Research on the influence mechanism of child dependency ratio on household saving rate

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Abstract. High family savings rate has always been an important feature of China's economy. With the gradual opening of China's birth policy, the high family savings rate is closely related to children's dependency ratio. Based on the data of CFPS in 2018, the regression results show that: first, the child dependency ratio enhances the precautionary savings of families and increases the household savings rate; Second, generational care makes the parents' lasting income more stable, so under the condition of the same child support ratio, households with generational care have a lower savings rate; Third, the ratio of child dependency in eastern and western families has a significant positive effect on saving rate, while the central region has no significant effect. Finally, it puts forward some suggestions on strengthening social security, advocating intergenerational care and narrowing the gap between East and west China.

Keywords: Household saving rate; Child dependency ratio; Intergenerational care; Regional differences.

1. Introduction

Low consumption and high savings are important features of the contemporary Chinese economy. According to World Bank data, from 2000 to 2019, the ratio of total savings to GDP of countries around the world fluctuated between 15% and 35%. However, China's ratio of total savings to GDP was higher than 43%, and reached 50% in 2008-2010, far higher than the level of other countries in the world. In recent years, on the one hand, with the increasing saturation of investment demand, the marginal output capacity of capital decreases, and the overcapacity caused by excessive investment is not conducive to the sound development of the economy; On the other hand, the impact of external factors has led to an obvious downward trend of the world economy, with weak import and export trade and a sharp decline in export demand. Therefore, domestic consumption demand is playing an increasingly important role in economic growth. In 2022, The General Office of the State Council issued Opinions on Further Releasing Consumption Potential and Promoting Sustained Recovery of Consumption, which pointed out that "barriers and barriers restricting consumption should be removed, people's willingness and ability to consume should be enhanced, consumption potential should be released, and orderly recovery and development of consumption should be promoted." At the same time, the report of the 20th National Congress of The State Council pointed out that "we should adhere to the theme of promoting high-quality development, organically integrate the implementation of the strategy of expanding domestic demand with the deepening of supply-side structural reform, strengthen the internal driving force and reliability of the major domestic circulation, and improve the quality and level of the international circulation", which further clarified the importance of expanding domestic demand for future economic growth. Therefore, based on the economic transformation strategy in the new era, it is of great significance to study the high saving behavior of Chinese households and its influencing factors, and explore how to effectively reduce the household saving rate to promote household consumption.

In recent years, China’s birth policy has been gradually liberalized. The birth policy will further affect the household savings rate by affecting the child dependency ratio. Therefore, understanding

the mechanism of the impact of the child dependency ratio on the savings rate can provide economic significance for the formulation of China's fertility policy, and provide theoretical basis for the government to promote and relax the fertility policy and expand domestic demand. At the same time, the impact of the child dependency ratio on the savings rate is greater than that of aging, which is helpful to strengthen the attention of the government, society and families to the fertility rate, and has important practical significance for the design of government system, social transfer payment and household saving decision.

The overall content of this paper is arranged as follows: In the second part, three theoretical hypotheses are proposed and theoretical analysis is carried out. After clarifying the composition of each variable in the model, descriptive statistics of the variables are carried out, and stepwise regression of the data is carried out to analyze the moderating effect, heterogeneity analysis and robustness test are carried out. Based on the empirical results, policy recommendations are put forward.

2. Theoretical Hypothesis

Samuelson (1958) linked the pension problems of the elderly in the family with the number of children, and proposed the household savings demand model (HSDM). According to this theory, the consumption expenditure level of a family is affected by the number of children, and children play the same economic role as savings in the family. There is a substitution relationship between the two, and parents can solve the future pension problem by raising children. Parents believe that the more children they have to take care of, the more secure their old age life will be in the future, so they will reduce the precautionary saving for the pension and promote the current consumption of the family. In addition, according to the precautionary saving theory, the opposite view will be obtained. When the child dependency ratio increases, parents will take into account the education expenditure or house purchase expenditure that may be generated by the child's future growth, and the parents' consumption decision is more inclined to "long-term" [1-4].In other words, the current consumption of parents will be relatively reduced, and the family precautionary saving motivation will be strengthened, thus the family saving rate will be increased. At the same time, according to Berger's quality-quantity trade-off, the quantity and quality of children are regarded as two commodities, and there is a substitution relationship between the two commodities. The optimal number of children will be determined by the marginal cost and benefit of the quantity and quality of children. Therefore, if parents choose to increase the child dependency ratio, it means that the marginal cost of having children is less than the cost of improving the quality of children. To sum up, the following hypothesis is proposed:

H1: With the increase of child dependency ratio, the household saving rate will increase

With the deepening of the aging degree and the current situation of traditional Chinese kinship social relations, many young parents in China are busy with their work, and often leave their children in their parents' home to be nurtured by their grandparents, which also leads to the emergence of complete intergenerational care behavior[5]. According to the permanent income hypothesis, consumers make consumption decisions based on the income level that can be maintained in the long run, rather than the temporary income in the current period. Therefore, when the child dependency ratio is the same, families with complete intergenerational care can make the labor force work longer, reduce the uncertainty of parents' income, maintain a relatively stable and lasting income level, and have the ability and willingness to spend in advance, which reduces the household saving rate [6-7]. To sum up, the following hypotheses are put forward:

H2: Intergenerational care will reduce the negative effect of child dependency ratio on saving rate

The eastern region has a high level of economic development, and its parents are highly educated, so they have a stronger tendency to benefit the next generation, and are more willing to invest in their children's education, housing and other investments, in order to better reduce their children's future life pressure and improve their living ability, the parents in the eastern region have a higher propensity to save. The disposable income in the western region is less than that in the eastern region due to the

low level of economic development. At the same time, the development level of education and medical care in the western region is naturally weaker than that in the eastern region. As a result, in order to catch up with the level of education expenditure in the eastern region, parents in the western region tend to increase their savings to improve the quality of education. However, in the central region, the economic development level is at a medium level, but the price level is lower than that in the eastern region, so the propensity to save for house purchase and education expenditure is relatively small. In view of the differences in the impact of the child dependency ratio on the family savings rate among family groups in different regions of China, based on the above analysis, the following hypotheses are proposed:

H3: The impact of child dependency ratio has the characteristics of regional heterogeneity.

3. Empirical model setting

3.1. Data selection and variable description

3.1.1 Database selection

This paper uses the Chinese Family Longitudinal Survey (CFPS) data to carry out empirical research. The CFPS adopts a stratified multi-stage sampling method, which is 95% representative of the Chinese population. The survey objects of CFPS include all the family members in the sample households, so the family relationship can be tracked according to the head of the household, and then the situation of the family's intergenerational care and family economic behavior can be investigated. This paper takes the family as the basic research unit, and uses the 2018 household economic database and individual database to obtain the required family cross-section data.

3.1.2 Definition of variables

(1) Key variables

The dependent variable is the household saving rate, which is referring to Formula (1). Household consumption expenditure specifically includes food expenditure, clothing and shoes expenditure, housing expenditure, household equipment and daily necessities expenditure, transportation and communication expenditure and other consumption expenditure. In the robustness test, we can refer to Formula (2) and add medical security expenditure and education expenditure to measure the household saving rate again. Among them, income represents disposable income, cost represents daily consumption expenditure, med represents medical expenditure, and edu represents education expenditure, as follows:

$$saving_a = \frac{income - \mathrm{cost} - (med + edu)}{income} \tag{1}$$

$$saving_b = \frac{income - \mathrm{cost}}{income} \tag{2}$$

The independent variable was the child dependency ratio, which was constructed as the number of children under the age of 14 in the family/the number of people aged 14 to 65 in the family unit. Using CFPS statistics, variables $children$ were defined as 1 for children under 14 years of age and 0 for children over 14 years of age. Variables $midage$ were defined as 1 for children aged 14 to 65 and 0 for children aged less than 14 to 65. The number of working people in each family was obtained by the same method as the number of children in the family. The dependency ratio of children is defined as (3):

$$children_ratio = \frac{children_\max}{midage_\max} \tag{3}$$

In the robustness test, the calculation method of the child dependency ratio was changed, and the number of children aged 0-14 in each family was divided by the number of children in each family.

(2) Moderating variables

This paper introduces the existence of complete intergenerational care as a moderator variable. Complete intergenerational care means that children are cared for only by their grandparents and their parents do not participate in the care. It corresponds to the specific questionnaire questions of "who takes care of the children during the day" and "who takes care of the children at night" in CPFS. If the child is taken care of by the child's grandparents in the morning and at night, it is defined as 1; otherwise, it is defined as 0.

(3) Control variables

According to the existing literature, two household characteristic variables were introduced: household income per capita and total household assets. Since the household saving is greatly affected by the individual characteristics of the household, five personal characteristics variables are introduced, including the years of education of the household head, the age of the household head, the marital status of the household head, the gender of the household head and the health status of the household head. In addition, because there are significant differences in household savings among regions, we introduce two regional characteristics: whether the household is an urban household and the location of the province where the household is located.

3.2. Model setting

In order to study the impact of child dependency ratio on household saving rate, the following models are established for empirical research:

$$saving_rate_i = \beta_0 + \beta_1 children_ratio_i + \beta_2 controls_i + \varepsilon_i \quad (4)$$

The explained variable $saving_rate_i$ is the household saving rate; the core explanatory variable $children_ratio_i$ is the child dependency ratio; $controls$ represents the control variables mentioned above; β is the degree of influence of child dependency ratio on corresponding variables. If it is positive, it means positive correlation; if it is negative, it means negative correlation; If it is positive, H1 hypothesis is accepted, and it is believed that when the child dependency ratio increases, the family saving rate increases simultaneously; if it is negative, H1 hypothesis is rejected, that is, when the child dependency ratio increases, the family saving rate decreases; ε is the random disturbance term; i is family i.

In order to verify the relationship between the family savings rate and the child dependency ratio, the moderator variable was added to construct the model, $grand$ is whether there is complete intergenerational care, and the interaction term D between the child dependency ratio and complete intergenerational care was further added to construct the model, as follows:

$$saving_rate_i = \beta_0 + \beta_1 child_ratio_i + \beta_2 grand_i + \beta_3 controls_i + \varepsilon_i \quad (5)$$

$$saving_rate_i = \beta_0 + \beta_1 child_ratio_i + \beta_2 grand_i + \beta_3 D + \beta_4 controls_i + \varepsilon_{ii} + \varepsilon_i \quad (6)$$

When β_3 is positive, H2 is significantly established, and it can be concluded that the intergenerational parenting behavior will reduce the negative effect of the child dependency ratio on the savings rate. β3

3.3. Descriptive statistical analysis

After clarifying the composition of each variable in the model, descriptive statistics were carried out on the variables, and the results are shown in Table1.

Table 1. Descriptive statistics of variable.

Variables	Mean	Sd	MIN	MAX	Sample size
Saving rate1	0.368	0.617	-3.280	0.950	13,474
Saving rate 2	0.121	0.965	-5.898	0.933	13,474
Child dependency ratio	0.083	0.230	0	4	11,850
Old-age dependency ratio	0.188	0.415	0	3	11,850
Level of household income per capita	9.732	1.031	6.908	12.206	13,503
Total household assets	12.691	1.376	8.537	15.932	13,503
Years of education of the household head	7.578	4.999	0	23	13,209
Age of household head	50.089	15.384	11	95	13,503
Marital status of household head	1.860	1.922	-8	5	13,337
Gender of household head	0.525	0.499	0	1	13,211
Health status of household head	3.063	1.497	-8	5	13,503
Whether it is a town family	0.355	1.322	-9	1	13.503
Province area where the household is located	38.079	15.018	11	65	13,496

4. Analysis of empirical results

4.1. Basic regression

In order to study the impact of the child dependency ratio on the household saving rate, a regression is conducted on the data. The estimated results are presented in Table2 (1) (2) (4) (5).

Table 2. The effect of the child dependency ratio on the household saving rate.

Variables	Saving rate1			Saving rate2		
	(1)	(2)	(3)	(4)	(5)	(6)
Child dependency ratio	0.087***	0.060**	0.088***	0.133***	0.099**	0.134***
	(3.68)	(2.57)	(3.56)	(3.49)	(2.57)	(3.57)
Old-age dependency ratio	0.096***	0.033**		0.087***	0.019	
	(7.16)	(2.19)		(4.17)	(0.82)	
Level of household income per capita	0.352***	0.401***	0.427***	0.563***	0.625***	0.660***
	(34.88)	(34.47)	(35.59)	(35.79)	(34.15)	(34.71)
Total household assets	-0.060***	-0.067***	-0.062***	-0.083***	-0.090***	-0.084***
	(-12.08)	(-12.22)	(-10.60)	(-11.37)	(-10.91)	(-9.49)
Years of education of the household head		-0.009***	-0.010***		-0.013***	-0.014***
		(-7.39)	(-8.42)		(-7.00)	(-7.53)
Age of household head		0.003***	0.004***		0.002***	0.003***
		(5.56)	(7.85)		(3.30)	(4.81)
Marital status of household head		0.007**	0.007**		0.009**	0.014***
		(2.36)	(2.13)		(1.99)	(3.60)
Gender of household head		0.024**	0.022**		0.035**	0.021*
		(2.49)	(2.27)		(2.28)	(1.70)
Health status of household head		0.004	0.005		-0.014**	-0.014***
		(0.93)	(1.37)		(-2.24)	(-3.06)
Whether it is a town family		-0.020***	-0.014**		-0.021**	-0.036***
		(-3.21)	(-2.42)		(-2.42)	(-4.68)
Province area where the household is located		0.002***			0.002***	
		(5.58)			(4.71)	
Whether it is intergenerational care			0.115***			0.198***
			(7.14)			(7.96)
Interaction terms			-0.131**			-0.234**
			(-2.18)			(-2.09)
Constant	-	-	-	-	-	-
	2.322***	2.810***	3.337***	4.311***	4.862***	5.581***
	(-28.04)	(-28.31)	(-25.86)	(-33.36)	(-31.38)	(-27.50)
Sample size	11,823	10,105	10,105	11,823	10,105	10,105
R^2	0.271	0.310	0.338	0.302	0.326	0.344

Note: ***, ** and * indicate that the coefficients are significant at the significance levels of 0.01, 0.05 and 0.1, respectively, with standard errors in parentheses

Basic regression result shows that at 5% level, the child dependency ratio is positively correlated with the household savings rate. The reasons are: First, according to the precautionary savings theory, when children's number increases, parents consider future expenses, the incentive to save and the savings rate will increase. Second, according to Becker's tradeoff, the quantity and quality of children are seen as two fungible goods. A higher child-support ratio means the marginal cost of having children is less. Therefore, the cost of having more children is lower and the savings rate is higher.

For control variables, the estimated old-age dependency ratio was significantly positive. In household wealth, the increase of per income leads to higher savings, while the increase of total household assets increases consumption and leads to lower savings [8]. In personal characteristics, the older, the healthier and the more estranged from their spouses, the householders have greater motivation of saving. Meanwhile, the longer schooling, the lower income uncertainty and savings rate. In household location, compared with central and west, east is higher due to higher income [9]. Compared with urban, rural tend to increase savings rate to cope with emergencies due to their unstable income, with a higher savings rate [10].

4.2. Moderating effect

Based on the accelerated pace of modern life and the unique concept of family blood in Chinese families, many parents often foster their children in their parents' home, forming a completely separated generation of children care. In terms of its impact on the household saving rate, on the one hand, generational care will increase the labor supply of parents and family income; On the other hand, grandparents will be early retirement and lower family income. To this end, we introduce whether there is an interaction term between complete generation separation care and child support ratio, and further analyze the moderating effect of complete generation separation care on the impact of child support ratio on household savings rate.

From Table 2(3) (6), after the introduction of interaction terms, the child dependency ratio can still significantly promote the improvement of household savings rate. The adjustment coefficient is significantly positive, that is, the existence of complete generational care can improve the household savings rate. The interaction term coefficient is significantly negative at the statistical level of 1%, that is, the presence of complete generation separation has a significant reverse moderating effect on the impact of child support ratio on household saving rate, which means that under the same child support ratio, the saving rate of families with generation separation behavior is about 13.1% lower than that of families without generation separation. According to the persistent income hypothesis, consumers make consumption decisions based on the level of income they can maintain in the long run. Therefore, when the child dependency ratio is the same, families with complete generational care can provide parents with more adequate and stable labor supply time, reduce the uncertainty of parents' future income, and families have the ability and willingness to consume ahead of time, which reduces the household savings rate.

4.3. Heterogeneity analysis

In this part, sub-sample regression is used to study the difference in the impact of child dependency ratio on household saving rate from the perspective of the province where the household is located. Table3 shows the differences in the impact of child dependency ratio on households in the eastern, middle and western regions of China.

Table 3. Regression results of regional heterogeneity in each province.

	East		Central		West	
	Saving rate1	Saving rate2	Saving rate1	Saving rate2	Saving rate1	Saving rate2
Child dependency ratio	0.120***	0.116**	0.068	0.002	0.088**	0.125*
	(3.24)	(2.16)	(1.62)	(0.03)	(2.11)	(1.93)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	5,376	4,656	2,680	2,477	3,353	2,972
R^2	0.329	0.339	0.332	0.346	0.318	0.336

Note: ***, ** and * indicate that the coefficients are significant at the significance levels of 0.01, 0.05 and 0.1, respectively, with standard errors in parentheses

Result shows that the positive correlation between the two is most significant in the east, followed by the west, and not significant in the central. In the east, prices are higher and parents are more educated, so they are more willing to save for their children. The income level of residents in the west is relatively low, but the expenditure on education and health care is rigid, so savings have to be increased. For the midlands, there is less pressure from spending on things like education or health. Therefore, the incentive to increase savings is not strong.

4.4. Robustness test

Table 4. Regression results of replacing explained variables.

	Saving rate3	Saving rate4	Saving rate1	Saving rate2
Child dependency ratio	0.078***	0.066**	0.264***	0.371***
	(2.89)	(2.54)	(5.67)	(5.30)
Control variables	Yes	Yes	Yes	Yes
Sample size	11,408	11,408	12,962	12,962
R^2	0.315	0.384	0.308	0.328

Note: ***, ** and * indicate that the coefficients are significant at the significance levels of 0.01, 0.05 and 0.1, respectively, with standard errors in parentheses

In the first two columns of Table4, the two savings rates mentioned above are respectively treated logarithmically and then returned again. In the last two columns, the calculation method of child dependency ratio is changed, and the number of children aged 0-14 in each family is divided by the number of children in each family. All the estimated results passed the significance level test, so it can be considered that the estimated results are robust.

5. Conclusions and policy recommendations

According to the above conclusions, this paper puts forward the following suggestions: at present, China is facing aging population, population deficit, "two children" and "three children" policy implementation and other population problems, to solve the population problem, promote sustainable development is the only way we have to go. First of all, we need to strengthen the social security and social welfare system on the macro level. The realistic reason for the current low fertility intention is that the high cost of birth, upbringing and education makes the problem of "unaffordable" prominent. Only by strengthening the construction of related supporting facilities, improving the level of social welfare and effectively solving the problem of high upbringing cost can the fertility intention be truly increased, and then the fertility rate be increased; Second, intergenerational care can be actively applied to improve the family economy and pay attention to family care. On the premise that the grandparents are willing to encourage parents and grandparents to participate in the process of raising children, on the one hand, reduce the burden of parental care, on the other hand, it can promote the growth of family economy; Finally, it is necessary to promote the fair distribution of public resources

in urban and rural areas and the coordinated development of local economy. The unstable income and less resources in rural areas make these residents tend to increase their family savings rate to cope with unpredictable risks. Only by promoting coordinated development can rural residents increase their fertility willingness, do not have to bear too much pressure of saving, and raise more children at ease. To promote the solution of the problem of low birth rate.

References

[1] Shenglong Liu; Angang Hu,2013.Household Saving in C hina: The K eynesian Hypothesis, Life-Cycle Hypothesis, and Precautionary Saving Theory[J]The Developing Economies Volume 51, Issue 4. 2013. PP 360-387

[2] Donatella Baiardi; Marco Magnani; Mario Menegatti, 2020. The theory of precautionary saving: an overview of recent developments [J] Review of Economics of the Household Volume 18, Issue No. XX. 2020. PP 513-542

[3] Xia Changyuan, Yu Lili, Hu Qiuming, He Na. Commercial health insurance and the mystery of high household savings rate in China: Theoretical construction and empirical evidence from precautionary savings [C]//. Proceedings of the 2019 China Insurance and Risk Management International Annual Conference.2019:653-668.

[4] ZHANG Anquan. Research on Preventive Savings of Chinese Residents [D]. Southwestern University of Finance and Economics, 2014.

[5] Wang Yunjiao. Research on Intergenerational Conflict under the intergenerational rearing model of "Only Second Generation" [D]. East China University of Science and Technology, 2014.

[6] Xu Xue, Song Haihan. China's population age structure change on the influence of urban and rural residents' consumption level [J]. Journal of capital university of economics and trade, 2019, 21 (01): 15 to 23. The DOI: 10.13504 / j.carol carroll nki issn1008-2700.2019.01.002.

[7] Wang Yazhang. The Impact of Population Aging on Macroeconomy -- An Investigation Based on the Generational Support Mechanism [J]. Population and Development, 2016, 22 (03): 13-23

[8] Nan Yongqing, Xiao Haoran, Shan Wentao. Household assets, wealth effect and upgrading of household consumption: micro evidence from China's household tracking survey [J]. Journal of Shanxi University of Finance and Economics, 2020, 42 (08): 1-15. DOI: 10.13781/j.cnki.1007-9556.220.08.001

[9] Yi Xingjian, Chen Renjing, Lai Te, Yang Biyun. Does the improvement of the education level of household heads significantly increase the household savings rate [J]. Shanghai Finance, 2017 (11): 21-27. DOI: 10.13910/j.cnki.shjr.2017.11.003

[10] Liu Pengfei Research on the Mechanism of the Impact of "Fewer Children" on Household Savings Rate [J]. Journal of Central University of Finance and Economics, 2022 (03): 81-92+104. DOI: 10.19681/j.cnki.jcufe.2022.03.005