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The Impact of Bequest Motives on the Saving Rate of Elderly Households : A Comparative Study Between China and Japan

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ABSTRACT

This study analyses the phenomenon of the high saving rate of Chinese elderly households from the perspective of bequest motives based on the data of China Household Finance Survey (CHFS). The result shows that, like Japan, the bequest motives of Chinese elderly households have a significant positive effect on the family saving rate, especially on rural household savings, middle-wealth and low-wealth elderly households, those whose children work outside of the government system and those whose children with low education levels, indicating that the bequest motives of Chinese elderly households are more altruistic. This provides a new understanding of the high savings of Chinese elderly households and can provide a reference for future policy making.

Keywords: Household saving, bequest motives; elderly households

JEL classification codes: D14, E21, D91

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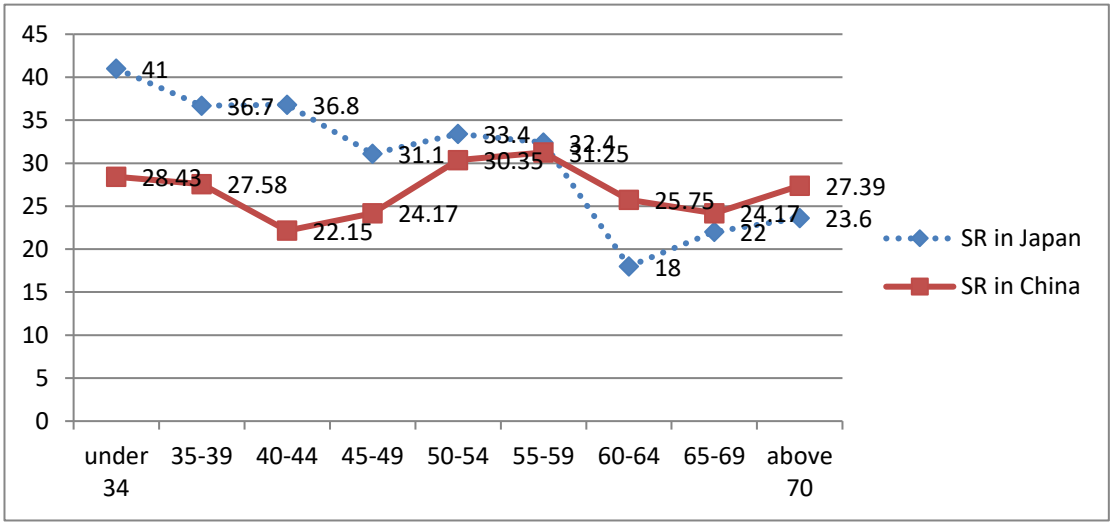
1. Introduction

Since China entered an aging society at the end of the twentieth century, the number and proportion of elderly people have continued to grow, affecting China's economic development. According to the World Population Prospects Report (2019)[1], China's aging rate — the proportion of the population aged over 65 —continues to increase and it will even exceed that of Japan (highest aging rate in the world) in the future. Based on the Fund Flow Table of the National Bureau of Statistics[2], as China's aging degree has intensified, the household saving rate has slowly fallen from 42.1% in 2010 to 36.2% in 2017. Even so, the household saving rate in China is still at a relatively high level (Ma and Yi, 2010), and this trend seems to be in line with the life cycle theory: family members save assets during work, while retirement reduces assets for consumption, so the saving rate has an inverted U-shaped relationship with age (Modigliani and Brumberg, 1954). However, some studies argue that in China the household saving rate is high both when householders are relative young and when they are old after retirement, whereas it is low in the middle-aged period. The relationship between age and the saving rate is roughly a U-shape (Chamon and Prasad, 2010; Rosenzweig, Mark and Zhang, 2014). This phenomenon contradicts the life cycle theory. So why does the saving rate of Chinese elderly households remain high? How does aging affect China's household saving rate? Existing studies provided explanations such as life expectancy extension (Zhang and Ma, 2019), population aging (Chen, Guo, and Yao, 2014), and population structure (Ni, Li, and He, 2014). However, few literature have analysed the saving behaviour of elderly households based on micro data from the perspective of bequest motives.

Japan has many similarities with China in terms of economic growth, demographic changes, and traditional cultural foundations, and it also has one of the highest household

saving rates in the world. According to the micro-survey data of China and Japan (Figure 1), the household saving rate in China exceeds that of Japan from age 55 and they both show an upward trend after age 65. By comparison, the saving rate of Chinese elderly households is higher than that of employed Japanese. Why is the saving rate of "aging before getting rich" in Chinese elderly households even higher than that of the wealthiest counterpart in Japan? And does bequest motive also significantly affect the saving rate of Chinese elderly households?

Figure 1: Saving Rate of Japan and China by age



Note: SR=Saving Rate.
Source from : https://population.un.org/wpp.

Cai and Zhang (2020) examine the reasons for the high savings of Chinese elderly households from the aspects of bequest motives, precautionary motive and time preference based on the survey data of Beijing, Shanghai and other urban areas from 2009 to 2010 (effective sample number of 328 people). They believe bequest-motivated families have higher financial assets and fixed assets than those without bequest-motivated families.

This paper focuses on the bequest motives of China's elderly households and introduces a comparative analysis with Japan, so it can better explain the reasons for the

saving behaviour of elderly households in China. Further, we analyse the influence of different elderly groups by combining micro-survey data for cross-validation, attempting to explain the exceptionally high saving rate and understand the saving behaviour of China's elderly households.

This study employs the latest China Household Financial Survey (CHFS) data from family's microscopic perspective. The latest CHFS data provide unique information on explanation of China's high saving rate. We not only compare the data between China and Japan but discuss the impact of bequest motives on the saving rate of elderly households from different groups, including urban and rural differences, different wealth levels, different children's education levels and different children's work types based on whether they work within the government system or not.

The rest of the study is arranged as follows: Section2 reviews the extant literature; Section 3 constructs econometric models, describes variables and analyses data; Section 4 analyses the empirical results; Section 5 is the heterogeneity analysis; Section 6 tests the robustness; Section7 concludes and proposes some policy implications.

2. Literature Review

According to the standard life cycle theory, families increase savings during work and show smooth consumption after retirement, so the saving rate declines (Ando and Modigliani, 1963). However, previous studies have found that the wealth declines slowly after retirement, so the saving rate does not drop significantly (Alessie, Lusardi, and Kapteyn, 1999; De Nardi et al., 2015). To find the reasons of this phenomenon, existing literature mainly explains from three aspects: life expectancy uncertainty (Yaari, 1965; De Nardi, French, and Jones, 2009; Cocco and Gomes, 2012; Post and Hanewald, 2013); voluntary bequest motivation (Kopczuk and Lupton, 2007; Laitner, 2012; De Nardi and Yang, 2014) and preventive saving motivation (De Nardi, French, and Jones, 2010;

Dobrescu, 2015). Several papers are close to this paper in the sense that they associate the bequest motives with saving rate. The bequest motives are classified into three categories: egoist motivation, altruism motivation, and legacy motivation (Kopczuk and Lupton, 2007; Horioka, 2014). First, egoist motive assumes that people are selfish, leaving no inheritance to children or only leaving it when the old understand the uncertainty of death and to children who respect and care about them responsibly (Hurd, 1989; Nardi and Yang, 2014). Second, altruistic motive is that people have intergenerational altruism (family relationships) towards their children. According to this theory, regardless of whether the children can inherit the family business or take care of the elderly or not, parents will no doubt leave an inheritance to their children (Laitner, 2002). Third, the main point of legacy motivation is that parents want to continue the family business or family property and take actions to minimize the possibility of them being destroyed. According to this theory, the inheritance will only be left to the children who can manage the family property (Norton and Van Houtven, 2006; Alessie, Angelini, and Pasini, 2014).

Previous work on the savings rate of Japanese elderly households has been conducted. After the elderly in Japan retire or stop working, according to the life cycle theory, the income level declines relatively slowly (Horioka, 2010; Horioka and Niimi, 2017; Murata, 2019). Precautionary saving motives and bequest motives are the key reasons of this slow downward trend. Whereas some scholars believe that the precautionary motive plays an important role (Niimi and Horioka, 2018), others found it could not fully explain the slow decline (Murata, 2018). Some studies suggest the family wealth declines more gently within bequest-motived families (Horioka et al., 1996; Horioka, 2002). However, research has not reached a consistent conclusion regarding the effect of precautionary saving motives and bequest motives on the savings rate of elderly

households. The individual property can be used not only for an inheritance to children, but used for medical expenses, nursing expenses or other expenses (Dynan Skinner, and Zeldes, 2002).

Only a handful studies examine the phenomenon of high savings of China's elderly households from the following aspects. First, the old-age pension reform has led to the uncertainty of households' income, leading to an escalating in the saving rate of elderly households (Chen, 2015). Second, the wealth effect brought by pension income will promote a growth of saving rate (Liu and Chen, 2010). Third, the individual's cognitive consumption capability affects household spending power, which in turn affects the saving rate (Li and Zhang, 2018). The empirical research on Chinese bequest motives mainly emphasises two aspects. The first is the impact on household wealth and asset portfolio. For example, Chen and Huang (2013) use the number of children and the number of core family members as proxy variables to examine the influence of bequest motives on the house wealth effect. Kuang, Wang, and Ge (2018) measured bequest motives by whether the family has multiple houses. It turns out that bequest motives push up housing prices. Yang and Gan (2020) use the CHFS data to understand the influence on urban household investment portfolios and wealth gaps. Yin (2012) focuses on the impact of bequest motives on wealth accumulation in elderly households by adopting micro-data from the Life Preference and Satisfaction Survey. Another important aspect is associated with the support of the children. Jiang, Li, and Feldman (2015) study the relationship between the support provided by children and their parents' bequest motives from the data of farmers in Anhui Province to. Yin (2010) analyses the relationship between bequest motives and children's co-living, and finds that regardless of whether it is urban or rural, the type of bequest motives in China is egoism.

Previous studies are predominantly on the perspectives of social security and pension insurance. They rarely shed light on the saving behaviour of elderly households from bequest motives, especially by in-depth analysis based on national representative data. Only Almås et al. (2020), referring to the urban and rural survey data of two provinces in China, suggest that the level of children's assistance to parents significantly affects how much inheritance is left to their children. For example, housing is an essential part of the elderly households' inheritance and is a significant saving reason for them. Cai and Zhang (2020) also points out that bequest motives significantly increase household financial assets and fixed assets by using China's urban survey data.

This paper aimed to extend the literature from microscopic perspective to examine the puzzle of high saving rate of elderly households. We first collected the latest NHFS data, including not only urban households but a sample of rural households. Then we analysed the impact of bequest motives on the saving rate of elderly households from three aspects: urban and rural areas, wealth accumulation, and differences in children's lives.

3. Model and variables

(1) Model

In order to investigate the impact of bequest motive on household savings, this study establishes the following econometric equation

$$\text{Saving}_i = a_0 + \alpha_1 * \text{Bequest\_motive}_i + \alpha_2 X_i + \mu_i \qquad (1)$$

where Saving_i denotes the saving rate of household i's. Bequest_motive_i is the bequest motive of household i's. X_i stands for the control variable, including

demographic characteristics variable, family characteristic variable and provincial characteristic variable. μ_i is the residual error.

(2) Data source and Variables

Data are obtained from the CHFS project conducted by Southwest University of Finance and economics in 2015, 2017 and 2019, which investigated 29 provinces, cities and autonomous regions except Xinjiang, Tibet, Hong Kong, Macao and Taiwan. The data contains the following demographic characteristics: households, family wealth, income, expenditure, insurance and employment information. The number of children, the types of insurance and the housing information are recorded in detail, which provides reliable data for the study. The CHFS data is scientifically and randomly sampled, and the survey data are representative with high quality (Gan Li et al., 2012). The main variables are described below.

- Saving rate.

In order to increase the robustness and reliability of the empirical results, we give two definitions of saving rate (dependent variables) based on the existing literature (Yin and Zhang, 2019). The formula of the first definition: the total household income in the current year subtracts the household expenditure, and then divided by the household income. Household expenditure[3] includes non-durable goods consumption such as food, daily necessities, communication expenses, cultural entertainment and transportation expenses, as well as education and medical expenses; household income contains property income, annual earning, transfer income and operating revenue. The expression of saving rate 1 is as follows:

$$\text{Saving1} = (\text{household income} - \text{household expenditure})/(\text{household income}) \quad (2)$$

As education expenditure and medical expenditure are very contingent and sudden, they have a strong rigidity for a family's expenditure. Considering robustness, we then defined the second household saving rate referring to Ma and Zhou (2014)'s study result. The total household income minus the household's regular consumption and divided by the household income. The regular consumption of the family excludes the medical expenditure and education expenditure. The expression of the saving rate 2 is as follows:

$$Saving2 = \frac{[\text{household income} - (\text{household consumption} - (\text{medical expenses} + \text{educational expenditure}))]}{\text{household income}} \quad (3)$$

In the process of empirical analysis, the main regression results are saving rate 1 and saving rate 2.

- Bequest motive

Combined with CHFS questionnaire survey data, we give three definitions to measure the bequest motive of elderly households. The first definition is to measure whether the householder or spouse has life insurance (Tin, 2010). The households whose householder or spouse with life insurance are assigned a value of one, while a value of 0 is assigned to those without any life insurance (i.e: with bequest motive= 1; 0 otherwise). The second definition, using Chen and Huang (2003)'s method, measures the bequest motive by the number of children in the family. With regard to this method, we took the percentage of boys in a family as the measurement. The third definition tests whether the family has several houses or not (Kuang, Wang, and Ge, 2018). If the family has multiple houses, the bequest motive is assigned a value of 1; otherwise, it is 0.

- Control variables

This paper selected the following control variables, including householder's demographic characteristic variables, family characteristic variables and provincial characteristic variables. Demographic variables of householders include: age, educational level, the CPC Party member or not, employed or unemployed, marital status, and registered rural residents. Family characteristic variables contain family members' participation in endowment insurance, family size, family business operation and family total assets. Regional variables include provincial control variables.

This paper emphasises the influence of bequest motive on the saving rate of elderly households. In data processing, we keep the sample of the householder aged 60 or above and the family has at least one child. To avoid the effect of outliers, we remove the samples whose total household income is less than or equal to 0, set the upper limit of household saving rate to 100%, and the lower limit to - 100%. Finally, the total number of respondents is 12475.

Table 1. Descriptive Statistics.

Variable	OV	Mean	S.D.	Min	Max
Dependent Variable					
SR1	12475	0.1828	0.6278	-1	1
SR2	12475	0.3726	0.6164	-1	1
Independent Variable					
BM1	12475	0.0394	0.1945	0	1
BM2	12475	0.6595	0.4204	0	1
BM3	12475	0.2098	0.4072	0	1
Control Variable					
Householder's age	12475	67.0934	6.0966	60	99
Householder's education level	12475	5.5979	3.8772	0	19
Family business	12475	0.1240	0.3296	0	1
Householder (Party Member)	12475	0.1226	0.3280	0	1
Householder (employed)	12475	0.2788	0.4484	0	1
Householder (married)	12475	0.8254	0.3796	0	1
Family size	12475	4.7525	1.7054	2	19
Children (employed)	12475	0.1437	0.3508	0	1
Number of children	12475	1.5295	0.8592	1	10
Children's education level	12475	0.2042	0.4031	0	1

Householder (registered rural residents)	12475	0.4045	0.4908	0	1
Householder (endowment insurance participation)	12475	0.8426	0.3796	0	1
Family assets (in 10,000 Yuan)	12475	97.69	178.82	0	2830

Note: The data comes from the 2015, 2017 and 2019 China Household Finance Survey data. OV=observed value; S.D.=standard deviation.

It can be seen from table 1 that the saving rate of China's elderly households is still at a high level with the average value of saving rate 1 at 18.28% and saving rate 2 at 37.26%. The average bequest motive of elderly households was 0.0394, 0.6595 and 0.2098 respectively by three definitions. The average age of the householder is 67.09 years old, but the average years of education is only 5.6 years, which means the education level of the elderly in China is relatively low. The proportion of employed householder is 27.88%, indicating that some elderly groups continue to choose work after retirement. The percentage of married householders was 82.54% while that of rural families was 40.45%. The control variables of family characteristics show that 12.40% of the families run business. The average number of family members is between 4 and 5 (4.75) whereas the number of children in a family is between 1 and 2(1.53). The rate of elderly households joining in endowment insurant is high (83.26%). The percentages of children with formal work and those with higher education level are low at 14.37% and 20.42%.

Table 2. Household Saving Rate.

	High-BM			Low-BM		
	BM1	BM2	BM 3	BM 1	BM 2	BM 3
SR1	0.3084	0.2268	0.3138	0.1777	0.1262	0.1480
SR2	0.4549	0.4066	0.4624	0.3695	0.3292	0.3488

Note: SR=Saving Rate; BM= Bequest Motive.

Furthermore, this paper explores the general situation of household saving rate of different bequest motives. It can be seen from table 2 that both SR1 and SR2 show saving

rate of high bequest motive is higher than that of low bequest motive. Taking saving rate 2 and bequest motive 2 as examples, the saving rate of high bequest motive families was 40.66%, which was higher than that of low bequest motive families (32.92%), with a difference of 7.74%.

4. Estimation Result

(1) benchmark regression

First of all, this paper analyses the impact of bequest motive on the savings behaviour of Chinese elderly households. The estimation results illustrate strong positive relationship between bequest motives and elderly household saving rate (Table 3).

Table 3. The Impact of Bequest Motives on the Saving Rate of Chinese Older Households.

	(1) SR1	(2) SR2	(3) SR1	(4) SR2	(5) SR1	(6) SR2
BM1	0.0675***	0.0423*				
	(0.0236)	(0.0228)				
BM2			0.0959***	0.0686***		
			(0.0130)	(0.0128)		
BM3					0.1157***	0.0775***
					(0.0127)	(0.0121)
Household's age	-0.0298**	-0.0064	-0.0325**	-0.0083	-0.0309**	-0.0071
	(0.0148)	(0.0144)	(0.0148)	(0.0144)	(0.0147)	(0.0143)
Age squared /100	0.0219**	0.0072	0.0238**	0.0085	0.0027**	0.0078
	(0.0104)	(0.0101)	(0.0104)	(0.0101)	(0.0103)	(0.0100)
Householder's education level	0.0146***	0.0103***	0.0152***	0.0107***	0.0136***	0.0096***
	(0.0019)	(0.0019)	(0.0019)	(0.0019)	(0.0019)	(0.0019)
Family business	-0.0332*	-0.0533***	-0.0361**	-0.0554***	-0.0421**	-0.0593***
	(0.0171)	(0.0167)	(0.0170)	(0.0167)	(0.0170)	(0.0167)
Householder (Party ember)	0.0549***	0.0313**	0.0546***	0.0311**	0.0511***	0.0288*
	(0.0156)	(0.0150)	(0.0156)	(0.0150)	(0.0156)	(0.0150)
Householder's occupation	0.0304**	0.0040	0.0284*	0.0026	0.0323**	0.0053
	(0.0149)	(0.0145)	(0.0149)	(0.0145)	(0.0149)	(0.0145)
Householder (married)	0.0450***	0.0532***	0.0456***	0.0536***	0.0434***	0.0521***
	(0.0157)	(0.0155)	(0.0157)	(0.0155)	(0.0157)	(0.0155)
Endowment insurance joined	0.1055***	0.1038***	0.1072***	0.1049***	0.1020***	0.1014***
	(0.0173)	(0.0171)	(0.0173)	(0.1071)	(0.0172)	(0.0170)
Family size	0.0280***	0.0282***	0.0277***	0.0280***	0.0250***	0.0262***
	(0.0039)	(0.0039)	(0.0039)	(0.0038)	(0.0039)	(0.0039)

Householder (registered rural esidents)	-0.0862*** (0.0130)	-0.0436*** (0.0126)	-0.0907*** (0.0129)	-0.0468*** (0.0126)	-0.0854*** (0.0129)	-0.0430*** (0.0126)
Provincial control	Yes	Yes	Yes	Yes	Yes	Yes
Time control	Yes	Yes	Yes	Yes	Yes	Yes
N	12453	12453	12453	12453	12453	12453
R-square	0.081	0.102	0.085	0.104	0.086	0.105

Note： *, ** and *** are significant at the levels of 10%, 5% and 1%, respectively; heteroscedasticity robust standard error is in ( ). BM=bequest motive , SR=saving rate.

In table 3, Column (1) and Column (2), by the first definition, measure whether the householder or spouse have life insurance. The estimation results in column (1) show the estimated coefficient of bequest motive to the elderly household saving rate 1 (SR1) is 0.0675, which is significant at 1%. We redefine the household saving rate 2 (SR2) in order to prevent the impact of accidental expenditure on education and health care. The results of column (2) reveal significant and positive coefficient (0.0423) but has relative weak explanatory power (at 10% significant level). Second, column (3) and column (4) are the regression results of the definition accessed by the proportion of boys in the family. The estimated coefficients are 0.0959 and 0.0686 respectively, which demonstrate strong link between bequest motives and saving rate (significant level=1%). Third, we used whether the family owns more than one house to measure bequest motives. The results also indicate that bequest motives have a strong positive effect on the elderly household saving rate, with the estimated coefficients of column 5 at 0.1157 and column 6 at 0.0775.

With regard to control variables, the significance of the estimation results from column (1) to column (6) is basically consistent. In order to avoid repetition, we focus on the estimation results of column (1). The householder's age effect on the family saving rate presents a U-shape relationship, which is consistent with Chamon and Prasad (2010)'s conclusion. The higher the level of education (years of education), the stronger the precautionary saving motive, thereby increasing the household saving rate (Z. Zhang and M. Zhang, 2016). Other stimulations include: employed householder, married

householder and family size. On the other hand, the household management of industry and Commerce significantly inhibited the household savings rate as the household needs more cash investment to run business and industry. Similarly, compared with urban areas, the income level of rural households is lower, which restrains the growth of elderly household's saving rate. An interesting finding is the participation of endowment insurance did not significantly shrink the household saving rate, but increased it. This is because residents still lack a sense of security in participating in the endowment insurance since the current pension system fails to provide good protection, and the pension insurance of social pooling mode accounts for a large degree of household consumption (Zhao, Wang and Liu, 2017).

Besides, we analyse the impact of bequest motives on the saving rate of Japanese elderly households. The estimation results by the two definitions of bequest motives are shown in Table 4.

Table 4. The Impact of Bequest Motives on the Saving Rate of Japanese Older Households.

	(1)	(2)	(3)	(4)
	SR1	SR2	SR1	SR2
BM1	0.0482**	0.0456*		
	(0.0227)	(0.0275)		
BM2			0.0299***	0.0237*
			(0.0115)	(0.0138)
Householder's character control	Yes	Yes	Yes	Yes
Family's character control	Yes	Yes	Yes	Yes
Time control	Yes	Yes	Yes	Yes
N	1464	1370	1408	1325
R^2	0.048	0.036	0.051	0.037

Note: *, ** and *** are significant at the levels of 10%, 5% and 1%, respectively; heteroscedasticity robust standard errors are in ( ). BM=bequest motive, SR=saving rate.

The data are from the Household Finance Survey of the Japan Postal Savings Consortium in 2013, 2015 and 2018[4]. The questions are directly linked to bequest motives. For instance, question 35 asked the family "under what circumstances will the inheritance be left to the children?" Respondents have the following options: "1. I would leave the inheritance under no circumstances; 2. I would leave the inheritance only when children take about of me. 3. I would leave the inheritance when a child can inherit the family business; 4. I will not actively leave an inheritance; 5. Others; 6. I do not want to leave an inheritance." (p17). The definitions of bequest motives are based on these questions while bequest motive 1 is defined as dummy variables. If the householder answers 1, then the value of bequest motive is 1; otherwise, it is 0; the value of heritage motivation 2 is assigned accordingly. If respondents choose answer 1, the bequest motive is assigned a value of 3.The bequest motive is assigned a value of 2 when respondents choose answer 2 and 3, while other situations are assigned a value of 1. The estimated results in Table 4 show that the estimated coefficients by the two definitions of bequest motives are both significantly positive within the statistical level of 10%, indicating that the bequest motives positively affects the saving rate of Japanese elderly households. In other words, the empirical findings of micro-data from both China and Japan make clear that bequest motives have positive effect on the saving rate of elderly households.

(2) instrumental variable estimation

The existing of endogenous bias in the benchmark results is due to two reasons: The first is the reverse causality, which means the family saving rate may in turn affect the individual's bequest motives: the higher the household saving rate, the stronger the individual's motivation to leave legacy for their children. Second, there may be missing variables that affect both bequest motives and household saving rate. In order to solve

Table 5. The Impact of Bequest Motives on the Saving Rate of Older Households (instrumental variable method).

	(1)	(2)	(3)	(4)	(5)	(6)
	SR1	SR2	SR1	SR2	SR1	SR2
BM1	0.1549***	0.1047**				
	(0.0532)	(0.0509)				
BM2			0.0578**	0.0084		
			(0.0275)	(0.0267)		
BM3					0.1667***	0.1339***
					(0.0250)	(0.0240)
Householder's character control	Yes	Yes	Yes	Yes	Yes	Yes
Family character control	Yes	Yes	Yes	Yes	Yes	Yes
Time control	Yes	Yes	Yes	Yes	Yes	Yes
N	12453	12453	12453	12453	12453	12453
R-square	0.0806	0.1021	0.0841	0.1027	0.0852	0.1034
F Value of first stage	17.07	17.07	174.99	174.99	152.17	152.17
Instrumental variable - value	25.90	25.90	73.49	73.49	72.01	72.01
DWH test	3.465	1.936	2.461	6.608	5.503	7.3625
Chi^2	(0.0627)	(0.1642)	(0.1167	(0.0102	(0.0190	(0.0067
(P-value)			)	)	)	)

Note: *, ** and *** are significant at the levels of 10%, 5% and 1%, respectively; heteroscedasticity robust standard errors are in ( ). BM=bequest motive, SR=saving rate.

the problems, we selected the average bequest motive of the elderly households in the same community as the tool variable of the family bequest motives, and estimated the model by two-stage least squares method.

Table 5 is the estimation results of instrumental variable method. Columns (1) (2), Columns (3) (4) and Columns (5) (6) are estimated results of the three definitions of bequest motives. The endogenous test of Durbin-Wu-Hausan bequest motive is reported at the bottom. To avoid duplication, we took the estimation results of column (1) and column (2) as examples for analysis. The P values of DWH test are 0.0627 and 0.1642 respectively and the results of column (1) and (2) both show that the model does not have endogenous problems and significant at the 10% level. The regression results of first stage

reveals that the influence of community average bequest motive on bequest motives was significant with coefficient at the 1% level, and the F value of the first stage was greater than 16.38 , which is the critical value (Hausman, Stock, and Yogo, 2005). So it is appropriate to use the community mean value as the instrumental variable of individual bequest motives, and there is no weak instrument selection problem. Results show that the estimated coefficients of bequest motives are significantly positive at the statistical level of 1% and 5%, and the coefficients are 0.1549 and 0.1047 respectively. From Column (3) to Column (6), only the estimation result of column (4) is not significant, while the rest columns are significant within the 5% level. The above regression results further identified the positive and significant relation between individual bequest motives and the saving rate of elderly household.

(3) propensity score matching estimation result

Personal choices and preferences are determinants of individual's bequest motives, so there may be sample selection problems in benchmark model estimation. Thus, we chose the propensity score matching (PSM) to modify the benchmark model. The kernel matching (1:2) is chose to re-estimate and the estimation results (Table 6). To ensure the reasonableness of the matching results, we tested whether the control variables are balanced before and after matching, and whether the mean values are still significantly different between the experimental group and the control group. The results show that the control variables passed the balance test, indicating that the model in this paper is suitable for estimation using this method. The PSM estimation results in Table 6 show that whether saving rate 1 or saving rate 2 is used as the explained variable, the ATT values by different bequest motive definitions are statistically significant at the 10% level. The estimation results of PSM further confirm that bequest motives can significantly increase the saving rate of elderly households.

Table 6. Matching Estimation Result.

Independent variable	Dependent variable	Experimental group	Control group	ATT	Standard error	T-value
BM1	SR1	0.3119	0.1776	0.1343***	0.0289	4.64
	SR2	0.4566	0.3954	0.0612**	0.0241	2.55
BM2	SR1	0.2185	0.1589	0.0596***	0.0126	4.74
	SR2	0.3959	0.3566	0.0393***	0.0124	3.17
BM3	SR1	0.3136	0.1954	0.1183***	0.0133	8.86
	SR2	0.4619	0.3822	0.0796***	0.0129	6.16

Note: *, ** and *** are significant at the levels of 10%, 5% and 1%, respectively; heteroscedasticity robust standard errors are in ( ). BM=bequest motive, SR=saving rate.

5. Further Analysis

Is there any significant difference in the impact of bequest motives on the household saving rate of different elderly groups? The following section will analyse from three aspects: urban and rural areas, different levels of wealth accumulation and children's living conditions.

(1)The influence of bequest motives on the saving rate of urban and rural elderly households

With the development of social support for the aged, although the ways to care about the old have shown a trend of diversity, child-support is still the most ideal way (Cong and Silverstein, 2011). In rural areas of China, the tradition of “to raise children to care for you when you get old” is prevalent. For example, Jiang, Li, and Feldman (2015)’s study shows that children play a leading role in providing for the aged in rural families. The rural children's support mode is easy to build intergenerational bonds and enhance the emotional exchanges among family members, which may lead the elderly more motivated to leave a legacy for their children, thereby increasing the family's saving rate.

For urban elderly households, on the other hand, the social pension mode is diverse, so the senior citizen's lives are splendid and full of variety. To a certain extent, this can replace their children in providing for the elderly, and can weaken the emotional dependence of the elderly to their children.

Table 7 demonstrate that the saving rate of rural elderly households is affected more by the bequest motives than urban areas. Columns (1) and (2) are the estimated results by the two definitions of saving rate. The regression coefficients of bequest motives and rural cross terms are 0.1450 and 0.1844 respectively, which are both significant at the 1% level. One explanation is, compared with urban areas, rural elderly households mainly rely on child-support, and they have a strong motive to save for their children; another reason is that rural areas have lower income levels, and the elderly may worry about their children's future life to save.

Table 7. The Influence of Bequest Motives on the Saving Rate of Urban and Rural Elderly Households.

	(1)	(2)
	SR1	SR2
BM	0.0184	0.0321
BM in rural area	0.1450***	0.1844***
	(0.0288)	(0.0290)
Rural area	-0.1461***	-0.2170***
	(0.0243)	(0.0242)
Householder's character control	Yes	Yes
Family's character control	Yes	Yes
Provincial control	Yes	Yes
Time control	Yes	Yes
N	12453	12453
R-square	0.106	0.088

Note: *, ** and *** are significant at the levels of 10%, 5% and 1%, respectively; heteroscedasticity robust standard errors are in ( ). BM=bequest motive, SR=saving rate.

(2) Influence of bequest motives on the saving rate of elderly households with different wealth levels

Are there significant differences in the household saving rate for the elderly with different wealth levels? In this study, we define families with wealth levels higher than 75 percentile are high-wealth families; low-wealth families refers to the wealth level is lower than 25 percentile and the middle part is the middle-wealth families. We use high-wealth families as the reference group to estimate the influence of bequest motives on the saving rate of different wealth families (table 8). Results show that compared with high-wealth families, the bequest motives significantly promote the saving rate of low-wealth and middle-wealth families both at 1% significant level. Specifically, the estimated coefficients of the cross-term between bequest motives and low-wealth families are 0.1220 and 0.0764, while that of middle-wealth families are 0.0698 and 0.0625. Therefore, low-wealth and middle-wealth households show the characteristics of "old before getting rich", and they would save to accumulate wealth.

Table 8 The Impact of Bequest Motives on the Saving Rate of Older Households (From Wealth Accumulation Perspective).

	(1)	(2)
	SR1	SR2
BM	0.0305	0.0188
	(0.0199)	(0.0192)
BM*Low-income	0.1220***	0.0764**
household	(0.0353)	(0.0351)
BM*middle-income	0.0698***	0.0625**
household	(0.0270)	(0.0264)
Low-income household	-0.2878***	-0.1649***
	(0.0298)	(0.0297)
Middle-income household	-0.1464***	-0.1030***
	(0.0225)	(0.0220)
Householder’s character control	Yes	Yes
Family’s character control	Yes	Yes
Provincial control	Yes	Yes
Time control	Yes	Yes
N	12453	12453
R-square	0.095	0.108

Note: *, ** and *** are significant at the levels of 10%, 5% and 1%, respectively; heteroscedasticity robust standard errors are in ( ). BM=bequest motive, SR=saving rate.

(3) The Influence of Bequest Motives on the Saving Rate of Elderly Households with Different Children's Living Conditions

For families with different children's living conditions, is there any difference in the impact of the bequest motives on the savings rate? Previous studies have found that parents have intergenerational altruistic motives (kinship and blood relationship) for their children. Altruistic motives believe parents will leave an inheritance to their children under any conditions (Laitner, 2002). Their bequest motives will be further enhanced especially when the elderly anticipate the decline trend of their children's living standards, thereby increasing the savings rate (Hamaaki and Hori, 2019). This study further uses empirical analysis to test. Although the CHFS data does not directly involve the future living conditions of the children's family, we can use the type of work and the education level of children to indirectly measure it. Children's work is classified into two types: work within the government system and outside of the government systems. If the children's organization is not in government agencies, public institutions, or state-controlled enterprises, it will be assigned a value of 1, otherwise it will be 0. Likewise, if the education level is low at the junior college level or below, the value is 1; otherwise, it is 0. Traditionally, parents believe that children working outside of the government system lack social security and stability. Under this condition, the bequest motives will improve the savings rate. Similarly, the education level affects employment level, income level and the future living conditions. Parents' concerning about children's future life leads to the growth of the savings of elderly households whose children have low education level. Next, we will use CHFS micro data for analysis.

Table 9. Influence of bequest motives on household savings rate (children's work and education level).

	(1)	(2)	(3)	(4)
	SR1	SR2	SR1	SR2
BM	0.0192	0.0172	0.0268	0.0131
	(0.0235)	(0.0228)	(0.0202)	(0.0194)
BM* Children working outside of the government system	0.0765***	0.0509*		
	(0.0276)	(0.0269)		
Children working outside of the government system	-0.2513***	-0.1744***		
	(0.0222)	(0.0219)		
BM* Children's low level of education			0.0969***	0.0775***
			(0.0256)	(0.0248)
Children's low level of education			-0.2294***	-0.1736***
			(0.0207)	(0.0201)
Householder's character control	Yes	Yes	Yes	Yes
Family's character control	Yes	Yes	Yes	Yes
Provincial control	Yes	Yes	Yes	Yes
Time control	Yes	Yes	Yes	Yes
N	12453	12453	12453	12453
R-square	0.093	0.107	0.092	0.107

Note: *, ** and *** are significant at the levels of 10%, 5% and 1%, respectively; heteroscedasticity robust standard errors are in ( ). BM=bequest motive, SR=saving rate.

Columns (1) and (2) of Table 9 examine the influence from the perspective of children with different types of work. The cross-term coefficients of bequest motives and children's work outside of the government system are 0.0765 and 0.0509 respectively, which are both significant at the 1% statistical level. The results show that bequest motives significantly increase the saving rate of elderly households with children working outside of the government system. Similarly, Columns (3) and (4) are from different education levels and the estimated coefficients of the cross-term between bequest motives and children's low educational level are 0.0969 and 0.0775 (significant at the 1% level). The results also show that the bequest motives mainly significantly increase the saving rate of elderly households with lower education level of their children.

The above results show that the bequest motives' positive effect on the saving rate of elderly households is mainly reflected in rural areas owing to the parents' concerns

about the future living standards of their children. Altruistic bequest motives can explain this especially with elderly households whose children working outside of the government system and children with low education levels.

6. Robustness Check

We performed a robustness test with respect to sample and estimation method to check the previous results. **(1).The sample robustness test.** We used the 2015 Shanxi survey questionnaire data, which directly measured the bequest motives, to re-verify the regression results. In the questionnaire, we defined bequest motives as a dummy variable. As for the question "what is the purpose of saving?", the answer "to leave an inheritance for your children or to marry your children" is assigned a value of 1, otherwise it is 0.

Table 10. The Impact of Bequest Motives on the Saving Rate of Older Households.

Based on Shanxi survey data analysis

	(1)	(2)
	SR1	SR2
BM	0.1834***	0.2117***
	(0.0370)	(0.0426)
Householder's character control	Yes	Yes
Family's character control	Yes	Yes
N	671	671
R^2	0.106	0.105

Note: *, ** and *** are significant at the levels of 10%, 5% and 1%, respectively; heteroscedasticity robust standard errors are in ( ). BM=bequest motive, SR=saving rate.

Based on Shanxi survey data, it was found that the estimated coefficient of bequest motives is significant at the 1% level. The regression results in Table 6 show that bequest motives significantly increases the household saving rate, which proves that the benchmark results in this paper are robust.

(2).The robustness test of the estimation method. In the benchmark regression results, this paper sets the upper and lower limits of the saving rate value to 1 and -1. Although only a small part of the extreme sample values are merged into the upper and lower limits, to prevent the estimation results from being biased, this paper further uses the Tobit model to re-estimate.

Table 11. The Impact of Bequest Motives on the Saving Rate of Older Households (Tobit).

Tobit Estimator	(1)	(2)	(3)	(4)	(5)	(6)
	SR1	SR2	SR1	SR2	SR1	SR2
BM1	0.0402***	0.0232**				
	(0.0200)	(0.0194)				
BM2			0.0732***	0.0485***		
			(0.0096)	(0.0092)		
BM3					0.0886***	0.0563***
					(0.0097)	(0.0094)
Household/ Family character control	Yes	Yes	Yes	Yes	Yes	Yes
Provincial control	Yes	Yes	Yes	Yes	Yes	Yes
Time control	Yes	Yes	Yes	Yes	Yes	Yes
N	12453	12453	12453	12453	12453	12453
Pseudo R^2	0.055	0.089	0.058	0.091	0.060	0.091

Note: *, ** and *** are significant at the levels of 10%, 5% and 1%, respectively; heteroscedasticity robust standard errors are in ( ). BM=bequest motive, SR=saving rate.

Table 11 demonstrates the estimated results of the Tobit model. Except for column (2), the regression coefficients of bequest motive on saving rate 1 and saving rate 2 are all positive at the statistical level of 1%. This confirms the bequest motives strongly and positively promotes the saving rate of elderly households, which further illustrates the reliability of the results of the study.

7. Conclusions

This study mainly explores the determinants of the high saving rate of elderly households from the perspective of bequest motives using the latest CHFS data and Japan's postal savings data. In order to overcome the bias caused by the endogenous problem on the estimation results, we selected the mean value of the individual bequest motive of the same community as the instrumental variable of the family bequest motive and the PSM method to re-estimate the benchmark model.

The followings are the empirical results: In the case of controlling demographic characteristics, family characteristics, and provincial characteristics, the individual bequest motives significantly increases the saving rate of elderly households. The estimated result is basically unchanged and reliable after considering endogeneity and the robustness section. Firstly, the bequest motives affect the saving rate of rural elderly households greater than urban counterparts. One reason is rural old people mainly depend on their children's support, and have a strong bequest motive to save for their children. For another, rural economy is under-developed and households have low income levels, and the old generation save for their children's better economic life in future. The second result, similarly, is associated with wealth levels, which reveal that low- and middle-wealth families with bequest motives would have high saving rate for children. This can be explained by the characteristics of "getting old before getting rich", so these families have a stronger bequest motive to save to accumulate wealth. Thirdly, the strong positive effect of bequest motives on saving rate is reflected on households whose children work outside of the government system and whose children have low education level, as the old parents worry about their children's future living standards.

Currently, why the saving rate of the elderly population remains high? On the one hand, the proportion of the elderly population in China continues to increase, and the

problems caused by aging tend to be prominent. On the other hand, the high savings of elderly households have caused insufficient consumption demand of residents, which restricts the current economic transformation and development of China. On the basis of the research results, the followings are the main policy implications. For elderly households in rural areas, relevant departments should improve their social security levels and promote the socialization of the elderly, so that the elderly can feel at ease in their old age, weaken their bequest motive, and thus stimulate consumption. In addition, considering the strong altruistic bequest motives, it is essential to maintain economic growth, to broaden employment channels, and to strengthen employment security; thereby alleviating the elderly's concerns about their children's future life and reducing the family saving rate. In the future, further study would learn from the experience of Japan and properly levy inheritance taxes to relieve the positive effect of bequest motive on the savings of elderly households.

Notes:

1. According to data released by the National Bureau of Statistics (http://www.stats.gov.cn/english/PressRelease/202002/t20200228_1728917.html), from 2000 to 2019, China's population of elderly people aged 65 and above increased from 88 million to 176 million people, the proportion of the elderly in the total population rose from 9.9% to 12.6%.

2. Accessed from http://data.stats.gov.cn/english/

3. According to the CHFS CAPI Questionnaire（2017）Part4 pp325, household consumption mainly includes the following items. For example, food expenses include food expenses, tobacco and alcoholic beverage expenses; daily living expenses, water, electricity, fuel, heating, property management expenses; daily necessities expenses, laundry supplies, washing tools, handmade supplies, toilet paper and bedding textiles etc.; communication expenses, telephone expenses, mobile phone expenses, cable TV expenses and Internet expenses; cultural and entertainment expenses, books and newspaper expenses, movie

expenses, bars, Internet cafes, pets, playgrounds, art equipment, sporting goods, travel and fitness expenses; beauty expenses, including cosmetic surgery, purchase of skin care products, cosmetics, beauty treatments; local transportation expenses, subway fees, bus fares, taxi and online taxi fares, various expenses for self-driving cars (gas, parking, maintenance fees) , Tolls, etc., but do not include self-driving tours for tourism purposes); purchases of clothing expenses; housing maintenance expenses (excluding expenses for improving housing performance and structure, and expanding housing area); education expenses and medical expenses.

4. The Japan Postal Savings Foundation conducted a nationwide survey on the savings behaviour of 5,000 households with more than two people in 2013, 2015 and 2018. The recovery rate was stabilized at about 40% each time, and the two-stage stratified random sampling method was adopted.

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