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## The Impact of Public Pension on Chinese Household Consumption\*

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### Abstract

**Purpose:** The improvement of the social security system can greatly affect residents' future uncertainty, and it is important to study the relationship between public pensions and household consumption. **Research design, data and methodology:** Using the 2018 China Household Panel Survey (CFPS) data, the instrumental variable method is used to analyze the impact of pension insurance on urban residents' consumption. **Results:** The results of the study show that there are differences in the impact of three different pension insurance systems on household consumption. The pension insurance for public sector significantly boosts household consumption, and having a pension insurance for public sector can increase household consumption by 7.7%. The pension insurance for enterprise employee will reduce household consumption, but this is only significant for urban households. The pension insurance for urban and rural residents has a negative impact on household consumption. For the 16- to 39-year-old group, having a pension insurance for urban and rural residents will reduce household consumption by 5.7%. At the same time, household income, assets, scale, and education level will positively stimulate household consumption. **Conclusions:** The study reveals varying impacts among different pension types, highlighting the need for optimizing social security schemes to incentivize higher consumption rates.

**Keywords:** Public Pension System, Pension Participation, Household Consumption

**JEL Classification Code:** D15, I38, J26

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## 1. Introduction

Since the 21st century, China's economy has been in a state of rapid development. The rapid economic development has increased per capita income, but the consumption rate has not increased. The Chinese economy has been facing the problem of low consumption and high savings. Insufficient household consumption has become one of the most important problems in the current Chinese economy. According to World Bank statistics, China's household consumption rate has dropped from 48% in 1996 to 38.7% in 2020. From an international comparison, China's household consumption rate is still at a low level. In 2010, the household consumption rates of the United States, Japan, and Australia were 65.8%, 57.6%, and 55.5%, respectively, and the Chinese household consumption rate was 35.9%; in 2020, the household consumption rates of the United States, Japan, Australia, and China were 65.2%, 53.7%, 55.1% and 38.7%, respectively. Insufficient consumption is not conducive to the sustainable development of the economy and has a negative impact on the development of China's economy.

One of the key factors to stimulate consumption is how to improve the social security system. The improvement of the social security system can greatly affect the uncertainty of residents in the future, which in turn affects the level of household consumption. In the social security system, public pensions are a very important component. At the same time, due to the serious aging of China's population, more and more people are concerned about the impact of public pensions on families. Therefore, it is even more important to identify the link between public pensions and consumption. In the post-crisis era, the governments of many countries hope to boost domestic demand and economic growth by expanding social security, which is also the strategy adopted by China, which has insufficient domestic demand. The study aims to investigate the impact of different pension insurance systems on urban household consumption in China using the 2018 China Family Panel Studies (CFPS) data. In the context of China's aging population and the need to stimulate domestic demand, understanding the relationship between public pensions and consumption becomes crucial. This research seeks to contribute to the broader goal of enhancing the social security system's effectiveness in promoting household consumption, especially given the challenges posed by the post-crisis economic landscape.

Many scholars have conducted research on the relationship between public pensions and household consumption. However, due to the differences in financial market levels, economic development levels, research methods and research data in different countries, scholars

have not made clear conclusions about the relationship between public pensions and household consumption. Some scholars argue that the pension system crowds out individual savings. Feldstein (1974) established an extended life cycle model and used time-series data to find that pension insurance reduces household savings by 30 to 50 percent. David Blake (2004) pointed out that the national pension system has a positive impact on personal consumption and a strong substitution effect on personal savings. Others, however, believe that such a significant effect did not exist. Leimer and Lesnoy (1982) questioned Feldstein's results and re-estimated the model, finding that public pensions have a much weaker effect on household savings. Barro et al. (1979) argues that transfers from old to young and bequest motives can offset the negative impact of Social Security on savings, so there is ultimately no difference.

In the context of China, researchers have explored the impact of public pension systems on household consumption and savings from different perspectives. According to Feldstein's framework, Feng et al. (2011) constructed a variable of "pension wealth" and found that pension wealth had a significant offsetting effect on urban household savings based on the surveys conducted by the China Household Income Project in 1995 and 1999. Similarly, Zhang (2008) and Shi and Wang (2010) found that pension wealth has a positive impact on the consumption expenditure of urban residents. But some scholars hold different views. Bai et al. (2012) found that, taking into account the pre-contribution income level and the coverage of old-age insurance, increasing the pension contribution rate will significantly inhibit the consumption of paying households. Zou et al. (2013) found that participating in basic insurance significantly increased household consumption expenditure, but for every 1% increase in pension insurance contribution rate, household consumption would decrease by 2.58%.

Based on the existing literature, it is found that although the research on the relationship between pension insurance and residents' consumption is relatively abundant, they are not consistent. Most of the research results show that pension insurance promotes residents' consumption, but there are also a small number of studies to the opposite conclusion. In terms of research methods, this paper pays attention to the possible endogeneity of old-age insurance, and uses the average participation rate of other families in the group as an instrumental variable to correct the estimation bias caused by endogeneity; in terms of research data, this paper uses the 2018 China The household tracking survey data, with sufficient sample, wide coverage area and wide survey scope, can reflect the general situation of Chinese residents, and the results are more representative and general.

The structure of this paper is as follows: Chapter 2 introduces the existing public pension system in China; Chapter 3 describes the data and constructs an econometric model; Chapter 4 examines whether pension insurance has an impact on household consumption through empirical analysis; Chapter five discusses the main findings of the study.

## 2. Public Pension Systems in China

With the great transformation of Chinese society, China has been exploring and reforming the pension system.

At present, there are three main types of parallel pension systems in China: the public sector pension system, the enterprise employee pension system, and the urban and rural residents pension system.

The public sector pension system is aimed at the staff of government agencies and institutions, who may not have participated in any social pension insurance projects and receive retirement benefits directly from their employers after retirement. The retirement age is 60 for males, 55 for female managers and technicians, and 50 for female workers. For these people, no contribution is required during the working period, and the pension received after retirement comes from the state financial appropriation.

The enterprise employee pension system includes basic pension insurance and enterprise supplementary pension insurance. The basic pension insurance covers all urban enterprises and their employees, freelancers and urban individual industrial and commercial households. It is a kind of old-age insurance system enforced in accordance with the unified national policy. The basic pension insurance requires enterprises and individuals to pay 20% and 8% of the total wages respectively. Those who have paid for 15 years and reached the retirement age can receive pensions. The pension age is the same as the public sector pension retirement age. The finance received after retirement will increase with the increase of the local average salary and contribution wages and the contribution years. Enterprise employee pension insurance belongs to the DB (defined benefit) type. Enterprise supplementary pension insurance refers to a form of pension insurance established by enterprises on the basis of participating in the national basic pension insurance, according to national policies and the economic situation of the enterprise. Enterprise supplementary pensions and basic pensions can be superimposed. Enterprise supplementary pension insurance is optional. Generally, companies with good economic conditions and high benefits will choose to purchase this insurance for their employees. Due to the low coverage of corporate supplementary pensions, which accounted for only 0.2% in 2018, this article does not consider the

for the time being.

The urban and rural residents pension insurance system refers to the new rural social pension insurance and urban residents' pension insurance after the merger in 2014.

This system is a pension insurance project implemented for urban and rural non-employed residents who do not meet the basic pension insurance conditions for employees. It is mainly composed of individual contributions and government subsidies. Urban and rural residents' endowment insurance cannot be received at the same time as enterprise employees' endowment insurance. Individuals who meet the insurance conditions can participate voluntarily and freely choose different payment standard grades, and the government subsidies for each payment grade are also different. When it was implemented in 2014, the payment standard was divided into 12 different grades from 100 yuan per year to 2,000 yuan per year. The specific payment and subsidy standards vary from region to region. The minimum annual payment standard in Beijing in 2020 is 1,000 yuan and the maximum is 9,000 yuan.

Individuals participating in the pension insurance for urban and rural residents, who have reached the age of 60 and have paid contributions for 15 years, can receive pension insurance benefits for urban and rural residents on a monthly basis.

Three different types of old-age insurance systems cover different types of people. In particular, the old-age insurance for urban and rural residents expands the coverage of the pension system from the employed to the non-employed, and from urban areas to rural areas. According to official statistics, in 2020, the number of people participating in pension insurance for enterprise employees reached 456 million; the number of people participating in pension insurance for urban and rural residents reached 540 million. According to the 2018 CFPS survey, public sector pension insurance accounted for 2.7%, enterprise employee pension insurance accounted for 13.2%, and urban and rural residents pension insurance accounted for 36.2%. Due to the fact that the latter two types of endowment insurance have not paid in the survey year, the coverage rate has been seriously underestimated. The average amounts of the three types of pension insurance in 2020 are 3,760 yuan, 2,940 yuan and 2,088 yuan respectively.

## 3. Methods

### 3.1. Data and Variables

The data used in this article is the 2018 China Family Panel Studies (CFPS). CFPS is a nationally representative large-scale micro-household survey conducted by the China

Social Science Survey Center of Peking University. CFPS is a biennial survey and is designed to be complementary to the Panel Study of Income Dynamics (PSID) in the United States. The first national wave was conducted under the collaboration of the Institute of Social Science Survey at Peking University and the Survey Research Center at the University of Michigan from April 2010 to August 2010. By tracking and collecting data at three levels of individuals, families and communities, CFPS reflects changes in China's society, economy, population, education and health. Provide a data foundation for academic research and public policy analysis. The survey samples in 2018 covered 14,218 households in 2,588 villages (communities) in 806 counties

in 32 provinces across the country.

Table 1 sets and defines the variables of interest. The CFPS respondents included all members of each household. This paper selects the head of household as the research object. In Chinese family life, the head of the household can better reflect the overall characteristics of the family. This paper selects the family financial manager as the head of household for analysis. The selection of financial managers is determined by the responses to the questionnaire "Which member of your household is most familiar with and able to answer some household financial questions from the past year?".

**Table 1:** Illustration of the variables.

Variables	Symbol	Definition
Household consumption (yuan/year)	hhcons	Household consumption includes food expenditure; communication and transportation; utilities; fuels; entertainment; clothing and bedding; beauty; furniture and durable goods; education and training; medical and fitness; purchase, maintenance and repair; automobiles; electronics; etc.
Pension	pension1	Whether you have a pension insurance for public sector : 1 for yes, 0 for no.
	pension2	Whether you have a pension insurance for enterprise employee : 1 for yes, 0 for no.
	pension3	Whether you have a pension insurance for urban and rural residents : 1 for yes, 0 for no.
Family characteristics.	hhinc	Household income (yuan/year). Household income covers household wage income and individual-based transfers; agricultural net income; self-employed activities; and household public transfer income.
	asset	Household assets (yuan). Household assets include current residence; other residences; land; equipment, durables and valuables; and financial assets.
	urban	Live in urban or rural areas.urban is 1, rural is 0.
	children	The number of children in the family.
	hhscale	Number of household members, including respondents living together with their children, parents or siblings.
Personal characteristics.	gender	Gender. Male is 1, female is 0.
	age	Age of head of household
	hukou	Agricultural hukou is 1 and non-agricultural hukou is 0.
	married	Married is 1, non-married is 0.
	schooling	Years of education.
	health	Health of the head of household. Healthy 1; Unhealthy 0.

Table 2 shows the descriptive statistics of the sample. First, samples with missing data were removed due to some missing data. Second, samples with heads of households younger than 16 were excluded. Third, because the household income of some low-income families only comes from subsidies, it is not representative. Therefore, the sample of the lowest and highest 5% of household income is not included. The final number of qualified samples was 9674. As shown in Figure 1, the average consumption, income and assets of the sample households are 58,985 yuan, 75,510 yuan and 725,700 yuan respectively.

The proportions of the three types of pension insurance in the sample were 2.7%, 13.2% and 36.2%, respectively.

**Table 2:** Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
hhcons	9457	58985.183	58335.465	5196	982600
pension1	9457	0.027	0.162	0	1
pension2	9457	0.132	0.339	0	1
pension3	9457	0.362	0.481	0	1
hhinc	9457	75510.152	58483.683	6900	316000
asset	9457	725695.97	1748351	2100	50461000
urban	9457	0.524	0.499	0	1
children	9457	1.731	1.073	0	9
hhscale	9457	3.573	1.846	1	21
health	9457	0.69	0.463	0	1
gender	9457	0.536	0.499	0	1

age	9457	49.717	14.559	16	93
hukou	9457	0.708	0.455	0	1
married	9457	0.847	0.36	0	1
schooling	9457	8.24	4.616	0	23

### 3.2. Model

The econometric regression model in this paper is as follows:

$$\ln hhcons_i = \alpha_1 + \beta_1 pension_i + \beta_2 F_i + \beta_3 P_i + \varepsilon_i \quad (1)$$

The explained variable  $\ln hhcons_i$  represents the logarithm of household consumption, and the pension include s three different types of pension insurance.  $F_i$  represents the control variable for family characteristics and  $P_i$  represents the variable for personal characteristics.  $i$  is the head of the household.

The underlying problem in this paper is the endogeneity of pension insurance. Because the pension insurance for enterprise employees are mandatory, they are highly related to the type of work. We assume that the participation of these two types of pension insurance is exogenous. Participation in pension insurance for urban and rural residents is voluntary. Whether or not to hold urban and rural residents' pension insurance is closely related to unobservable family characteristics or family heterogeneity, and these factors also affect household consumption decisions. Neglecting this problem can cause serious endogenous problems.

In order to solve the potential endogeneity problem, this paper makes various attempts to reduce the omission bias caused by the endogeneity problem as much as possible. Specifically, first, control more variables. The differences in household economic characteristics are mainly caused by regional differences. Controlling regional variables can capture family heterogeneity to a certain extent. According to Zong et al. (2015), this paper also controls in the regression. Second, for instrumental variables (IV), the selection of instrumental variables requires that the selected instrumental variables are highly correlated with the explanatory variables to be substituted and are not correlated with the error term. This paper selects the pension insurance ratio of other families in the group as an instrumental variable. To construct this instrumental variable, the most important thing is to determine the division of the number of groups and the control of samples within the group. In general, grouping variables should satisfy the exogenous condition. Based on the 2018 China House-

hold Tracking Survey data used in this article, household heads are grouped by age, education level, and region. Specifically, the heads of households are divided into 3 groups according to age (under 40 years old, 40-60 years old, and over 60 years old); household heads are divided into 2 groups according to their educational level (high school education and above, high school education below); Regions divide household heads into 3 groups (Eastern, Central, Western). So there are 18 groups: 3 age groups  $\times$  2 educational attainment groups  $\times$  3 regional groups. For the  $i$ -th family, the average participation rate of urban and rural residents' pension insurance of other families in the family's group is calculated as an instrumental variable.

### 4. Results and Discussion

In order to verify whether the influence of basic old-age insurance on household consumption exists, this paper adopts two methods of OLS and 2sls to study the influence of old-age insurance on household consumption. There exists a strong correlation between instrumental variables (IV) and explanatory variables. The p-value of the first-stage regression is less than 0.001. The Cragg-Donald Wald F-statistic results indicate that the IV is not a weak instrument. The regression results are shown in Table 4. The regression results show that the public sector pension insurance promotes household consumption. In the fourth column, the 2SLS regression coefficient is 0.077 under the control of regional characteristics, indicating that having public sector pension insurance can increase household consumption by 7.7%. This value is similar to the regression results of other models. The impact of enterprise employee pension insurance on household consumption is negative. The regression coefficients are small and insignificant. The pension insurance for urban and rural residents has restrained household consumption. This is likely because participation in such insurance is voluntary. Paying insurance premiums is also a part of the family's expenditure. Although it can get higher income in the future, it will still reduce the current consumption. In addition, household income and assets have a significant impact on consumption, and households with a large household population will also significantly promote consumption; households with higher education levels will also consume more. In addition, agricultural hukou and health have a significant negative impact on household consumption; marriage and living in a city have a significant positive impact on household consumption.

**Table 3:** OLS and 2SLS regression results

VARIABLES	OLS		2SLS	
	(1)	(2)	(3)	(4)
pension1	0.084** (0.041)	0.085** (0.041)	0.082** (0.041)	0.077* (0.041)
pension2	-0.009 (0.022)	-0.014 (0.022)	-0.015 (0.024)	-0.029 (0.024)
pension3	-0.031** (0.015)	-0.017 (0.015)	-0.050 (0.038)	-0.070* (0.041)
lnhhinc	0.355*** (0.011)	0.338*** (0.011)	0.355*** (0.011)	0.338*** (0.011)
lnasset	0.137*** (0.006)	0.136*** (0.007)	0.137*** (0.006)	0.136*** (0.007)
urban	0.108*** (0.016)	0.103*** (0.016)	0.107*** (0.016)	0.101*** (0.016)
hhscale	0.063*** (0.004)	0.067*** (0.004)	0.064*** (0.004)	0.068*** (0.004)
children	-0.001 (0.008)	0.003 (0.008)	-0.000 (0.008)	0.003 (0.008)
gender	-0.021 (0.013)	-0.026* (0.014)	-0.020 (0.013)	-0.026* (0.014)
age	- 0.009*** (0.001)	- 0.009*** (0.001)	-0.009*** (0.001)	-0.009*** (0.001)
schooling	0.010*** (0.002)	0.013*** (0.002)	0.010*** (0.002)	0.013*** (0.002)
hukou	- 0.136*** (0.018)	- 0.131*** (0.019)	-0.133*** (0.019)	-0.123*** (0.019)
married	0.146*** (0.020)	0.162*** (0.020)	0.149*** (0.020)	0.169*** (0.020)
health	- 0.058*** (0.015)	- 0.055*** (0.015)	-0.058*** (0.015)	-0.056*** (0.015)
Constant	5.147*** (0.114)	5.444*** (0.140)	5.155*** (0.115)	5.453*** (0.140)
Province Control	-	Yes	-	Yes
Cragg-Donald Wald F statistic	-	-	1710.681	1552.791
Observations	9,457	9,457	9,457	9,457
R-squared	0.444	0.455	0.444	0.454

Note: (1) The value in brackets is the standard error; (2)\*, \*\*, \*\*\* mean significant at the 10%, 5%, and 1% significance levels, respectively.

Table 5 is the regression results for different age groups and urban and rural classification. The results in the second column show that having a public sector pension increases household consumption by 15.8% when the head of the household is 40-59 years old. However, the effect was not significant for other age groups. This shows that the public sector pension has the strongest effect on the non-retirement middle-aged group. Due to the high benefit characteristics of the public sector pension insurance, these people may not save for future old age. The negative effect of urban and rural residents' pension insurance on the younger generation is the most obvious. This is because this kind of pension insurance is a "visible expenditure" compared to the first two. Participants will reduce their consumption accordingly when paying monthly fees. While such spending can pay off in the future, the rate of return is not high. On the other hand, compared with public sector pension insurance and enterprise employee

pension insurance, in the eyes of participants, urban and rural residents pension insurance can only guarantee the basic life in the future, and individuals still need to make precautionary savings for future old age life. Therefore, the negative effect of urban and rural residents' pension insurance on consumption is reasonable. This negative effect is more pronounced for young people. Enterprise employee pension insurance has a negative impact on urban households.

**Table 4:** Regression results of different age groups and groups by urban and rural

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Age 16~39	Age 40~59	Age 60+	urban	rural
pension1	0.035 (0.061)	0.158*** (0.057)	0.270 (0.171)	0.054 (0.041)	0.149 (0.111)
pension2	-0.023 (0.032)	0.037 (0.033)	0.086 (0.170)	-0.041* (0.023)	0.083 (0.052)
pension3	-0.057** (0.029)	0.022 (0.023)	-0.076 (0.055)	-0.011 (0.021)	-0.004 (0.022)
lnhhinc	0.356*** (0.022)	0.308*** (0.017)	0.340*** (0.021)	0.377*** (0.015)	0.298*** (0.016)
lnasset	0.123*** (0.013)	0.152*** (0.011)	0.110*** (0.014)	0.139*** (0.009)	0.129*** (0.011)
urban	0.087*** (0.028)	0.073*** (0.024)	0.141*** (0.034)	-	-
hhscale	0.040*** (0.008)	0.076*** (0.007)	0.083*** (0.009)	0.064*** (0.006)	0.070*** (0.006)
children	0.008 (0.021)	0.004 (0.013)	-0.013 (0.012)	-0.007 (0.011)	0.014 (0.011)
Constant	5.321*** (0.252)	5.818*** (0.246)	5.104*** (0.346)	4.833*** (0.182)	6.152*** (0.264)
Personal characteristics control	Yes	Yes	Yes	Yes	Yes
Province Control	Yes	Yes	Yes	Yes	Yes
Observations	2610	4,422	2,425	4,998	4,459
R-squared	0.375	0.396	0.494	0.449	0.371

Note: (1) The value in brackets is the standard error; (2)\*, \*\*, \*\*\* mean significant at the 10%, 5%, and 1% significance levels, respectively.

## 5. Conclusions

This paper uses the 2018 China Family Tracker Survey (CFPS) data to explore the relationship between pension insurance and household consumption. The results of the study show that there are differences in the impact of three different pension insurance systems on household consumption. Public sector pension insurance can significantly boost household consumption. Having public sector pension insurance can increase household consumption by 7.7%; enterprise employee pension insurance will reduce household consumption, but this is only significant for urban households; urban and rural residents pension insurance have a negative impact on household consumption influences. For the 16- to 39-year-old group, having a pension insurance for

urban and rural residents will reduce household consumption by 5.7%. The purpose of pension is to protect the basic living needs of the elderly and provide them with a stable and reliable source of life. At the same time, as a kind of social security, pension insurance should also be used as a macro policy to promote economic development. As China's household consumption rate is decreasing year by year, the government should subsidize enterprise employee pension insurance and urban and rural residents pension insurance to improve the benefits of these two types of pension insurance, thereby increasing the marginal consumption rate of these two insurance participants and driving domestic economic cycle.

While this study sheds light on the intricate relationship between public pension systems and household consumption, it is important to acknowledge its limitations. A major limitation is that although the data sample covers the entire region, it is not uniform. Smaller samples in some regions may lead to measurement errors. Additionally, the study primarily examines the immediate impact of pension participation on consumption, and further research could delve into long-term effects. To enhance the value of future research, a comprehensive exploration of regional variations and potential policy implications could provide a more nuanced understanding of how different pension systems influence consumption patterns.

This study offers several theoretical implications for understanding the dynamics between pension insurance and household consumption. The findings underscore the significance of considering the design and structure of pension systems as essential elements in shaping consumption behavior. Furthermore, the study's identification of differential effects among various pension types contributes to the ongoing discourse on optimizing social security programs to encourage higher consumption rates. By delving deeper into the theoretical underpinnings of consumer behavior and social policy, this research provides valuable insights for policymakers and researchers aiming to design effective strategies to bolster domestic demand and economic growth.

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