Is There a Phenomenon of Despising the Poor and Currying Favour with the Rich in Urban and Rural Residents' Basic Pension Insurance System? Empirical Test Based on Ordered-Probit Model and Strategy of Establishing an Information Pension Insurance Service System

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Abstract. When establishing a unified basic pension insurance system for urban and rural residents, the State Council of China emphasized that it should be fair and sustainable. However, whether there is a phenomenon of despising the poor and currying favor with the rich in urban and rural residents' basic pension insurance system is rarely discussed. Using China household financial survey data and Ordered-Probit Model, this paper analyses the impact of rural households' income on the selection of pension insurance grades. The research results show that there is a significant positive correlation between the income of rural households and the grades selection of urban and rural residents' basic pension insurance system. and the robustness of this result was tested using IV Ordered-Probit model. Further analysis shows that income presents obvious heterogeneity in promoting the participation level of urban and rural residents' basic pension insurance system, which is mainly manifested as: income has a greater impact on the choice of pension insurance level for rural women and middle-aged people. From the perspective of income division, the effect of income in promoting high-end pension insurance participation is only significant for high-income groups. At last, this paper puts forward the strategy of establishing an information pension insurance service system.

Keywords: Urban and Rural Residents' Basic Pension Insurance System · Participation Grades · Ordered Probit Model · Information · Instrumental Variable Method

1 Introduction

In 2009, the new rural social pension insurance began to be piloted. After 10 years of operation, the number of people participating in the pension insurance for urban and

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rural residents in China increased from 102.77 million in 2010 to 532.66 million in 2019, and the proportion of the rural population increased from 15.3 in 2010 15.3% increased to 96.6% in 2019. According to data from the China Pension Report, in 2017, the per capita payment of urban and rural residents' pension insurance was 227.2 yuan, and rural residents generally chose the lowest level of payment. However, after the age of 60, the insured cannot meet their minimum survival needs only by receiving the lowest-grade pension insurance for urban and rural residents. High-end pension insurance with stronger old-age security capabilities are mostly covered by higher-income groups. The pension insurance for urban and rural residents in China has formed a situation of wide coverage, low security, and polarization between the rich and the poor.

When the State Council established the pension insurance for urban and rural residents, it emphasized that it should be fair and sustainable. Rural residents are the main participants and beneficiaries of the implementation of the pension insurance system. Ensuring their fair participation and high-quality participation is an important prerequisite for ensuring the fairness of the pension insurance for urban and rural residents. However, the current fiscal subsidy model has led to insufficient incentives for fiscal subsidy funds, and to a certain extent, there has been a double loss of fairness and efficiency. The fiscal subsidy model urgently needs to be optimized. At the same time, due to short-sighted behaviors, generally low pension benefits, and lack of trust in pension insurance products, rural residents with lower incomes are more inclined to choose low-grade pension insurance with a higher proportion of financial subsidies. A large number of low-grade contributions have increased the financial pressure of the fund and have become the shackles of the sustainable development of urban and rural residents' pension insurance. Therefore, it is of great practical significance to assess whether the urban and rural residents' pension insurance has the phenomenon of despising the poor and currying favor with the rich for the fairness and sustainable development of the system.

So is the pension insurance for urban and rural residents more conducive to the rich, resulting in the polarization between the rich and the poor? If so, how does the income of rural residents affect their choice of insurance? This issue is related to the high-quality development of urban and rural residents' pension insurance. However, the academic research on urban and rural residents' pension insurance lacks corresponding theoretical analysis and empirical tests. The existing literature on pension insurance for urban and rural residents mainly revolves around the effects of insurance participation [2], policy reform paths, the sustainability of funds [3], the logic of participation, influencing factors of insured behavior and other issues unfold [4].

Most of the literature on the relationship between income and insured behavior lists income as one of the explanatory variables, without considering the endogenous problem, and most of them are studying the impact of income on whether to participate in insurance. Few literature studies the impact of income on the choice of pension insurance grades for rural residents. Based on this, this article uses 6198 cross-sectional data from the China Household Financial Survey Database (CHFS), uses Ordered-Probit regression and instrumental variable methods to test the impact of income on the choice of pension insurance grades, and further reveal the heterogeneity of the impact of income on the choice of pension insurance grades for rural residents. This article explores the logical difference of rural residents' different income groups participating in the pension

insurance, and provides empirical answers to whether there is a phenomenon of despising the poor and currying favor with the rich in urban and rural residents' basic pension insurance system.

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2 2. Research Design

2.1 Data Source

The data in this article mainly comes from the fourth round of the China Household Finance Survey (CHFS) survey data conducted by the China Household Finance Survey and Research Center of Southwestern University of Finance and Economics in 2017. The Chinese Household Finance Survey adopts a three-stage stratified sampling method. The CHFS2017 sample covers 40011 households in 29 provinces except Tibet, Xinjiang, Hong Kong, Macao and Taiwan. The sample covers a wide area and is well representative. Since this article mainly studies the payment grades of the pension insurance for urban and rural residents, only the data of household heads aged 18–60 who have participated in the pension insurance for urban and rural residents are retained, and the urban sample is excluded. After further matching and screening, 6198 valid samples were finally obtained. The amount data of the pension insurance payment grades for urban and rural residents in each province in 2016 was compiled by the author from the announcements of the provincial government websites.

2.2 Variable Description

2.2.1 Explained Variable

The explained variable of this study is the grades of the urban and rural residents' pension insurance. Since the grades of pension insurance for each province are uneven, each province's original grades are equally divided into six grades and assigned values Six integers. For example, in Shanxi Province, the original grades are 100 yuan, 200 yuan, 300 yuan, 400 yuan, 500 yuan, 600 yuan, 700 yuan, 800 yuan, 900 yuan, 1,000 yuan, 1,500 yuan, and 2,000 yuan. This article assigns the insured grade of Shanxi Province from 0–200 yuan to "1", which means low grade; 201–400 yuan to "2", which means lower grade; and 401–600 yuan to "3", which means general grade; 601–800 yuan is assigned a value of "4", which means a higher grade; 801–1000 yuan is assigned a value of "5", which means high grade; more than 1000 yuan is assigned a value of "6", which means the highest grade.

2.2.2 Main Explanatory Variable

The main explanatory variable in this article is the salary income of the sample last year. The questionnaire is "How much after-tax monetary salary did you actually earn last year?"; "How much is the total after-tax bonus income received last year? Including monthly bonus, quarterly bonus, year-end bonus, and Other awards."; "How much is

Table 1. Descriptive Statistics of Variables that Income Affects the Choice of the Urban-Rural Resident Pension Insurance Grades.

Variable name	Variable interpretation	Mean	Standard deviation
Insured grade	1 = low grade, 6 = highest grade	1.900	1.710
Logarithm of income	Logarithms of all wages in 2016	4.377	5.007
Age	Unit: Years	49.129	7.407
Education	1 = illiterate, 9 = PhD	2.758	0.930
Marriage	1 = married, 0 = not married	0.957	0.203
Health	1 = very good, 5 = very bad	2.695	1.030
Gender	1 = male, 2 = female	1.096	0.294
Risk preference	1 = risk aversion, 2 = risk preference	1.216	0.412
Family population size	Unit: individual	3.520	1.533
Total family assets	Logarithm of total household assets	12.052	1.484

the total after-tax subsidy income or in-kind income received last year? Including food, medical subsidies, transportation and communication subsidies, housing subsidies, etc. "The results of these three are added together to get the income of the sample last year, and the income is logarithmized.

2.2.3 Control Variable

In addition to explanatory variables and explained variables, based on reference to existing research on the factors affecting urban and rural residents' pension insurance, this article also controls the demographic and sociological characteristics, family characteristics, and province variables of the sample. The demographic and sociological characteristics of the sample mainly include age, education, marital status, health status, gender, and risk preference; family characteristics mainly include family population size and total family assets (Table 1).

2.3 Research Methods

The explained variables in this article are discrete variables. For discrete variables, probability models are usually used for estimation. Since the discrete variable of participation grade selection has more than two types and is ordered, this article chooses the Ordered-Probit model for analysis. This research focuses on investigating the impact of rural household income on the choice of pension insurance grades for urban and rural residents. According to the above model, the following linear relationship is established:

$$\text{grades} = \alpha_0 + \alpha_1 \ln(\text{income}) + \beta X_i + \varepsilon_i \quad (1)$$

In the above formula, grades represents the level of farmers participating in the urban-rural resident pension insurance. Ln (income) represents the logarithm of the farmer's

wage income in 2016; X_i represents a vector set of control variables, such as the age, education, marriage, health, gender, risk preference, family population, logarithm of family assets and other variables of farm households. If the coefficient α_1 is significant, it means that the income of farmers has a significant impact on farmers' participation in urban and rural residents' pension insurance. α_0 represents the intercept term; ε_i represents the random disturbance term.

In fact, whether the coefficient of farm household income in Eq. (1) can truly reflect the causal relationship between income and farm household's insured grade depends on the zero conditional mean assumption, that is, after controlling for variables such as farm households and family characteristics, the interviewee's income has nothing to do with the error term. In order to further illustrate the robustness of income affects farmers' participation in pension insurance grades, based on the method of [1], this paper uses the OLS measurement model to analyze and test whether the estimated results of the two methods are consistent. In addition, this article also uses the instrumental variable method and the key variable substitution method to discuss the robustness of the impact of income on rural households participating in the pension insurance grades for urban and rural residents.

3 3. Empirical Results and Analysis

3.1 Benchmark Regression Analysis

Table 2 is the regression results considering the influence of other factors. Among them, the models (I)-(IV) are the regression results after controlling for different variables such as personal characteristics and family characteristics. According to the results of model (IV), there is a significant positive correlation between income and the level of pension insurance for urban and rural residents. This shows that the higher the income of farmers, the more they tend to choose high-end pension insurance for urban and rural residents, it proves that urban and rural resident pension insurance has the phenomenon of despising the poor and currying favor with the rich. Model (V) is the estimated result of OLS. This result is completely consistent with the estimated result of the Ordered-Probit model in sign direction and significance level, which proves the robustness of the benchmark regression result.

The regression results of the control variables show that farmers with higher education levels are more inclined to choose high-end pension insurance for urban and rural residents. This may be because farmers with higher education have a clearer understanding of the policy and believe that high-end pension insurance has better pension insurance. Married farmers are more likely to choose lower-grade pension insurance for urban and rural residents. It may be that after marriage and childbirth, there are more diversified old-age options available, and the lack of motivation to participate in high-end pension insurance is in line with the traditional concept of "raise children to old age". Farmers with better health status are more likely to participate in high-end pension insurance. It may be that farmers with poor health have higher expenditures on medical and health, which has a crowding-out effect on pension insurance contributions. Female farmers are more inclined to participate in high-end pension insurance for urban and rural residents, because women have higher expectations for the elderly and hope

Table 2. The Influence of Income on the Choice of the pension insurance grades for urban and rural residents

	(I)	(II)	(III)	(IV)	(V)
Logarithm of income	0.033*** (0.003)	0.028*** (0.003)	0.025*** (0.003)	0.018*** (0.004)	0.026*** (0.004)
Age		0.008*** (0.002)	0.006*** (0.002)	0.002 (0.002)	0.001 (0.003)
Education		0.145*** (0.018)	0.116*** (0.018)	0.130*** (0.019)	0.159*** (0.025)
Marriage		−0.217*** (0.083)	−0.224*** (0.085)	−0.197** (0.089)	−0.269** (0.116)
Health		−0.105*** (0.017)	−0.081*** (0.017)	−0.055*** (0.018)	−0.055*** (0.020)
Gender		0.251*** (0.056)	0.244*** (0.056)	0.203*** (0.059)	0.297*** (0.075)
Risk preference		0.009 (0.031)	−0.002 (0.031)	0.025 (0.033)	0.010 (0.038)
Family population size			−0.045*** (0.011)	−0.020* (0.012)	−0.022* (0.013)
Total family assets			0.102*** (0.012)	0.090*** (0.013)	0.096*** (0.015)
Province fixed effect	NO	NO	NO	YES	YES
N	6198	6198	6198	6198	6198

Note: The robust standard errors are in parentheses. *, **, and *** indicate that the significance level is 10%, 5%, and 1% respectively, the same below

to get better protection in the future. The larger the family population, the lower the probability that farmers will participate in the high-end pension insurance. It may be that farmers have more diverse options for future pensions. Farmers with lower family assets tend to choose low-grade pension insurance for urban and rural residents, because relatively speaking, these farmers have higher family economic fragility and require careful calculations.

3.2 Analysis of Instrumental Variable Regression Results

From the perspective of the relationship between income and the level of pension insurance for urban and rural residents, On the one hand, participating in the pension insurance for urban and rural residents makes rural residents' old-age care more secure, reduces their pension pressure, and may weaken their motivation to save money for old-age care by increasing their income, which will affect their income. Therefore, there is a potential reverse causality. On the other hand, there may be some important variables that are missing in the benchmark regression, such as the propaganda of the pension insurance

Table 3. Regression result of instrumental variable method (IV-oprobit).

	(I)	(II)
Logarithm of income	—	0.057*** (0.018)
Non-agricultural working days last year	0.221*** (0.014)	—
Individual characteristic control variables	YES	YES
Family characteristics control variable	YES	YES
Province fixed effect	YES	YES
DWH test	chi2(1) = 4.132**	—
F statistic value	281.843***	—
Constant	10.808*** (0.959)	—
N	6198	6198

policy for urban and rural residents in the region, which may also cause endogenous problems. Choosing appropriate instrumental variables for the core explanatory variables is an effective way to solve the endogenous problem [5]. The instrumental variable selected in this paper is the number of working days of the farmers last year. First of all, the more days the farmers worked last year, the higher their labor remuneration would be, and there is a strong correlation with the farmers' wages last year. Secondly, the number of days rural households worked last year does not directly affect their choice of pension insurance for urban and rural residents. It needs to indirectly affect the choice of rural households' pension insurance participation through income. Therefore, this paper chooses the number of working days of farmers last year as an instrumental variable to satisfy the correlation and exogenous assumptions.

The estimated results of the IV-Oprobit model are shown in Table 3. From the estimation results of the first stage, the instrumental variables have a significant impact on the core explanatory variables, and meet the requirements of high correlation between instrumental variables and core explanatory variables. The result of the DWH test rejected the exogenous hypothesis of farmers' income. In addition, the F statistic value of 281.843 is significant at the 1% level, indicating that there is no problem of weak instrumental variables. Judging from the estimated results of the second stage, the impact of farmers' income on the choice of pension insurance grades for urban and rural residents is similar to the benchmark regression in direction and significance, but the impact coefficient is larger than that of the benchmark regression model, indicating the potential endogenous problem underestimated the influence of farmers' income on their choice of insurance grades.

Table 4. Robustness test.

	(I)	(II)	(III)	(IV)	(V)
Logarithm of household income per capita	0.131*** (0.015)	0.103*** (0.014)	0.071*** (0.015)	0.053*** (0.014)	0.060*** (0.016)
Individual characteristic control variables	NO	YES	YES	YES	YES
Family characteristics control variable	NO	NO	YES	YES	YES
Province fixed effect	NO	NO	NO	YES	YES
N	6050	6050	6050	6050	6050

3.3 Robustness Test

In order to explore the robustness of the benchmark regression results, this paper chooses the key variable substitution method for robustness testing. Divide the "2016 total household income" in the questionnaire by the total number of households to calculate the per capita income of the household and replace the core explanatory variable of rural household wage income in 2016. The regression results are shown in Table 4. The correlation coefficient between per capita household income and pension insurance grades is positive, and it has passed the significance test, indicating that per capita household income and farmers' wages have similar effects on pension insurance grades. The estimation results in Table 4 are very similar to those in Table 2, which once again proves the robustness of the benchmark estimation results in this paper.

3.4 Heterogeneity Analysis

Studies have shown that there is a significant inverted U-curve relationship between the age of rural residents and their insured behavior. There may be the same curve relationship in the selection of insurance grades. Secondly, the different division of labor between rural men and women in the family may affect their decision-making for insurance. In addition, different income groups may have similarities or differences in their internal insurance choices. Therefore, the following analysis of heterogeneity will be carried out according to the division of different ages, genders, and incomes. Table 5 reports the heterogeneity analysis of the impact of income on the level of urban and rural residents' pension insurance participation. From the perspective of different ages, the impact of income on the level of pension insurance participation is only significant in the sample of the middle-aged group. It may be that the farmers in the youth group have a more thorough understanding of the policy, and the youth group's pension pressure is not as great as that of the middle-aged group. From the perspective of different genders, the income estimated based on the male sample and the female sample has a significant positive impact on the level of the urban-rural resident pension insurance participation, which shows the robustness of the benchmark regression results. The estimation results

Table 5. Heterogeneity analysis.

	Logarithm of income	Control variable	Province fixed effect	N
< 45 years old	0.009 (0.008)	YES	YES	1439
>= 45 years old	0.020*** (0.004)	YES	YES	4759
Female	0.026** (0.013)	YES	YES	592
Male	0.017*** (0.004)	YES	YES	5606
< ¥3007	0.027 (0.018)	YES	YES	3585
¥3007-¥7827	−0.187 (0.576)	YES	YES	204
¥7828-¥11158	−0.484 (1.317)	YES	YES	167
¥11159-¥15726	−1.179 (0.992)	YES	YES	273
> ¥15726	0.293*** (0.067)	YES	YES	1969

show that the role of income in promoting women's choice of high-end pension insurance is greater than that of men, and it may be that women are more pursuing pension quality. According to the quintile per capita disposable income of rural residents in China Statistical Yearbook 2017 as the basis for grouping, this paper divides the sample into low-income group, lower-middle group, middle-income group, upper-middle group, and high-income group. The estimation results show that the impact of income on the insured grade is only significant in the high-income group. It may be that high-income groups have higher purchasing power and higher pension requirements.

4 Conclusions

This paper uses the data of the China Household Finance Survey (CHFS), using the Ordered-Probit model and instrumental variable method, to analyze the impact of rural household income on the choice of pension insurance grades for urban and rural residents. The conclusions are as follows: (1) The urban and rural residents' pension insurance presents a phenomenon of despising the poor and currying favor with the rich. Although urban and rural resident pension insurance has achieved the goal of wide coverage, it has also formed a situation of polarization between the rich and the poor. The existing system is more conducive to higher income farmers to enjoy better pension security. (2) Increasing income has shown obvious heterogeneity in promoting rural households to choose high-end urban and rural residents' pension insurance. Compared with men and

young people, income has a greater impact on rural women and middle-aged people in the choice of pension insurance levels. In terms of income, the effect of rising income on farmers' participation in high-end pension insurance is only significant in the high-income group, it shows that when income rises to a certain threshold, its promotion effect will be revealed.

With the development of information technology, the role of informatization on social security has become more prominent. The application of the Internet needs to go deep into the management process of urban and rural residents' basic pension insurance system, this informatization construction meets the standardization requirements for the construction of the pension insurance management system, and standardization and informatization promote each other. Therefore, this paper proposes the following strategies of establishing an information pension insurance service system: (1) Establish an integrated public service information platform to realize the organic connection of online and offline service channels. (2) Realize the professional management of archives. Innovate the means of file management informatization, improve the level of file informatization, establish a comprehensive service platform for file management, and realize the intelligent and convenient transfer of files in the handling business process. (3) Accelerate the application of handling services in informatization construction, use the Internet, big data, mobile terminals, social networks and other information technologies as means to establish a national unified information platform, build a social security online office, launch a social security APP or public account, provide Self-service, inquiry service.

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