for women during and after retirement, which constitutes a significant life transition.

Furthermore, retirement exerts an influence on specific dimensions of subjective well-being, encompassing perceived health, social status, relative income, and confidence about the future. Our findings indicate that gender disparities emerge in these dimensions, with men more prone to report improvements in these areas, while women may not experience the same enhancements. These results also underscore the effectiveness of the overall life satisfaction score in encapsulating a comprehensive cognitive evaluation of sentiments across various life aspects.

Moreover, the selection of reference groups assumes a pivotal role in molding subjective evaluations. In contemporary society, women's growing inclination to compare themselves to men can result in diminished self-evaluations, especially when men typically enjoy advantages across diverse life domains. To further investigate this phenomenon, we examine objective health behaviors. Our findings reveal pronounced gender disparities that align with our observations regarding subjective well-being. Specifically, males exhibit enhancements in healthy behaviors, including increased physical activity, whereas females are more likely to grapple with obesity and engage in health-compromising practices, such as smoking.

Our findings underscore the importance of considering gender disparities in the development of retirement policies and the structuring of social support systems. It is imperative to address the unique challenges and expectations that women encounter during their retirement years to promote greater gender equality in subjective well-being as individuals navigate this significant life transition.

Finally, it is worth noting that the impact of retirement on subjective well-being,

particularly for both men and women, may significantly vary from one country to another. This variation stems from differences in retirement and social policies, socioeconomic conditions, cultural contexts, prevailing norms, gender roles, and existing disparities across countries (Cuberes and Teignier, 2014; Jayachandran, 2015). These variations can potentially lead to gender disparities in subjective well-being after retirement in specific countries. Consequently, our findings may not necessarily generalize to other nations.

However, it is important to acknowledge that the interplay between retirement, subjective well-being, and all other influencing factors is multi-dimensional and intricate. Much of the existing knowledge on the relationship between retirement and subjective well-being is derived from developed countries, such as the United States (Gorry, Gorry, and Slavov, 2018), Germany (Bonsang and Klein, 2012), Australia (Barrett and Kecmanovic, 2013; Heybroek, Haynes, and Baxter, 2015; Atalay and Barrett, 2022), and the United Kingdom (Kesavayuth, Rosenman, and Zikos, 2016, 2020), among others. Additionally, Kim and Moen (2001) emphasize that existing scholarship provides mixed findings on how retirement is related to subjective well-being. To gain a deeper understanding of gender disparities in the intersection of retirement and subjective well-being and to establish more robust empirical patterns, further research encompassing data from various countries would be invaluable.

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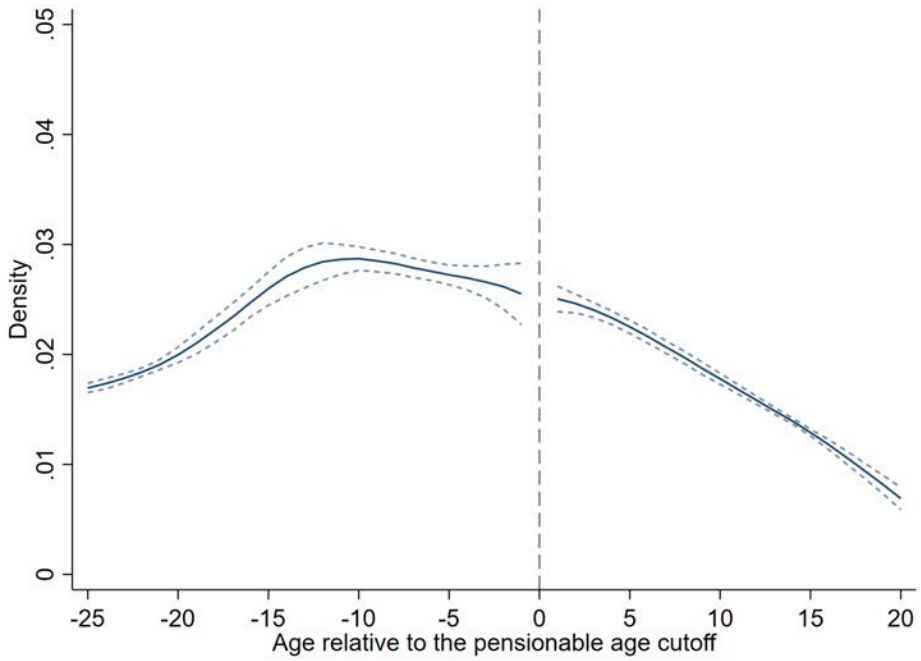
Appendix: For Online Publication

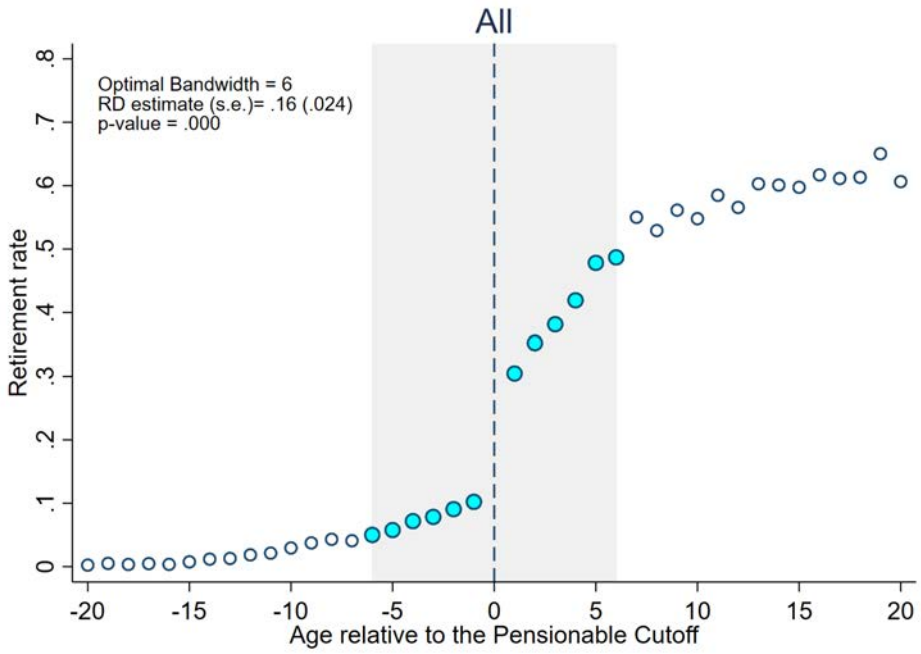
A. Additional Figures and Tables

Figure A.1: Testing for Manipulation in Pensionable Age



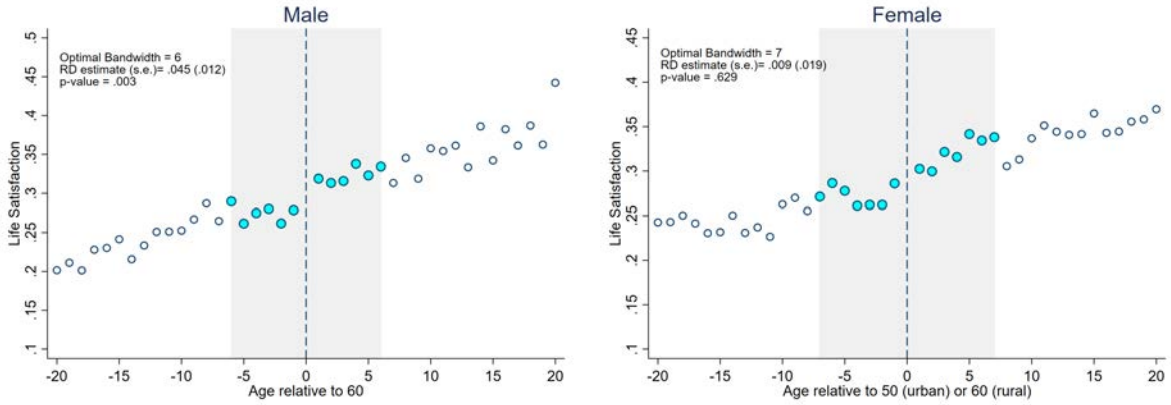
Notes: This figure depicts the results of a manipulation test on the running variable at the cutoff of pensionable age (denoted by the dashed line). The test is conducted using the full sample, including both genders. Following the approach of McCrary (2008), we examine the discontinuity at the age cutoff by measuring the log difference in the intercepts obtained from separate linear regressions on both sides of the age cutoff. Our findings do not provide evidence to reject the null hypothesis of no manipulation, with the log difference calculated at -0.0179 and a standard error of 1.213.

Figure A.2: Retirement Rate, Pooled Sample (Males and Females)

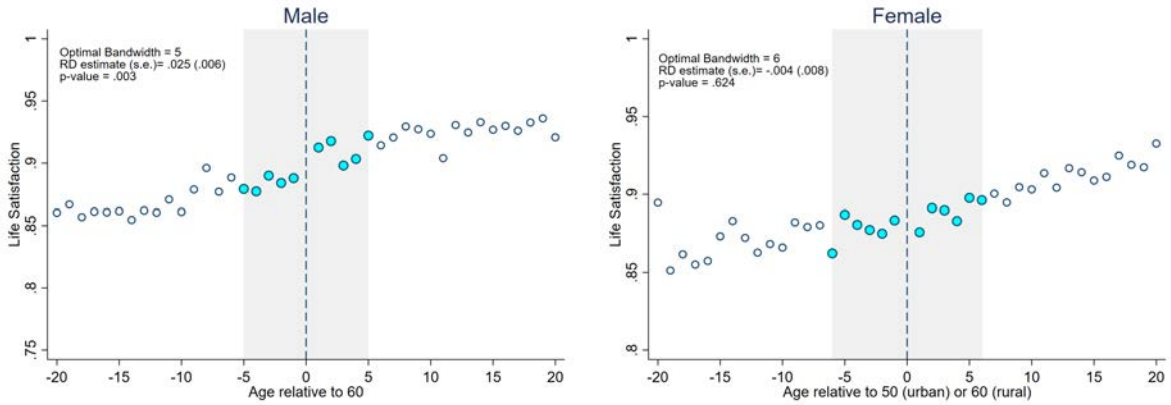


Notes: This figure depicts the discontinuity in retirement rate using a pooled sample of males and females. We estimate the discontinuity using MSE-optimal bandwidths and employ a triangular kernel for weighting. The upper left corner reports the corresponding RD estimate, optimal bandwidth, and p-value. The shaded area represents the optimal bandwidth utilized in the estimation. The dashed vertical line indicates the pensionable age cutoff, normalized to zero. In our estimation, we control for a full set of individual covariates as described in Equations (1) and (2). Standard errors are clustered at the age level.

Figure A.3: Alternative Classifications of Life Satisfaction



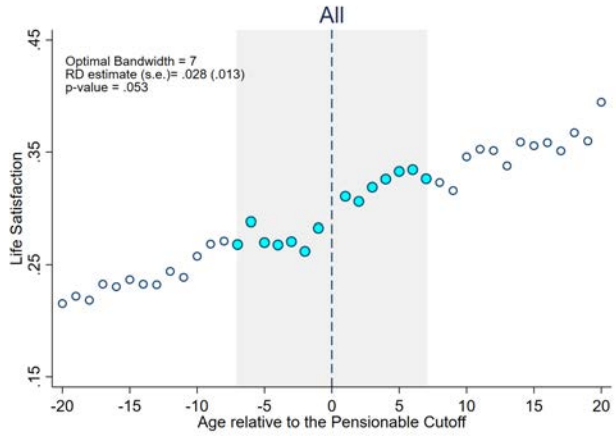
(a) Life Satisfaction (Very Satisfied) by Gender



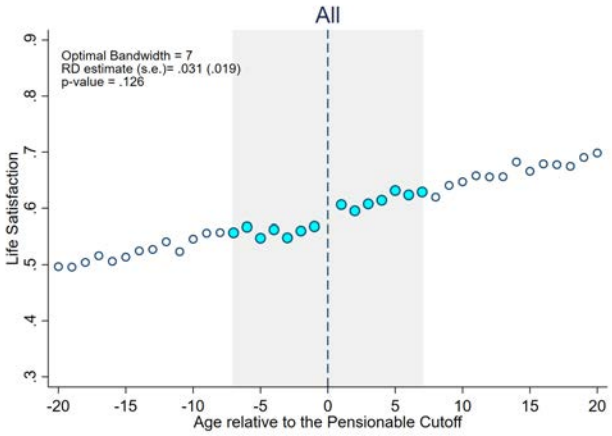
(b) Life Satisfaction (Very Satisfied, Satisfied, or Somewhat Satisfied) by Gender

Notes: This figure depicts the discontinuity in life satisfaction using alternative classifications of the outcome. In sub-figure A.3a, the outcome is an indicator of life satisfaction that takes a value of one if an individual reports being "very satisfied" with their life and zero otherwise. In sub-figure A.3b, the outcome is an indicator of life satisfaction that takes a value of one if an individual reports being "somewhat satisfied", "satisfied", or "very satisfied" with their life and zero otherwise. We estimate the discontinuity using MSE-optimal bandwidths and employ a triangular kernel for weighting. The upper left corner of each sub-figure reports the corresponding RD estimate, optimal bandwidth, and p-value. The shaded area represents the optimal bandwidth utilized in the estimation. The dashed vertical line indicates the pensionable age cutoff, normalized to zero. In our estimation, we control for a full set of individual covariates as described in Equations (1) and (2). Standard errors are clustered at the age level.

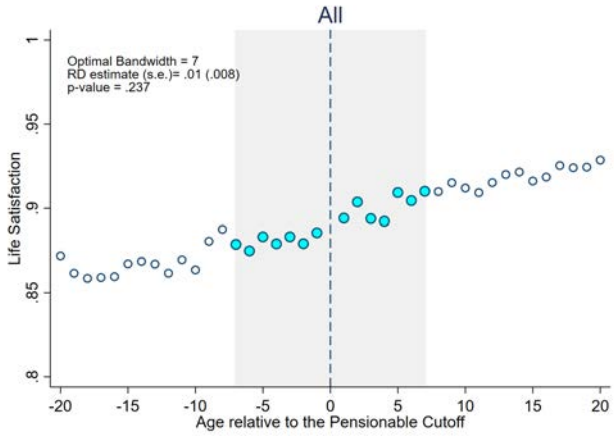
Figure A.4: Life Satisfaction, Pooled Sample (Males and Females)



(a) Very Satisfied



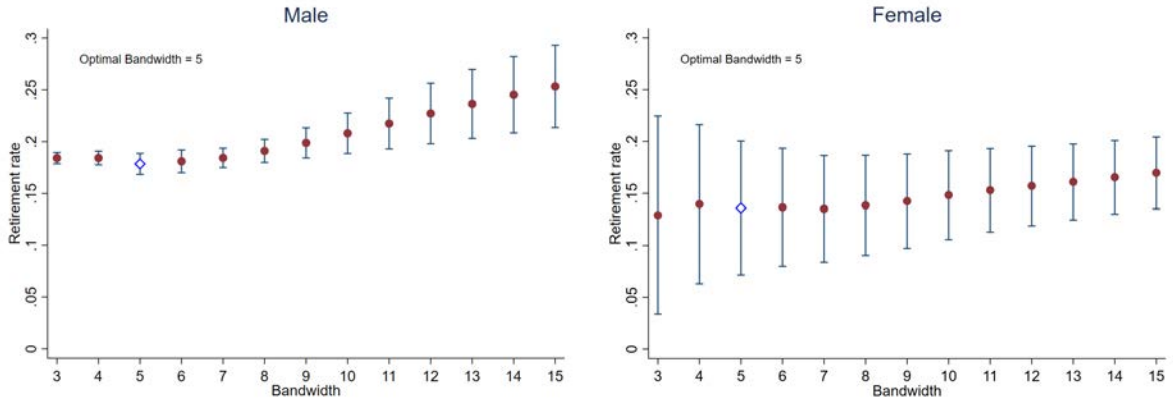
(b) Very Satisfied or Satisfied



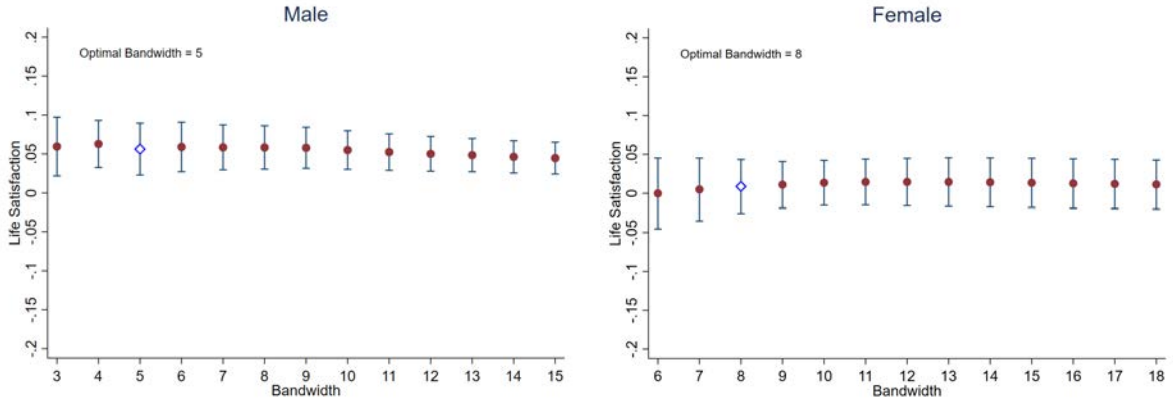
(c) Very Satisfied, Satisfied, or Somewhat Satisfied

Notes: This figure depicts the discontinuity in life satisfaction using alternative classifications of the outcome for a pooled sample of males and females. These classifications mirror those in Figures 3b and A.3. We estimate the discontinuity using MSE-optimal bandwidths and employ a triangular kernel for weighting. The upper left corner of each sub-figure reports the corresponding RD estimate, optimal bandwidth, and p-value. The shaded area represents the optimal bandwidth utilized in the estimation. The dashed vertical line indicates the pensionable age cutoff, normalized to zero. In our estimation, we control for a full set of individual covariates as described in Equations (1) and (2). Standard errors are clustered at the age level.

Figure A.5: Alternative Bandwidths



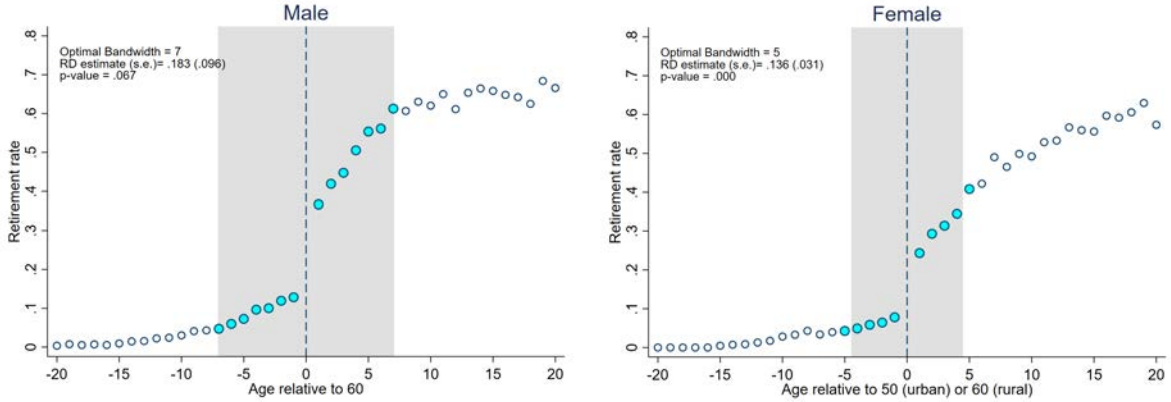
(a) Retirement Rate by Gender



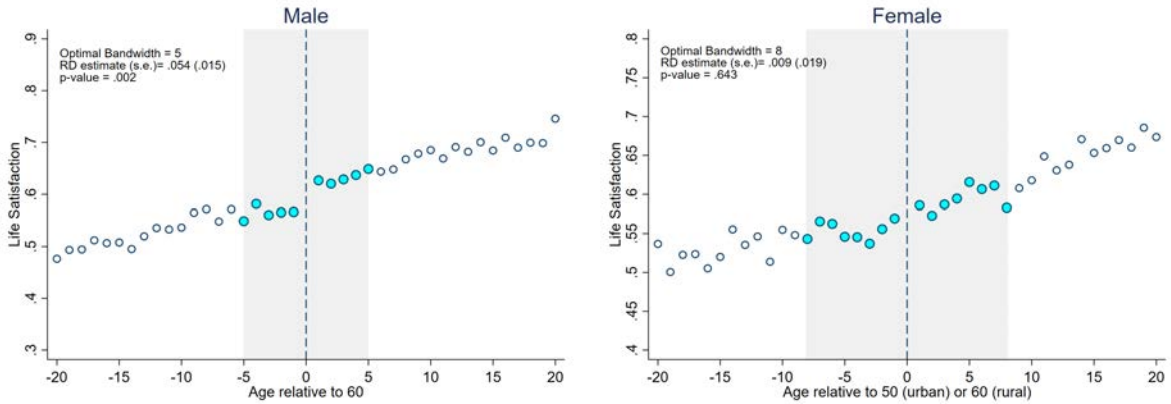
(b) Life Satisfaction (Very Satisfied or Satisfied) by Gender

Notes: This figure depicts the RD estimates using alternative bandwidths. The top panel reports the first stage estimates for males and females, respectively. The bottom panel reports the reduced form estimates for males and females, respectively. In each sub-figure, the diamond-shaped coefficient represents our benchmark RD estimate obtained using the MSE-optimal bandwidth. In our estimation, we control for a full set of individual covariates as described in Equations (1) and (2), and employ a triangular kernel for weighting. Standard errors are clustered at the age level.

Figure A.6: Alternative Inference



(a) Retirement Rate by Gender



(b) Life Satisfaction (Very Satisfied or Satisfied) by Gender

Notes: This figure depicts the RD estimates using an alternative inference. Specifically, we cluster standard errors at the age-by-urban level in all regressions. We estimate the discontinuity using MSE-optimal bandwidths and employ a triangular kernel for weighting. The upper left corner of each sub-figure reports the corresponding RD estimate, optimal bandwidth, and p-value (obtained from alternative inference). The shaded area represents the optimal bandwidth utilized in the estimation. The dashed vertical line indicates the pensionable age cutoff, normalized to zero. In our estimation, we control for a full set of individual covariates as described in Equations (1) and (2).

Table A.1: Covariate Balance Around the Pensionable Age Cutoff

Male							
	Minority	Married	Communist Party Member	< High School School Diploma	Bachelor's Degree or Higher	Father Bachelor's Degree Degree or Higher	Mother Bachelor's Degree or Higher
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Retirement	0.003	0.003	0.001	0.020	-0.002	0.001	0.000
	(0.002)	(0.004)	(0.016)	(0.021)	(0.009)	(0.001)	(0.001)
Observations	12544	12544	12544	12544	12544	12544	12544
Female							
	Minority	Married	Communist Party Member	< High School School Diploma	Bachelor's Degree or Higher	Father Bachelor's Degree Degree or Higher	Mother Bachelor's Degree or Higher
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Retirement	-0.005	-0.004	-0.003	0.016	-0.011	-0.005	-0.002
	(0.016)	(0.009)	(0.011)	(0.096)	(0.031)	(0.008)	(0.004)
Observations	21420	21420	21420	21420	21420	21420	21420

Notes: This table reports the changes in predetermined characteristics around the pensionable age cutoff for males and females, respectively. We obtain each coefficient from a separate regression. In all regressions, standard errors are clustered at the age level and reported in parentheses.

Table A.2: Alternative Specifications - Retirement

	Retirement (1)	Retirement (2)	Retirement (3)	Retirement (4)	Retirement (5)
			Male		
Above Pensionable Age	0.179***	0.181***	0.177***	0.178***	0.178***
	(0.004)	(0.007)	(0.006)	(0.006)	(0.006)
Optimal Bandwidth	5	5	5	5	5
Observations	11524	11524	11524	11524	11524
			Female		
Above Pensionable Age	0.136***	0.139***	0.126***	0.126***	0.125***
	(0.031)	(0.033)	(0.032)	(0.031)	(0.030)
Optimal Bandwidth	5	5	5	5	5
Observations	12397	12397	12397	12397	12397
Province FE	✗	✓	✓	✓	✓
Wave FE	✗	✗	✓	✓	✓
Province-specific wave trends	✗	✗	✗	✓	✗
Province by wave FE	✗	✗	✗	✗	✓

Notes: This table presents the first stage estimates using alternative specifications for a sample of males and females, respectively. Each regression includes a full set of individual controls as described in Equation (1). In all regressions, standard errors are clustered at the age level and reported in parentheses.

Table A.3: Alternative Specifications - Life Satisfaction

	Life Satisfaction (1)	Life Satisfaction (2)	Life Satisfaction (3)	Life Satisfaction (4)	Life Satisfaction (5)
			Male		
Panel A: Life Satisfaction (Very Satisfied)					
Above Pensionable Age	0.045***	0.044***	0.022*	0.021*	0.021**
	(0.012)	(0.012)	(0.011)	(0.010)	(0.009)
Baseline mean of DV	0.268	0.268	0.268	0.268	0.268
Percentage change	16.8%	16.4%	8.2%	7.8%	7.8%
Optimal bandwidth	6	6	6	6	6
Observations	15006	15006	15006	15006	15006
Panel B: Life Satisfaction (Very Satisfied or Satisfied)					
Above Pensionable Age	0.056***	0.056***	0.027*	0.026*	0.028*
	(0.015)	(0.016)	(0.014)	(0.014)	(0.014)
Baseline mean of DV	0.561	0.561	0.561	0.561	0.561
Percentage change	10.0%	10.0%	4.8%	4.6%	5.0%
Optimal bandwidth	5	5	5	5	5
Observations	12544	12544	12544	12544	12544
Panel C: Life Satisfaction (Very Satisfied, Satisfied, Somewhat Satisfied)					
Above Pensionable Age	0.025***	0.025***	0.013*	0.014*	0.013**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Baseline mean of DV	0.887	0.887	0.887	0.887	0.887
Percentage change	2.8%	2.8%	1.5%	1.6%	1.5%
Optimal bandwidth	5	5	5	5	5
Observations	12544	12544	12544	12544	12544
			Female		
Panel A: Life Satisfaction (Very Satisfied)					
Above Pensionable Age	0.009	0.007	-0.007	-0.008	-0.008
	(0.019)	(0.014)	(0.020)	(0.020)	(0.020)
Baseline mean of DV	0.270	0.270	0.270	0.270	0.270
Percentage change	3.3%	2.6%	-2.6%	-3.0%	-3.0%
Optimal bandwidth	7	7	7	7	7
Observations	18998	18998	18998	18998	18998
Panel B: Life Satisfaction (Very Satisfied or Satisfied)					
Above Pensionable Age	0.009	0.008	-0.005	-0.006	-0.005
	(0.017)	(0.014)	(0.022)	(0.022)	(0.022)
Baseline mean of DV	0.547	0.547	0.547	0.547	0.547
Percentage change	1.6%	1.5%	-0.9%	-1.1%	-0.9%
Optimal bandwidth	8	8	8	8	8
Observations	21420	21420	21420	21420	21420
Panel C: Life Satisfaction (Very Satisfied, Satisfied, Somewhat Satisfied)					
Above Pensionable Age	-0.004	-0.004	-0.009	-0.009	-0.008
	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)
Baseline mean of DV	0.877	0.877	0.877	0.877	0.877
Percentage change	-0.5%	-0.5%	-1.0%	-1.0%	-0.9%
Optimal bandwidth	6	6	6	6	6
Observations	16469	16469	16469	16469	16469
Province FE	✗	✓	✓	✓	✓
Wave FE	✗	✗	✓	✓	✓
Province-specific wave trends	✗	✗	✗	✓	✗
Province by wave FE	✗	✗	✗	✗	✓

Notes: This table presents the reduced form estimates using alternative specifications and classifications of the outcome for a sample of males and females, respectively. Each regression includes a full set of individual controls as described in Equation (2). In all regressions, standard errors are clustered at the age level and reported in parentheses.

Table A.4: Alternative Specifications - Life Satisfaction as a Cardinal Construct

	Life Satisfaction (1)	Life Satisfaction (2)	Life Satisfaction (3)	Life Satisfaction (4)	Life Satisfaction (5)
			Male		
Above Pensionable Age	0.131***	0.129***	0.061**	0.059**	0.063***
	(0.023)	(0.024)	(0.020)	(0.019)	(0.015)
Optimal Bandwidth	5	5	5	5	5
Observations	12544	12544	12544	12544	12544
			Female		
Above Pensionable Age	0.009	0.006	-0.027	-0.030	-0.028
	(0.038)	(0.031)	(0.048)	(0.047)	(0.048)
Optimal Bandwidth	8	8	8	8	8
Observations	21420	21420	21420	21420	21420
Province FE	✗	✓	✓	✓	✓
Wave FE	✗	✗	✓	✓	✓
Province-specific wave trends	✗	✗	✗	✓	✗
Province by wave FE	✗	✗	✗	✗	✓

Notes: This table presents the reduced form estimates using alternative specifications and cardinal life satisfaction (on a 5-point scale) for samples of males and females, respectively. Each regression includes a full set of individual controls as described in Equation (2). In all regressions, standard errors are clustered at the age level and reported in parentheses.

Table A.5: Alternative Classifications of Life Satisfaction by Urban and Rural Settlements

	Male		Female	
	Very Satisfied	Very Satisfied, Satisfied, Somewhat Satisfied	Very Satisfied	Very Satisfied, Satisfied, Somewhat Satisfied
	(1)	(2)	(3)	(4)
			Urban	
Above Pensionable Age	0.065***	0.045***	0.011	-0.010
	(0.017)	(0.011)	(0.014)	(0.009)
Baseline mean of DV	0.278	0.895	0.238	0.882
Percentage change	23.4%	5.0%	4.6%	-1.1%
Bandwidth	6	5	7	6
Observations	6031	5030	8749	7732
			Rural	
Above Pensionable Age	0.041**	0.017*	-0.010	0.006
	(0.013)	(0.008)	(0.015)	(0.009)
Baseline mean of DV	0.276	0.888	0.327	0.884
Percentage change	14.9%	1.9%	-3.1%	0.7%
Bandwidth	6	5	7	6
Observations	7630	6363	7996	6949

Notes: This table presents the reduced form estimates using alternative classifications of the outcome for a sample of urban males and females, as well as rural males and females. Each regression includes a full set of individual controls as described in Equation (2). In all regressions, standard errors are clustered at the age level and reported in parentheses.