

The Retirement Consumption Puzzle in China[†]

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This paper examines whether Chinese households smooth consumption at retirement, as predicted by the theory of Modigliani and Brumberg (1954). Mixed evidence has been documented in developed countries (Banks, Blundell, and Tanner 1998; Hurst 2008; Battistin et al. 2009; Luengo-Prado and Sevilla 2013); however, the hypothesis has hardly been tested using data from developing countries and none from China, where smoothing could be more difficult with liquidity constraints and insufficient pensions.

Empirically, China provides a natural experiment for the test. In sectors such as governments, public sectors, state-owned enterprises (SOE), and collectively owned enterprises (COE), the mandatory retirement at age 60 for men and 55 for women allows us to employ the regression discontinuity (RD) method to identify the causal effect of retirement on consumption. Moreover, the unique dataset we employ, the Urban Household Survey (UHS) in China, includes detailed information on each item of household consumption, which allows us to separate work-related expenditures, expenditures on food consumed at home, and entertainment expenditures from other expenditures. This task has proved to be difficult for most previous studies because of the lack of good data. We also

exploit the data from the time use survey conducted in 2008 to investigate the change of time allocation to home production activities around the retirement.

We find that retirement reduces total nondurable expenditures by 20 percent. The reduction is accounted for by the reduction of work-related expenditures and expenditures on food at home. Moreover, after retirement, husbands increase the time spent on shopping and food preparation. Our findings can be explained by the life-cycle model with home production, suggesting that Chinese retirees smooth consumption well.

I. Sample and Specification

The major analysis relies on data from the UHS. The UHS was conducted by the National Bureau of Statistics (NBS) in China. The UHS covers all of the provinces in China and uses a probabilistic sampling and stratified multistage method to select households. It is a rotating panel in which one-third of the sample is replaced each year, and the full sample is changed every three years. We have access to the data gathered in the nine Chinese provinces of Beijing, Liaoning, Zhejiang, Anhui, Hubei, Guangdong, Sichuan, Shaanxi, and Gansu, which represent different regions and economic conditions. Our paper focuses on the data gathered from 2002 to 2009.

Considering that the mandatory retirement policy is only applied to those who work in governments, public sectors, SOEs, and COEs, we only use entries from retirees and individuals working in these four types of institutions. In our paper, the retirement status of households is determined by the retirement status of the husband. The RD approach is applied to estimate the effect of retirement; we therefore keep households with husbands aged around 60 years (the retirement age for men), that is, from 50 years to 70 years. We exclude households with husbands aged 60 years to avoid the mixture of pre-retirement and

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TABLE 1—EFFECTS OF BEING OLDER THAN 60 ON RETIREMENT

	(1) ^a	(2) ^b	(3) ^a	(4) ^c	(5) ^d
Dependent variable: Husband retired = 1					
Older than 60 = 1	0.318 (0.019)***	0.209 (0.033)***	0.316 (0.015)***	0.277 (0.018)***	0.216 (0.018)***
Province dummies	No	No	Yes	Yes	Yes
Year dummies	No	No	Yes	Yes	Yes
Constant	0.546 (0.015)***	0.614 (0.026)***	0.534 (0.015)***	0.533 (0.015)***	0.557 (0.014)***
Observations	36,974	36,974	36,974	36,974	36,974
R^2	0.49	0.49	0.49	0.49	0.50
F -value of H_0 that the coefficients on the variable (older than 60 = 1) and its interactions with polynomial terms are equal to 0	315.72	169.23	440.26	423.61	401.07

Notes: Polynomial function of age relative to 60 not shown. Robust standard errors clustered over province-age in parenthesis.

^aPolynomial function of age relative to 60 controlled has the first order on either side of 60.

^bPolynomial function of age relative to 60 controlled has the second order on either side of 60.

^cPolynomial function of age relative to 60 controlled has the first order on the left of 60 and the second order on the right.

^dPolynomial function of age relative to 60 controlled has the third order on the left of 60 and the second order on the right.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

post-retirement consumption. Eventually, 36,974 households from the UHS are left.

We focus on household nondurable expenditures, which include work-related expenditures, expenditures on food consumed at home, expenditures on entertainment, and the remaining expenditures on nondurable goods. Following the literature, we exclude expenditures on education and medical care in nondurable expenditures (Aguiar and Hurst 2007).¹

In our sample, the average age of husbands is 58 years, and their average duration of schooling is 11 years. Approximately 3 percent of the husbands are minorities. A total of 48 percent of the husbands and 58 percent of their wives retired at the time of the survey. The average family size is 2.8, and the housing area is approximately 79 square meters.

¹Work-related expenditures include expenditures on eating out, transportation, wearables (i.e., clothes, clothes processing service, shoes, and others), and communication (i.e., phone service, postal service, and others). Expenditures on food consumed at home are the total expenditures on 24 types of foods consumed at home, such as rice, pork, beef, egg, fish, and vegetables. Expenditures on entertainment include expenditures on tour, physical fitness activities, and other entertainment activities. The remaining nondurable expenditures include expenditures on property management, rent, utilities, personal care, and other services.

In addition to the UHS, a time use survey in 2008 also conducted by the NBS, was used as a source of data. The survey covered ten provinces in China.² We use the same method described in the aforementioned text to select the sample from this survey. Finally, we obtain 2,321 households from the time use survey. Only the sample of husbands is used in this paper.

We estimate the following equation:

$$(1) \quad Y_{hpt} = \alpha_0 + \alpha_1 R_{hpt} + k(s) + \omega_{hpt}.$$

Y_{hpt} is the outcome variable for household h in province p and year t . We investigate expenditures (in log form) and time use. R_{hpt} is an indicator for whether the husband retired. $k(s)$ is approximated by the polynomial function of husband's age s (relative to 60). The specification of $k(s)$ is chosen using Akaike information criterion (AIC).

In reality, the mandatory retirement policy might not be strictly implemented. To address this issue, we introduce a second treatment variable E_{hpt} , which is equal to 1 if the age of the husband

²Beijing, Hebei, Heilongjiang, Zhejiang, Anhui, Henan, Guangdong, Sichuan, Yunnan, and Gansu.

TABLE 2—EFFECTS OF RETIREMENT ON PREDETERMINED VARIABLES

	Schooling years (1) ^a	Minority (2) ^a	Family size (3) ^b	Housing area (4) ^a	Wife was retired = 1 (5) ^b
Retired (older than 60 as an IV)	−0.748 (0.463)	0.003 (0.022)	−0.007 (0.177)	−4.525 (8.734)	−0.037 (0.075)
Constant	11.053 (0.324)***	0.022 (0.015)	2.942 (0.123)***	69.680 (5.936)***	0.582 (0.052)***
Observations	36,974	36,974	36,974	36,974	36,974
R ²	0.05	0.02	0.03	0.10	0.15

Notes: Province and year dummies not shown. Polynomial function of age relative to 60 not shown. Robust standard errors clustered over province-age in parenthesis.

^aPolynomial function of age relative to 60 controlled has the second order on either side of 60.

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TABLE 3—EFFECTS OF RETIREMENT ON CATEGORIES OF NONDURABLE EXPENDITURES

	ln(total) ^a (1)	ln(work related) ^b (2)	ln(food at home) ^a (3)	ln(entertainment) ^c (4)	ln(remaining) ^a (5)
Mean of expenditures (Yuan)	18,632.400	6,356.659	8,546.267	949.127	2,780.352
Retired (older than 60 as IV)	−0.195 (0.060)***	−0.331 (0.064)***	−0.116 (0.059)*	−0.223 (0.249)	−0.168 (0.111)
Constant	9.773 (0.041)***	8.598 (0.046)***	8.981 (0.040)***	5.850 (0.162)***	7.768 (0.072)***
Observations	36,974	36,964	36,972	30,715	36,966
R ²	0.26	0.22	0.23	0.11	0.12

Notes: Province and year dummies not shown. Polynomial function of age relative to 60 not shown. Robust standard errors clustered over province-age in parenthesis.

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is above 60 years, and it is equal to 0 if the age is below 60 years. To obtain an unbiased estimate of this effect, we use E_{hpt} as an instrument for R_{hpt} .

II. Results

First, we find that being over the age of 60 years can strongly predict the probability of retirement. The results are shown in Table 1.

We then test the validity of the RD design by checking whether other variables (including

husband’s years of schooling, minority status, family size, housing areas, and the wife’s retirement status) are correlated with the jump in the probability of retirement at age 60. These tests support our use of the RD approach. The results are shown in Table 2.

Table 3 reports the effects of retirement on nondurable expenditures. The total nondurable expenditures decrease by 20 percent at retirement (column 1). Table 1 also indicates that retirement reduces work-related expenditures by 33 percent

TABLE 4—EFFECTS OF RETIREMENT ON THE TIME SPENT ON SHOPPING AND FOOD PREPARATION

	Weekday		Weekend	
	Shopping ^a (1)	Food preparation ^b (2)	Shopping ^c (3)	Food preparation ^b (4)
Mean of time spent (minutes)	20.233	53.490	34.696	60.259
Retired (older than 60 as IV)	26.807 (18.395)	29.297 (16.864)*	−3.885 (10.560)	2.678 (17.890)
Constant	5.486 (13.373)	50.461 (13.055)***	46.713 (8.918)***	74.726 (12.824)***
Observations	2,284	2,284	2,284	2,284
R ²	0.06	0.10	0.01	0.03

Notes: Province and year dummies not shown. Polynomial function of age relative to 60 not shown. Robust standard errors clustered over province-age in parenthesis.

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(column 2), reduces household expenditures on food consumed at home by 12 percent (column 3), and has a negative but insignificant effect on the entertainment expenditures (column 4).

The decrease in time cost after retirement induces households to spend more time in searching for and preparing food, which decreases the expenditures on food consumed at home. This outcome is confirmed by the results shown in Table 4. On weekdays, retirement increases the time spent on shopping and food preparation. Interestingly, on weekends, when the time cost is low for both retirees and non-retirees, retirement does not have a significant effect on the time spent on shopping or food preparation.

To test the existence of the retirement consumption puzzle, we need to remove these expenditures from the nondurable expenditures and investigate the effect of retirement on the remaining expenditures (Hurst 2008). Column 5 in Table 3 shows that retirement does not have a significant effect on the remaining nondurable expenditures. The results suggest that the retirement consumption puzzle is no longer a puzzle in our context.

III. Conclusion

We find that retirement reduces the total nondurable expenditures by 20 percent. Moreover, retirement reduces work-related expenditures

and expenditures on food consumed at home, but it does not have a significant effect on the expenditures on entertainment. After we exclude these expenditures from the total nondurable expenditures, retirement does not have a significant effect on the remaining nondurable expenditures. These results indicate that if the extended life-cycle model with home production is considered, the retirement consumption puzzle is actually not a puzzle. The results have implications for the debate about whether governments need to do something to increase the welfare of old people, whose ratio in the Chinese population has increased rapidly in the last decade.

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