

## Article

# Household Registration, Old-Age Insurance, and Consumption: Evidence from China

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**Abstract:** Understanding migrants' status and socio-economic outcomes can help develop immigrant societies. Household registration in China plays a vital role in migrants' status to provide an excellent research environment. Based on panel data from the Institute of Social Science Survey (CFPS) from 2012 to 2020, this paper investigates the impact of various old-age insurance schemes on urban residents' consumption with the difference in household registration. The result shows that insurance increases consumption more in a higher benefit scheme due to a lower level of precautionary saving motivation. Household registration reduces consumption by causing disparities in insurance coverage. Even after matching propensity scores to adjust for baseline differences between agricultural and non-agricultural households in cities, residents with agricultural registration participate more in a lower benefit scheme of old-age insurance. Furthermore, agricultural households consume less than non-agricultural households despite receiving the same old-age insurance scheme, owing to a greater incentive for precautionary savings. This finding sheds light on the relationship between economic behavior and social conditions with significant policy implications for the economic assimilation of migrants.



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**Keywords:** household registration; old-age insurance; household consumption; immigrant

## 1. Introduction

As an essential part of the social management system, old-age insurance has long been a focus of academic research. When it comes to the old-age insurance schemes, the issue of demographics is often involved. In recent years, the phenomenon of migration has gained prominence. Migration can slow down the trend of population decline in some aging countries and fill their labor gaps. However, it can lead to inequalities in access to old-age insurance. Due to the difficulty in acquisition of citizenship and the differences in international old-age insurance schemes, there is a significant difference in the non-naturalized immigrants' and native populations' retirement entitlements. Although immigrants live and work locally, they often do not participate in the same scheme of old-age insurance as natives because of status differences. Inequalities in access to old-age insurance can have many social, cultural, and economic implications [1–5]. As a critical driver of economic development, the impact on consumption is of particular concern. Specifically, how will the old-age insurance affect consumption? If differences in status lead to differences in people's access to old-age insurance schemes, will this lead to further differences in consumption? Answering these questions can help promote better social governance and foster socio-economic development. However, the existing literature has not explored these sufficiently. This paper discusses the joint effects of household registration and the old-age insurance schemes on household consumption for improving social management systems based on data from China.

China's urban–rural split and household registration requirements provide the perfect setting for our study. Household registration has long been a vital topic in China. The

Chinese government developed a population registration system to restrict and manage population migration in 1958 by issuing the Regulations on Household Registration of the People's Republic of China (In this paper, we refer to extensive research who used the term "household registration" to describe this system [6–9]. Some studies have also used the term "Hukou System", "Household System", etc., to describe this population registration system). Depending on whether a person lives in a rural or urban location, they are classified as either agricultural (rural) or non-agricultural (urban) registrations. Agricultural and non-agricultural households are eligible for distinct government subsidies and other benefits. In the system's early years, access to cities was denied to rural residents. Reform and opening up in China facilitated urban–rural mobility. Rural immigrants have long been a part of China's urbanization process. According to China's Seventh National Census results in 2020, the number of immigrants is 375.82 million. Compared with 2010, it increased by 69.73%. It has resulted in a "new urban–rural dual structure" of agricultural and non-agricultural households. Although the transfer from an agricultural registration to a non-agricultural registration is theoretically open to rural immigrants, people who achieve this transformation are very selective and few [7,10]. Without a local (non-agricultural) registration, rural immigrants cannot obtain local old-age insurance and some other public services from the local government, which may further affect the overall consumption level of residents in cities. For example, the World Development Indicators (WDI) from the World Bank show that Chinese households and NPISH's final consumption expenditure has remained at around 37% of GDP since 2010 and only 38.1% of GDP in 2020. This number is probably a result of the social division between agricultural and non-agricultural households, like old-age insurance schemes.

The literature has provided a rich foundation for our discussion. However, to the best of our knowledge, they have not concurrently linked consumption with old-age insurance and household registration. First, the literature investigates the effect of old-age insurance on residents' consumption [11–13]. Regrettably, their findings are inconclusive, suggesting either a positive "wealth effect" or a negative "crowding out effect". Few include household registration differences, although some scholars have discussed the urban–rural divide in China's old-age insurance [14,15]. Second, a similar gap is in the literature on household registration. Scholars have analyzed the consumption differences that household registration restrictions bring to households [16,17], but without introducing the old-age insurance schemes simultaneously. Third, most existing empirical literature builds upon cross-sectional or two-period panel data with a short time dimension [18,19]. It limits the application of more research methods and does not consider the impact of time series.

Using multi-period household dynamics tracking data from the ISSS from 2012 to 2020, this paper discusses the residents' consumption under the joint influence of household registration and the old-age insurance schemes. Our study contributes to several strands of the literature. First, by introducing the heterogeneity of various schemes, we provide some fresh perspectives on how old-age insurance affects consumption. We find that old-age insurance shows a positive "wealth effect" on households' development and enjoyment consumption. It implies that the primary channel is precautionary saving. Different old-age insurance schemes have varying levels of impact because of this channel. The higher the benefits of the old-age insurance scheme, the higher the positive effects on household consumption owing to the lower incentive of saving preventively against future uncertainties. Secondly, we demonstrate that household registration plays a vital role in old-age insurance's influence on consumption. After matching for group differences, rural migrants with agricultural registration are more likely to be eligible for the lower-benefit insurance scheme, resulting in lower consumption. Even if the same insurance schemes cover them, migrants with agricultural registration spend less. The reason could be increased incentives for precautionary saving, which is being investigated further by introducing new forms of wealth such as housing. Finally, this paper uses a large sample of micro panel data with a fuller time series. Based on multiple methods of the propensity

score matching model and the fixed-effects model, we alleviate the sample selectivity bias to a certain extent to make the effect more explicit.

The paper is structured as follows: Section 2 presents the literature review and research hypotheses, Section 3 offers the data description and empirical design, Sections 4 and 5 present the empirical results and robustness tests, and Section 6 presents the conclusion.

## 2. Literature Review and Research Hypotheses

Consumption has always been an essential topic of economics research [20–22]. In terms of its causes, extensive research has linked it to demographic and sociological factors such as age structure and gender ratios [20,23]. Some of them are the impact of social security systems, such as old-age insurance, which involves Modigliani's life-cycle theory and Leland's precautionary savings theory [24,25].

According to Modigliani's life-cycle theory, rational people would maximize their consumption utility by saving during their working years to smooth their consumption in retirement [24]. After that, Leland suggests that even in temporary fluctuations in income, consumers would smooth out their consumption by saving preventively [25]. Further studies have introduced the role of old-age insurance. Scholars have argued that old-age insurance schemes can reduce future uncertainty from the micro perspective, thereby reducing households' precautionary savings and thus boosting current consumption [26–31]. Simultaneously, old-age insurance may also increase consumption from a macro perspective. In terms of risk mitigation strategies, old-age insurance is essentially distinct from private savings. Private saving is the reallocation of resources across an individual's lifetime. On the other side, old-age insurance achieves external risk-taking. Its risk-sharing mechanism is income redistribution within cohorts (groups of people who buy the same type of insurance) and across generations (within generations) [32,33]. Old-age insurance's redistributive role has been shown to promote macroeconomic wellbeing [32,34,35]. Old-age insurance can increase stability in older age groups by diversifying inflation risk and minimizing individual market investment risk. Old-age insurance benefits are distributed according to progressive welfare standards, which transfer more to low-wage earners. It reduces poverty and improves income distribution. The above macro factors also help to boost population consumption. Another view is that old-age insurance has a "crowding out effect" on current consumption. The reason lies in the budget constraints or the target savings that may be present. Participation in old-age insurance may reduce current disposable income, reducing residents' current consumption [36–41]. Therefore, the direction of old-age insurance's effect on residents' consumption depends on these two factors. When the wealth impact is greater, the reduction in the savings rate caused by old-age insurance may exceed the premium contribution of residents, increasing current consumption. Conversely, it would lead to a decrease in households' current consumption.

In addition, some studies have also focused on the impact of old-age insurance on the structure of household consumption. Household consumption expenditure is in two categories: consumption for survival and consumption for development and enjoyment under the variations in residents' consumption motives. The former includes clothing, food, and housing to meet the survival needs, and the latter comprises education, communication, and health to meet the higher-level needs of the household. Based on the above consumption types, the results of the studies are not entirely consistent. According to some studies, as social security programs like old-age insurance improve, both kinds of consumption rise because of predictable increases in social benefits and more stable income [12,42,43]. In contrast, some scholars have found that old-age insurance impacts development and enjoyment consumption [44–46].

In short, as part of the social security system, old-age insurance plays a vital role in household consumption. The impact of old-age insurance on household consumption expenditure is uncertain. In other words, participation in old-age insurance can either increase consumption by reducing precautionary saving, which is the "wealth effect", or decrease household consumption by reducing current disposable income due to the

“crowding out effect”. Moreover, old-age insurance includes social insurance and commercial insurance. The two schemes in China’s social old-age insurance system are old-age insurance for employees and old-age insurance for urban and rural residents. There are inconsistencies between the two schemes’ policies and concrete procedures, specifically regarding contribution requirements and pension benefit calculations. First, considering the contribution criterion for employee old-age insurance, employers and employees are accountable for income-based contributions. The employee contributes 8% of their salary, and the employer contributes 19%, for a total contribution ratio of 27%. For the old-age insurance for urban and rural residents, contributions range from 100 to 2000 RMB annually. The local government subsidizes participants’ contributions by 30 or 60 RMB per person each year. We derive an individual contribution rate of around 8 percent by dividing the personal minimum payment amount (RMB 100) by China’s average minimum living standard (RMB 1245). Hence, the individual contribution rates are similar between the two insurances.

Second, there are also differences in the pension benefit calculation. The monthly standard of basic pension for old-age insurance for employees takes the monthly average wage of employees in the last year in their area and the average value of indexation monthly average pay cost wage of individual as the base. In comparison, the central government determines the minimum basic pension level for old-age insurance for urban and rural residents based on economic development, price levels, etc. Regarding the monthly per capita pension (absolute amount), there is a glaring discrepancy between the two insurances. The per capita pension for the old-age insurance for employees is always higher than that for old-age insurance for urban and rural residents. From 2012–2021, the absolute difference in yearly per capita pensions between the two insurances ranged from 20,020 to 40,637 RMB. Thus, the individual contribution rates for the two insurances are similar. However, there are substantial variations in pension benefits. The benefit for participants of old-age insurance for employees is more excellent than that for the other insurance participants. Making a distinction between the effects of various old-age insurance programs can help test whether the “wealth effect” or the “crowding out effect” is more effective. If the “wealth effect” prevails, the greater the inadequacies of benefits, the greater the need for precautionary savings, and the lower the level of consumption. Compared to employee insurance, old-age insurance for urban and rural residents might have less of a positive impact on consumption. Moreover, if it exists, it verifies the existence of the precautionary savings channel since the role of macro-level factors should not vary significantly between schemes. If the “crowding out effect” is prominent, the effects of the two insurances on consumption should be similar because of equal individual contribution rates. Accordingly, this paper proposes two alternative hypotheses.

**Hypothesis 1a:** *Residents’ participation in old-age insurance positively affects household consumption. Old-age insurance for urban and rural residents may have a lower positive impact on consumption than old-age insurance for employees.*

**Hypothesis 1b:** *Residents’ participation in old-age insurance harms household consumption. Old-age insurance for urban and rural residents and old-age insurance for employees have consistent effects.*

Below, we introduce the household registration. The movement of the population between urban and rural areas has provided a rich source of labor for China’s economic development. At the same time, China’s long-standing urban–rural household registration system has prevented most of China’s rural immigrants from obtaining non-agricultural registered residence in the place of entry [47,48]. Researchers also refer to rural–urban migrants as the “migrant workers” [47,49–51]. Although they live in the city, their agricultural registration does not change. The “migrant workers” differ from the local residents in terms of housing, social security, etc., and these differences extend to the education and health of

the next generation and to economically sustainable areas such as the environment [52–54]. At the same time, researchers find that this group tends to have a lower propensity to consume in the current period and a higher propensity to save, which differs from residents with non-agricultural household registration [55,56]. There are many explanations for this, one being income from work. Some studies have found that the “migrant workers” have lower incomes than citizens, reducing their consumption levels [57,58]. According to this kind of research, this paper attempts to explain the lower consumption levels of the “migrant workers”, who are rural immigrants with agricultural registration in cities, from the participation of old-age insurance of various benefits.

Rural immigrants have always been vulnerable regarding old-age insurance. Work discrimination due to household registration differences affects the employment of rural immigrants [59–62]. The immigrants with an agricultural registration in cities are often confined to lower-end industries and lack formal employment relationships. This situation may result in them not participating in the same scheme of old-age insurance as local urban residents with non-agricultural registration. They may suffer a low-benefit level of old-age insurance. Further, lower access to future benefits may increase their precautionary saving incentive and thus lead to a low level of consumption for them. Therefore, we developed Hypotheses 2 and 3.

**Hypothesis 2:** *Residents with agricultural registration in cities are likelier to participate in a lower-benefit level of old-age insurance.*

**Hypothesis 3:** *Agricultural registration weakens the positive effect of old-age insurance on household consumption.*

### 3. Data Description and Empirical Design

#### 3.1. Data Description

The data in this paper are from the China Family Panel Studies (CFPS), a nationwide tracking survey conducted by the Institute of Social Science Survey of Peking University in 2012, 2014, 2016, 2018, and 2020. These data use a stratified sampling method to collect a large amount of micro-level information on households, providing a more comprehensive and detailed picture of their economic and financial behavior. The sample of households in the survey data comes from 31 provinces (municipalities and districts) across China, excluding Hong Kong, Macao, and Taiwan. Among them, 2211 households are in 2012, 4382 households in 2014, 4483 in 2016, 4671 in 2018, and 2546 in 2020. Referring to the literature, we clean the data as followings: (1) As the questionnaire does not set questions for the head of household, this paper designates the financial respondent as the head of household. (2) Because of the research topic of this paper, we only retain those residents whose place of residence is in cities. (3) The head of household’s age is restricted to over 18 and under 65, and we exclude the retired sample to avoid changes in household consumption due to retirement. (4) Remove missing values.

#### 3.2. Model Design and Variable Definition

This paper first examines the impact of the various types of old-age insurance schemes on household consumption. Recalling the classification of the old-age insurance scheme in China is necessary. According to the different contribution ratios and post-retirement benefits, China’s old-age social insurance schemes are two types: old-age insurance for employees and old-age insurance for urban and rural residents, apart from the commercial supplementary old-age insurance scheme. The old-age insurance for employees has a higher contribution and provides a higher level of benefit than the old-age insurance for urban and rural residents. Thus, we set up the following model to test hypothesis 1: identify the effect of various old-age insurance schemes on consumption.

$$\ln Cons_{it} = \sum \beta I\_Model_{it} + \beta_x X_{it} + \lambda_j + \gamma_t + \mu_{it} \quad (1)$$

Among them,  $\ln\text{Cons}_{it}$  represents the natural logarithm of household consumption expenditure. Specifically, we include three categories of consumption expenditure: total household consumption expenditure, survival consumption expenditure, and development and enjoyment consumption expenditure. The subscript  $it$  represents the  $i$  household in the  $t$  year;  $I\_Model_{it}$  represents the different types of old-age insurance schemes participated by the head of household;  $X_{it}$  are the control variables at the individual level and household level, such as party membership, marriage, work, household income, household housing assets, household financial assets, etc.;  $\lambda_j$  is province fixed effect,  $\gamma_t$  is for the time fixed effect, and  $\mu_{it}$  is for the residual item.

Next, we turn to the role of household registration for hypotheses 2 and 3. The effect of household registration on consumption first acts on the participation of different old-age insurance schemes. Despite being urban residents, agricultural and non-agricultural households have various chances of enrolling in various old-age insurance schemes. We cannot ignore that agricultural and non-agricultural households may belong to heterogeneous groups regarding factors like educational attainment and employment status. The differences in individual characteristics between groups may impact their participation in the old-age insurance scheme. Therefore, the empirical strategy to verify whether household registration affects the enrollments of the old-age insurance schemes focuses on dealing with the initial selective bias of the sample. Therefore, we utilize the propensity score matching method to obtain a balanced sample before comparing the participation rates of the old-age insurance schemes under different household registration statuses.

Further, this paper constructs an interaction term between household registration and various old-age insurance schemes. We set up the specific model as follows.

$$\ln\text{Cons}_{it} = \sum \beta_1 I\_Model_{it} + \beta_2 \text{hukou}_{it} + \sum \beta_3 I\_Model_{it} * \text{hukou}_{it} + \beta_x X_{it} + \lambda_j + \gamma_t + \mu_{it} \quad (2)$$

Among them,  $\text{hukou}_{it}$  represents the household registration type of the head of household;  $I\_Model_{it} * \text{hukou}_{it}$  represents the interaction between the three old-age insurance schemes and household registration. The primary parameter of interest in our paper is  $\beta_3$ .

The variable descriptions are in Table 1.

**Table 1.** Description of variables.

| Variable Type        | Variable Name                                            | Variable Description                                                           |
|----------------------|----------------------------------------------------------|--------------------------------------------------------------------------------|
| Explained variable   | Total household consumption expenditure (yuan)           | Consumer spending by household members last year                               |
|                      | Survival consumption expenditure (yuan)                  | Expenditure on food, utilities, transportation, communications, clothing, etc. |
|                      | Development and enjoyment consumption expenditure (yuan) | Expenditure on recreation, education, tourism, health care, welfare, etc.      |
| Explanatory variable | The old-age insurance for employees                      | Head of household, 1 = participated; 0 = not participated                      |
|                      | The old-age insurance for urban and rural residents      | Head of household, 1 = participated; 0 = not participated                      |
|                      | Commercial supplementary old-age insurance scheme        | Head of household, 1 = participated; 0 = not participated                      |
|                      | Household registration                                   | Head of household, 1 = agricultural household; 0 = non-agricultural household  |
| Control variable     | Age (years)                                              | Head of household, age                                                         |
|                      | Married or not                                           | Head of household, 1 = married; 0 = unmarried                                  |
|                      | Whether or not a member of the Communist Party of China  | Head of household, 1 = yes; 0 = no                                             |
|                      | Years of education (years)                               | Head of household, years of education                                          |

Table 1. Cont.

| Variable Type    | Variable Name                                         | Variable Description                                                                                      |
|------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Control variable | Health status                                         | Head of household, 1 = very healthy; 2 = very healthy; 3 = relatively healthy; 4 = general; 5 = unhealthy |
|                  | Number of household participants in old-age insurance | The number of people in the household who participated in old-age insurance                               |
|                  | Whether or not working                                | Head of household, do they have a job                                                                     |
|                  | Medical insurance                                     | Head of household, 1 = participated; 0 = not participated                                                 |
|                  | Gender                                                | Head of household, 1 = male; 0 = female                                                                   |
|                  | The total value of the housing (yuan)                 | The total value of housing owned by the household                                                         |
|                  | Value of current housing (yuan)                       | Current housing value of the household                                                                    |
|                  | Value of other housings (yuan)                        | The total value of other housing invested by the household                                                |
|                  | Number of housings in the household                   | Other properties owned by households in addition to existing housing                                      |
|                  | Whether or not own a house                            | 1 = yes; 0 = no                                                                                           |
|                  | Number of people working in the household             | Number of people with jobs in the household                                                               |
|                  | Number of children in the household                   | Number of children under the age of 18 in the household                                                   |
|                  | Number of household members                           | Number of household members                                                                               |
|                  | The total value of cash and savings (yuan)            | The total value of cash and deposits owned by households (precautionary savings)                          |
|                  | Household liabilities (yuan)                          | Total liabilities of households to buy financial assets, houses, etc., last year                          |
|                  | Total household income (yuan)                         | The income of household members last year                                                                 |
|                  | Household net assets (yuan)                           | Net assets of household members                                                                           |
|                  | Value of land (yuan)                                  | Value of land assets owned by household                                                                   |
|                  | Total household financial assets (yuan)               | The total value of all financial assets, such as stocks, funds, deposits, etc., in the household          |

### 3.3. Descriptive Statistics

Table 2 provides descriptive statistics for the subgroup's total household consumption, with the grouping criteria being household registration and old-age insurance schemes. The *t*-test value is a significant indicator of the between-group difference. Overall, households with non-agricultural registration consumption are significantly higher than residents with agricultural registration. Those who participated in old-age insurance also have significantly higher consumption than those who do not. Regarding the particular old-age insurance schemes, households who participate in the old-age insurance for employees and those who do the commercial supplementary old-age insurance have higher consumption than residents who do not.

Table 2. Grouping descriptive statistics.

| Categorical Variables                                                      | Total Household Consumption (Yuan) | <i>t</i> -Test |
|----------------------------------------------------------------------------|------------------------------------|----------------|
| Agricultural household                                                     | 73,112.67                          | 14.384 ***     |
| Non-agricultural household                                                 | 97,611.00                          |                |
| Participated in old-age insurance                                          | 91,680.73                          | −13.953 ***    |
| Not participated in old-age insurance                                      | 70,109.31                          |                |
| Participated in the old-age insurance for employees                        | 109,000.30                         | −17.557 ***    |
| Not participating in the old-age insurance for employees                   | 72,752.50                          |                |
| Participated in the old-age insurance for urban and rural residents        | 77,734.14                          | 6.030 ***      |
| Not participating in the old-age insurance for urban and rural residents   | 87,537.29                          |                |
| Participated in the commercial supplementary old-age insurance system      | 137,818.60                         | −8.094 ***     |
| Not participating in the commercial supplementary old-age insurance system | 82,375.85                          |                |

Note: \*\*\* denote significance at the 1% levels, respectively, with heteroskedasticity robust standard deviation in brackets, as below.

On the other hand, the consumptions of the households with agricultural registration and those who participated in the old-age insurance for urban and rural residents are both smaller. One possible reason for their convergence is the overlap between these two groups. That is, the majority who participated in the old-age insurance for urban and rural residents

are households of agricultural registration, thus resulting in the same lower consumption. However, this is only a simple statistics result which needs further analysis later.

#### 4. Empirical Results

##### 4.1. Effects of Old-Age Insurance on Household Consumption

First, this paper explores the impact of various old-age insurance schemes on household consumption. Columns 1–2 of Table 3 show the effects of different old-age insurance schemes on total household consumption before and after the inclusion of control variables, but none of the results are significant. Since this may be due to the heterogeneity of the different types of consumption, we further estimate by dividing household consumption into survival consumption expenditure and development and enjoyment consumption expenditure. We found that the old-age insurance schemes have a significant positive effect on development and enjoyment consumption, which is reported in columns 3–4 of Table 3. This result suggests that old-age insurance in China has a “wealth effect” on development and enjoyment consumption by lowering future uncertainty and precautionary saving. We believe that the insignificant impact of old-age insurance on survival consumption is reasonable because survival consumption expenditure is a necessary part of household consumption expenditure. It is difficult for residents to change this part of expenditure regardless of future certainty. Thus, we focus on total household consumption and development and enjoyment consumption in the following sections.

**Table 3.** Impact of different insurance schemes on household consumption.

| Variables                                             | Total Household Consumption |                       | Development and Enjoyment Consumption |                      |
|-------------------------------------------------------|-----------------------------|-----------------------|---------------------------------------|----------------------|
|                                                       | (1)                         | (2)                   | (3)                                   | (4)                  |
| The old-age insurance for employees                   | 0.003<br>(0.023)            | 0.021<br>(0.022)      | 0.077 *<br>(0.041)                    | 0.091 **<br>(0.040)  |
| The old-age insurance for urban and rural residents   | −0.034<br>(0.021)           | −0.015<br>(0.020)     | 0.070 *<br>(0.037)                    | 0.083 **<br>(0.037)  |
| Commercial supplementary old-age insurance            | 0.051<br>(0.041)            | 0.038<br>(0.039)      | 0.180 **<br>(0.073)                   | 0.159 **<br>(0.072)  |
| Number of household participants in old-age insurance | 0.056 ***<br>(0.010)        | 0.017 *<br>(0.010)    | 0.060 ***<br>(0.017)                  | 0.021<br>(0.018)     |
| Health status                                         |                             | −0.002<br>(0.007)     |                                       | 0.033 **<br>(0.013)  |
| Whether or not working                                |                             | −0.010<br>(0.022)     |                                       | −0.013<br>(0.041)    |
| Log of the total value of housing                     |                             | 0.008 ***<br>(0.002)  |                                       | 0.003<br>(0.005)     |
| Number of housings in the household                   |                             | 0.083 ***<br>(0.015)  |                                       | 0.099 ***<br>(0.028) |
| Whether or not you own a house                        |                             | −0.087 ***<br>(0.027) |                                       | −0.022<br>(0.049)    |
| Number of people working in the household             |                             | 0.024 **<br>(0.010)   |                                       | −0.014<br>(0.019)    |
| Number of children in the household                   |                             | 0.017<br>(0.016)      |                                       | 0.048 *<br>(0.029)   |
| Number of household members                           |                             | 0.085 ***<br>(0.009)  |                                       | 0.142 ***<br>(0.017) |
| Log of the total value of cash and savings            |                             | −0.006 *<br>(0.003)   |                                       | −0.010 *<br>(0.006)  |
| Log of household liabilities                          |                             | 0.027 ***<br>(0.002)  |                                       | 0.024 ***<br>(0.003) |
| Log of total household income                         |                             | 0.033 ***<br>(0.003)  |                                       | 0.049 ***<br>(0.006) |
| Log of household net assets                           |                             | 0.007 ***<br>(0.002)  |                                       | 0.006<br>(0.004)     |
| Log of the value of land                              |                             | −0.003<br>(0.002)     |                                       | 0.006<br>(0.005)     |
| Log of total household financial assets               |                             | 0.013 ***<br>(0.003)  |                                       | 0.025 ***<br>(0.006) |
| Province fixed effects                                | YES                         | YES                   | YES                                   | YES                  |
| Year fixed effects                                    | YES                         | YES                   | YES                                   | YES                  |
| Constant                                              | 10.741 ***<br>(0.258)       | 9.935 ***<br>(0.252)  | 9.127 ***<br>(0.464)                  | 7.873 ***<br>(0.464) |
| Observed values                                       | 15,747                      | 15,747                | 15,747                                | 15,747               |
| R-squared                                             | 0.106                       | 0.183                 | 0.092                                 | 0.129                |

Note: \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

The results in Table 3 also show that different old-age insurance schemes have different levels of impact. Participation in the commercial supplementary old-age insurance has the most significant impact on development and enjoyment consumption, followed by the old-age insurance for employees and the old-age insurance system for urban and rural residents. Compared with residents who do not participate in the specific insurance, the three insurance schemes lead to an increase in household consumption of 15.9%, 9.1%, and 8.3%, respectively. By then, we verify Hypothesis 1a. The result confirms the wealth effect and the channel of precautionary saving. The benefit of the commercial supplementary old-age insurance and the old-age insurance for employees is more potent than that of the old-age insurance for urban and rural residents, which reduces the need for precautionary savings and leads to more excellent effects to increase consumption. It is also intuitive that commercial supplementary old-age insurance has the most remarkable impact on boosting current consumption. Because commercial supplementary old-age insurance is an additional optional insurance, households that can purchase commercial supplementary old-age insurance should be wealthy enough not to squeeze consumption to buy insurance. This phenomenon makes the role of the positive influence even more pronounced in the case of commercial supplementary old-age insurance.

In addition, the results in Table 3 show that the more household participants in old-age insurance, the higher the household consumption, which further supports the positive effect of participation in old-age insurance on household consumption. In terms of other control variables, it is a similar result to the previous literature. Pay a little attention to some variables. One is the household head's health. Here, the health status variable is derived from the CFPS survey question, "How would you rate your health status?" There are five potential answers. "1. Excellent; 2. Very good; 3. Good; 4. Fair [Don't read out]; 5. Poor." Based on this, we built a dummy variable to measure their health by converting the option number to value. A higher value indicates poorer health. Considering that the above question is a subjective self-assessment questionnaire, we developed an alternative dummy variable to represent health status from the following questions. "During the previous six months, have you had any doctor-diagnosed chronic disease?" The answer "Yes" is set to 1, indicating unhealth, or vice versa. The results of the estimates are consistent. The worse the health status, the higher the development and enjoyment consumption. This might be due to medical care consumption in the development and enjoyment consumption. We found that the more housing and the higher housing's value, the higher the total household consumption. That is, there is also a positive "wealth effect" of the housing value on household consumption, consistent with Gan's research [63].

#### 4.2. Tying Household Registration to Insurance Participation

Next, we investigated whether households with various registration statuses participate differently in various old-age insurance schemes. As shown in columns 1, 3, and 5 of Table 4, there are discrepancies in participating in old-age insurance schemes between household registers. Among them, there are a total of 8616 households in agricultural households, of which 14.75% are in old-age insurance for employees, 2.58% are in commercial supplementary old-age insurance, and 46.02% are in old-age insurance for urban and rural residents. In non-agricultural households, there are 7131 households, with 51.96% in old-age insurance for employees, 4.18% in commercial supplementary old-age insurance, and 19.42% in old-age insurance for urban and rural residents. This means that non-agricultural households are significantly more likely than agricultural households to participate in the old-age insurance for employees and the commercial supplementary old-age insurance before controlling for baseline differences. Given the old-age insurance for the urban and rural residents, the ratio of log occurrence rates for agricultural and non-agricultural registrations is 1.157. That is to say, without considering the baseline difference between the groups, residents with agricultural registrations in cities tend to participate in old-age insurance for urban and rural residents.

**Table 4.** The participation rates in insurance schemes for varied households before and after matching.

| Domicile status                 | The Old-Age Insurance for Employees |                       | Commercial Supplementary Old-Age Insurance |                       | The Old-Age Insurance for Urban and Rural Residents |                      |
|---------------------------------|-------------------------------------|-----------------------|--------------------------------------------|-----------------------|-----------------------------------------------------|----------------------|
|                                 | Pre-Match                           | After Match           | Pre-Match                                  | After Match           | Pre-Match                                           | After Match          |
|                                 | (1)                                 | (2)                   | (3)                                        | (4)                   | (5)                                                 | (6)                  |
| Agricultural households (%)     | 14.75                               | 16.63                 | 2.58                                       | 2.82                  | 46.02                                               | 44.02                |
| Non-agricultural households (%) | 51.96                               | 51.96                 | 4.18                                       | 4.18                  | 19.42                                               | 19.42                |
| D                               | −1.678 ***<br>(0.008)               | −1.675 ***<br>(0.008) | −0.493 ***<br>(0.058)                      | −0.463 ***<br>(0.060) | 1.157 ***<br>(0.125)                                | 1.166 ***<br>(0.129) |
| Sample size                     | 15,747                              | 14,262                | 15,747                                     | 14,262                | 15,747                                              | 14,262               |

Note: 1. \*\*\* denote significance at the 1% levels, respectively. 2. D = ln (odds ratio), the standard error in parentheses. 3. 1:1 matching based on whether the household is rural or not.

However, as there may be some fundamental differences between households with agricultural registration and households with non-agricultural registration in cities, this may impact the participation of the residents' insurance schemes. This paper uses the propensity score matching method to address heterogeneity. We used a logistic model to calculate the probability of households with different registration statuses. The covariates are the head of the household's gender, whether or not they are a member of the Communist Party of China, years of education, health status, married or not, whether or not working, the number of children in the household, the number of people working in the family, and whether or not they own a house. For each household, the logit estimation yields a propensity score. Using the scores, we paired a rural migrant household with a nearby urban household and got 14,262 samples. After the propensity score matching, the two groups with agricultural or non-agricultural registrations in the matched sample are very similar.

Table 4's columns 2, 4, and 6 compare the proportion of households with different registrations participating in various old-age insurance schemes in the matched sample. The results show that the proportion of agricultural households participating in the old-age insurance for employees and the commercial supplementary old-age insurance has risen. In the case of old-age insurance for employees, the chance of occurrence of agricultural households against non-agricultural households increases from 18.67% ( $10^{-1.678}$ ) to 18.73% ( $10^{-1.675}$ ), while households registered for agriculture experience a declining occurrence in old-age insurance for urban and rural residents.

Comparing the participation of old-age insurance schemes by households with different registrations before and after matching, we found that varied households still prefer particular types of insurance. That is, households with agricultural registrations participate more frequently in the old-age insurance for urban–rural residents. In comparison, households with non-agricultural registration participate more regularly in the old-age insurance scheme for employees and the commercial supplementary old-age insurance scheme. Hypothesis 2 is proved. Due to factors such as job discrimination and unequal professional development resulting from the restriction on household registration [61,64,65], agricultural households have greater job mobility. Frequent job mobility makes it difficult for them to enjoy the scheme with a higher level of benefits. Further, this can impede residents' economic assimilation.

#### 4.3. The Joint Influence of Household Registration and Insurance on Consumption

The above result shows different participation rates in the old-age insurance schemes for households with various household registrations. Since the residents with agriculture registration participate more in the low-benefit insurance, the low level of consumption might have. Does the impact of insurance on consumption vary by household registration status? To address it, we introduce the interaction terms between various insurance schemes and household registration in the two-way fixed effects model.

Table 5 shows the results. The insurance schemes only significantly affect development and enjoyment consumption, so we concentrate on column 4, and the corresponding interaction terms are the focus. The interaction term coefficients in column 4 are all significantly

negative. It suggests that, regardless of the type of old-age insurance, agricultural registrations consume less than non-agricultural registrations with the same old-age insurance scheme. The effect is the biggest among households participating in the old-age insurance for urban and rural residents. At the 1% significance level, those with agricultural registrations would consume 19.8 percent less than those with non-agricultural registrations among participants in insurance for urban and rural residents. This makes sense, as rural migrants are more likely to enroll in the old-age insurance program for urban and rural residents and to save for the future. Hypothesis 3 is confirmed.

**Table 5.** The joint effects on consumption.

| Variables                                                                    | Total Household Consumption |                       | Development and Enjoyment Consumption |                       | Development and Enjoyment Consumption (Except Medical Care Consumption) | Medical Care Consumption |
|------------------------------------------------------------------------------|-----------------------------|-----------------------|---------------------------------------|-----------------------|-------------------------------------------------------------------------|--------------------------|
|                                                                              | (1)                         | (2)                   | (3)                                   | (4)                   | (5)                                                                     | (6)                      |
| The old-age insurance for employees                                          | 0.017<br>(0.027)            | 0.034<br>(0.026)      | 0.129 ***<br>(0.048)                  | 0.142 ***<br>(0.048)  | 0.185 ***<br>(0.060)                                                    | 0.176<br>(0.111)         |
| The old-age insurance for urban and rural residents                          | 0.024<br>(0.030)            | 0.044<br>(0.029)      | 0.178 ***<br>(0.054)                  | 0.195 ***<br>(0.053)  | 0.269 ***<br>(0.066)                                                    | 0.195<br>(0.124)         |
| Commercial Supplementary Old-age insurance                                   | 0.072<br>(0.054)            | 0.067<br>(0.052)      | 0.170 *<br>(0.097)                    | 0.159 *<br>(0.095)    | 0.160<br>(0.119)                                                        | 0.613 ***<br>(0.222)     |
| Number of household participants in old-age insurance                        | 0.058 ***<br>(0.010)        | 0.020 **<br>(0.010)   | 0.065 ***<br>(0.017)                  | 0.027<br>(0.018)      | 0.027<br>(0.023)                                                        | 0.077 *<br>(0.043)       |
| The old-age insurance for employees × household registration                 | −0.032<br>(0.043)           | −0.028<br>(0.042)     | −0.132 *<br>(0.078)                   | −0.131 *<br>(0.076)   | −0.127<br>(0.096)                                                       | −0.030<br>(0.178)        |
| The old-age insurance for urban and rural residents × household registration | −0.098 ***<br>(0.037)       | −0.101 ***<br>(0.035) | −0.188 ***<br>(0.066)                 | −0.198 ***<br>(0.065) | −0.267 ***<br>(0.081)                                                   | −0.198<br>(0.152)        |
| Commercial supplementary old-age insurance × household registration          | −0.051<br>(0.081)           | −0.072<br>(0.077)     | 0.007<br>(0.145)                      | −0.018<br>(0.142)     | 0.054<br>(0.178)                                                        | −0.752 **<br>(0.332)     |
| Household registration                                                       | −0.012<br>(0.040)           | 0.000<br>(0.039)      | 0.119 *<br>(0.072)                    | 0.126 *<br>(0.071)    | 0.057<br>(0.089)                                                        | 0.323 *<br>(0.166)       |
| Control variables                                                            | YES                         | YES                   | YES                                   | YES                   | YES                                                                     | YES                      |
| Province fixed effects                                                       | YES                         | YES                   | YES                                   | YES                   | YES                                                                     | YES                      |
| Year fixed effects                                                           | YES                         | YES                   | YES                                   | YES                   | YES                                                                     | YES                      |
| Constant                                                                     | 10.749 ***<br>(0.259)       | 9.933 ***<br>(0.253)  | 9.064 ***<br>(0.465)                  | 7.799 ***<br>(0.465)  | 6.432 ***<br>(0.583)                                                    | 5.456 ***<br>(1.087)     |
| Observed value                                                               | 15,747                      | 15,747                | 15,747                                | 15,747                | 15,747                                                                  | 15,747                   |
| R-squared                                                                    | 0.107                       | 0.184                 | 0.093                                 | 0.130                 | 0.134                                                                   | 0.027                    |

Note: 1. \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% levels, respectively. 2. Control variables are the same as those in Table 3, as below.

Column 4 also shows that the direct term of household registration positively impacts development and enjoyment consumption. It may be because development and enjoyment consumption include medical care expenditure, which is necessary for people with agricultural registrations due to insufficient medical coverage. To validate it, we estimate development and enjoyment consumption (excluding medical care consumption) and medical care consumption separately as explained variables. Columns 5 and 6 show the results. Household registration does not affect development and enjoyment consumption (except medical care consumption), but it significantly impacts medical care consumption. It corresponds to what we suspected.

#### 4.4. Further Test

##### 4.4.1. Distinguishing between Housing Values

The most important channel of the above influence is precautionary savings. In this section, we provide more evidence for this channel. In China, where investment instruments

are relatively scarce, housing serves as a buffer reserve, and as its value rises, households' need for precautionary savings decreases, increasing current consumption [63,66,67]. In other words, housing property can be a substitute for precautionary savings, which may influence the effect of old-age insurance on consumption. Thus, we distinguish housing values for further discussion. Households with no housing value are classified as no-housing households, totaling 1885. Among those with housing, those with values less than the median were classified as low housing value households (totaling 6849) while categorizing the rest as high housing value households (totaling 7013).

Table 6 displays the sub-group estimation results. Comparing the full-sample regression results in Table 6 to the results in Table 5, the various insurance schemes' direct and interaction terms on development and enjoyment consumption decrease in statistical significance and coefficient significance. It implies that housing and old-age insurance are substitutes for carrying out a preventive savings function and confirms that precautionary savings are the channel. As housing values rise, the substitution effect becomes more pronounced. The importance of old-age insurance in consumption is waning because housing already plays a significant role in helping households with high housing values deal with the uncertainty after retirement.

**Table 6.** Heterogeneity of housing values.

| Variables                                                                    | Total Household Consumption |                   |                    | Development and Enjoyment Consumption |                   |                    |
|------------------------------------------------------------------------------|-----------------------------|-------------------|--------------------|---------------------------------------|-------------------|--------------------|
|                                                                              | No Housing                  | Low Housing Value | High Housing Value | No Housing                            | Low Housing Value | High Housing Value |
|                                                                              | (1)                         | (2)               | (3)                | (4)                                   | (5)               | (6)                |
| The old-age insurance for employees                                          | 0.175 *                     | 0.092 **          | −0.051             | 0.303                                 | 0.127             | 0.102              |
|                                                                              | (0.105)                     | (0.047)           | (0.038)            | (0.244)                               | (0.095)           | (0.063)            |
| The old-age insurance for urban and rural residents                          | 0.124                       | 0.103 **          | 0.025              | 0.142                                 | 0.218 **          | 0.163 **           |
|                                                                              | (0.147)                     | (0.052)           | (0.041)            | (0.340)                               | (0.106)           | (0.068)            |
| Commercial supplementary old-age insurance system                            | 0.057                       | −0.076            | 0.072              | 0.670                                 | −0.100            | 0.189 *            |
|                                                                              | (0.262)                     | (0.126)           | (0.064)            | (0.606)                               | (0.257)           | (0.107)            |
| Number of household participants in old-age insurance                        | −0.236                      | −0.127 *          | 0.115 *            | −0.267                                | −0.160            | 0.023              |
|                                                                              | (0.150)                     | (0.077)           | (0.066)            | (0.347)                               | (0.157)           | (0.110)            |
| The old-age insurance for employees × household registration                 | −0.101                      | −0.166 ***        | −0.113 *           | −0.156                                | −0.288 **         | −0.184 *           |
|                                                                              | (0.168)                     | (0.058)           | (0.058)            | (0.390)                               | (0.119)           | (0.097)            |
| The old-age insurance for urban and rural residents × household registration | 0.155                       | 0.076             | −0.149             | −0.289                                | 0.181             | −0.187             |
|                                                                              | (0.359)                     | (0.162)           | (0.112)            | (0.831)                               | (0.331)           | (0.185)            |
| Commercial supplementary old-age insurance × household registration          | 0.155                       | 0.074             | −0.041             | 0.560                                 | 0.173             | 0.062              |
|                                                                              | (0.154)                     | (0.065)           | (0.067)            | (0.356)                               | (0.133)           | (0.111)            |
| Household registration                                                       | 0.124                       | 0.103 **          | 0.025              | 0.142                                 | 0.218 **          | 0.163 **           |
|                                                                              | (0.147)                     | (0.052)           | (0.041)            | (0.340)                               | (0.106)           | (0.068)            |
| Control variables                                                            | YES                         | YES               | YES                | YES                                   | YES               | YES                |
| Province fixed effects                                                       | YES                         | YES               | YES                | YES                                   | YES               | YES                |
| Year fixed effects                                                           | YES                         | YES               | YES                | YES                                   | YES               | YES                |
| Constant                                                                     | 8.853 ***                   | 8.575 ***         | 8.969 ***          | 5.198 ***                             | 6.221 ***         | 6.218 ***          |
|                                                                              | (0.689)                     | (0.336)           | (0.626)            | (1.596)                               | (0.685)           | (1.041)            |
| Observed value                                                               | 1885                        | 6849              | 7013               | 1885                                  | 6849              | 7013               |
| R-squared                                                                    | 0.307                       | 0.132             | 0.185              | 0.157                                 | 0.091             | 0.174              |

Note: \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

#### 4.4.2. Classifying the Level of Household Consumption

Housing is a type of household wealth. Theoretically, having more wealth brings about more certainty for the future, which would affect how old-age insurance affects consumption. Due to the lack of data, analyzing all forms of wealth is complex. We attempted to test the wealth's impact by categorizing residents' consumption levels, given the correlation between wealth ownership and consumption levels among residents [67,68]. Generally, the

larger one's wealth, the greater one's spending level is. The impact of old-age insurance on the consumption of the high-consumption group should be less sensitive, since this group has more wealth to cope with future uncertainty. According to the consumption levels of households, we designate households with total household consumption expenditure below the median consumption level as low consumption level households and those above the median consumption level as high consumption level households.

Table 7 shows the results. It demonstrates that, in the group of high consumption levels, the effect of the various insurance schemes on households' consumption becomes less significant, both in terms of statistical significance and coefficient significance, similar to the findings for the grouping of housing values. The results make sense and support the role of precautionary savings.

**Table 7.** Heterogeneity of consumption levels.

| Variables                                                                    | Total Household Consumption |                        | Development and Enjoyment Consumption |                        |
|------------------------------------------------------------------------------|-----------------------------|------------------------|---------------------------------------|------------------------|
|                                                                              | Low Consumption Level       | High Consumption Level | Low Consumption Level                 | High Consumption Level |
|                                                                              | (1)                         | (2)                    | (3)                                   | (4)                    |
| The old-age insurance for employees                                          | 0.097 ***<br>(0.038)        | 0.001<br>(0.030)       | 0.161 *<br>(0.096)                    | 0.070<br>(0.046)       |
| The old-age insurance for urban and rural residents                          | 0.116 ***<br>(0.040)        | −0.006<br>(0.033)      | 0.330 ***<br>(0.102)                  | 0.084<br>(0.051)       |
| Commercial supplementary old-age insurance                                   | −0.045<br>(0.106)           | 0.030<br>(0.050)       | −0.197<br>(0.271)                     | 0.208 ***<br>(0.077)   |
| Number of household participants in old-age insurance                        | −0.200 ***<br>(0.060)       | 0.028<br>(0.049)       | −0.292 *<br>(0.154)                   | −0.003<br>(0.076)      |
| The old-age insurance for employees × household registration                 | −0.134 ***<br>(0.045)       | −0.022<br>(0.045)      | −0.257 **<br>(0.116)                  | −0.031<br>(0.071)      |
| The old-age insurance for urban and rural residents × household registration | 0.155<br>(0.142)            | −0.039<br>(0.079)      | 0.556<br>(0.362)                      | −0.078<br>(0.123)      |
| Commercial supplementary old-age insurance × household registration          | 0.067<br>(0.049)            | −0.041<br>(0.051)      | 0.119<br>(0.126)                      | 0.082<br>(0.079)       |
| Household registration                                                       | 0.116 ***<br>(0.040)        | −0.006<br>(0.033)      | 0.330 ***<br>(0.102)                  | 0.084<br>(0.051)       |
| Control variables                                                            | YES                         | YES                    | YES                                   | YES                    |
| Province fixed effects                                                       | YES                         | YES                    | YES                                   | YES                    |
| Year fixed effects                                                           | YES                         | YES                    | YES                                   | YES                    |
| Constant                                                                     | 8.592 ***<br>(0.397)        | 11.633 ***<br>(0.310)  | 5.765 ***<br>(1.011)                  | 8.921 ***<br>(0.481)   |
| Observed value                                                               | 7869                        | 7878                   | 7869                                  | 7878                   |
| R-squared                                                                    | 0.134                       | 0.116                  | 0.079                                 | 0.138                  |

Note: \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

## 5. Robustness Tests

### 5.1. Changing the Measure of the Primary Explanatory Variable

We performed several robustness checks. First, as an alternative measurement of the primary explanatory variable, we used the ratio of different consumption expenditures to total household expenditures. Table 8 shows the new results in column 1. Column 1 indicates that various old-age insurance still significantly impacts the development and enjoyment consumption ratio. The direction of influence remains consistent with the original findings despite the interaction term being less statistically significant. This paper's conclusions remain valid.

**Table 8.** Impact of old-age insurance on household consumption structure and results of tailing treatment.

| Variables                                                                       | The Ratio of<br>Development and<br>Enjoyment Consumption | Total Household<br>Consumption | Development and<br>Enjoyment Consumption |
|---------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------|------------------------------------------|
|                                                                                 | (1)                                                      | (2)                            | (3)                                      |
| The old-age insurance for employees                                             | 0.014 *<br>(0.007)                                       | 0.034<br>(0.026)               | 0.142 ***<br>(0.048)                     |
| The old-age insurance for urban and<br>rural residents                          | 0.022 ***<br>(0.008)                                     | 0.044<br>(0.029)               | 0.195 ***<br>(0.053)                     |
| Commercial supplementary<br>old-age insurance                                   | 0.033 **<br>(0.015)                                      | 0.067<br>(0.052)               | 0.159 *<br>(0.095)                       |
| Number of household participants in<br>old-age insurance                        | −0.004<br>(0.003)                                        | 0.020 **<br>(0.010)            | 0.027<br>(0.018)                         |
| The old-age insurance for<br>employees × household registration                 | −0.018<br>(0.012)                                        | −0.028<br>(0.042)              | −0.131 *<br>(0.076)                      |
| The old-age insurance for urban and<br>rural residents × household registration | −0.014<br>(0.010)                                        | −0.101 ***<br>(0.035)          | −0.198 ***<br>(0.065)                    |
| Commercial supplementary old-age<br>insurance × household registration          | −0.002<br>(0.022)                                        | −0.072<br>(0.077)              | −0.018<br>(0.142)                        |
| Household registration                                                          | 0.010<br>(0.011)                                         | 0.000<br>(0.039)               | 0.126 *<br>(0.071)                       |
| Control variables                                                               | YES                                                      | YES                            | YES                                      |
| Province fixed effects                                                          | YES                                                      | YES                            | YES                                      |
| Year fixed effects                                                              | YES                                                      | YES                            | YES                                      |
| Constant                                                                        | 0.242 ***<br>(0.072)                                     | 9.933 ***<br>(0.253)           | 7.799 ***<br>(0.465)                     |
| Observed value                                                                  | 15,745                                                   | 15,747                         | 15,747                                   |
| R-squared                                                                       | 0.024                                                    | 0.184                          | 0.130                                    |

Note: \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

Furthermore, this paper estimates with upper and lower 1 percent tail reductions to avoid extreme values that bias estimation results. Columns 2 and 3 of Table 8 show the results. It shows that old-age insurance continues to boost household consumption, whereas agricultural households can suppress this effect, and the conclusions of this paper still hold.

### 5.2. Testing with PSM Matching

In the preceding section, two-way fixed effects regression is our primary method. We used the propensity score matching method to examine household registration's intermediary role as a complementary tool. In this section, we switched the primary method to PSM to determine whether there is a statistically significant difference between the PSM method

and two-way fixed effects. In detail, we used the PSM method, dealing with heterogeneity between participants of specific old-age insurance and non-participants, such as differences in household registration. The matching process is still with logit estimating, which estimates the probability of participation in old-age insurance. There are several covariates in the logit model. The first is the character of the household head. It includes the registration status, age, whether married or not, whether or not a member of the Chinese Communist Party, years of education, health status, and whether or not working. The second is the family's fundamental character. It includes the number of persons who work, the number of children, and the region (East, West, and Central). The third is the family property situation. It includes the total value of the property, whether or not they own a house, the total number of housing, the full value of cash and savings, total liabilities, total income, net assets, land value, and total financial assets. All of the values are in the log. Table 9's results demonstrate that residents' participation in old-age insurance has a significant positive impact on household consumption. It supports the findings of this paper.

**Table 9.** Treatment effects of Propensity Score Matching (PSM).

| Dependent Variable                    | Average Treatment Effect | Standard Deviation | T-Value  |
|---------------------------------------|--------------------------|--------------------|----------|
| Total household consumption           | 0.09                     | 0.023              | 4.05 *** |
| Development and enjoyment consumption | 0.236                    | 0.038              | 6.20 *** |
| Survival consumption                  | 0.053                    | 0.023              | 2.26 *** |

Note: \*\*\* denote significance at the 1% levels, respectively.

### 5.3. Test on Instrumental Variable Approach

There is concern that people's consumption levels will influence whether or not they participate in old-age insurance. To alleviate this reverse causality, we employed the instrumental variables approach. We used the participation rate of age-old insurance schemes at the municipal level as the instrumental variable. As a variable based on the aggregate value, the insurance participation rate should be highly relevant to the primary explanatory variable, which is whether or not to participate in insurance. In the meantime, it should not directly affect the micro level consumption, which is the explained variable. Therefore, using this rate as an instrumental variable can satisfy the exclusion restriction. Table 10 displays the results. In columns 2 and 4, Table 10 shows the results of the instrumental variable approach by two-step least squares estimation (2SLS-IV), while columns 1 and 3 display the results of the OLS estimation without using the instrumental variable. The results obtained by the 2SLS-IV strategy are identical to those obtained by the OLS estimation. The findings support the preceding conclusion.

**Table 10.** Impact of insurance participation on household consumption.

| Variables                                  | Total Household Consumption |                    | Development and Enjoyment Consumption |                     |
|--------------------------------------------|-----------------------------|--------------------|---------------------------------------|---------------------|
|                                            | OLS                         | 2SLS-IV            | OLS                                   | 2SLS-IV             |
|                                            | (1)                         | (2)                | (3)                                   | (4)                 |
| Whether participating in old-age insurance | 0.026<br>(0.017)            | 0.094 *<br>(0.052) | 0.129 ***<br>(0.034)                  | 0.232 **<br>(0.094) |
| Household registration                     | −0.047<br>(0.032)           | −0.050<br>(0.032)  | 0.023<br>(0.075)                      | 0.020<br>(0.075)    |
| Control variables                          | YES                         | YES                | YES                                   | YES                 |
| Province fixed effects                     | YES                         | YES                | YES                                   | YES                 |
| Year fixed effects                         | YES                         | YES                | YES                                   | YES                 |
| Observed value                             | 15,747                      | 12,916             | 15,747                                | 12,916              |
| R-squared                                  | 0.181                       | 0.179              | 0.123                                 | 0.122               |

Note: \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

## 6. Conclusions

Using panel data from the China Institute of Social Science Survey (CFPS) 2012–2020, this paper examines the joint impact of household registration and old-age insurance schemes on household consumption from a micro perspective of Chinese households. The main conclusions are: First, by lowering future uncertainty and precautionary saving, old-age insurance encourages current consumption. Different old-age insurance schemes have various effects depending on the levels of benefits. Because it offers the weakest benefits in retirement, old-age insurance for urban and rural residents has the lowest impact. Moreover, household registration affects participation in old-age insurance schemes, and households registered in agriculture are more likely to enroll in old-age insurance for urban and rural residents, which has the lowest benefits. Furthermore, agricultural registration reduces old-age insurance's impact on household consumption.

In summary, the Chinese government's household registration system links the status of immigrants to public services and social benefits, leading to economic implications. China's urbanization has led to large numbers of rural migrants from rural to cities. They are residents in the cities but do not have non-agricultural registration. When the rural immigrants enter the towns, their demand for social insurance and public services increases. However, the household registration system limits the social insurance they participate in, which further affects economic and social variables, like consumption in this paper. Our findings can also benefit the advancement of other immigrant societies. In immigrant communities, the growing social insurance needs of rural immigrants and the relatively lagged social insurance provision will pose a potentially significant challenge to the social management systems in cities. China's household registration system functions as a barrier to the labor market, whereas labor market barriers are prevalent in other societies. Therefore, immigration societies should eliminate administrative restrictions on the labor market to improve social insurance access equity, boost consumption, and contribute to the economy.

Subject to data availability, this paper contains some deficiencies that must be addressed in future research. (1) This research focuses solely on the effect of various types of insurance on resident consumption. Various types of insurance are accompanied by varying premium costs. When future data on residential premium expenditure are available, it will be necessary to do additional research into the impact of various premiums on residents' consumption. (2) Consumption integrates microeconomic and macroeconomic concepts. Research on individual spending behavior can be translated into macro aggregate consumption demand analysis. As a significant social security policy, the impact of pension insurance on economic growth should be studied. In summary, while we give some evidence on old-age insurance's microscopic effects, more remains to be done.

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## References

1. Sabates-Wheeler, R.; Koettl, J. Social protection for migrants: The challenges of delivery in the context of changing migration flows. *Int. Soc. Secur. Rev.* **2010**, *63*, 115–144. [\[CrossRef\]](#)
2. Ruhs, M. Migrant rights, immigration policy and human development. *J. Hum. Dev. Capab.* **2010**, *11*, 259–279. [\[CrossRef\]](#)
3. Le, G.G. Social security, income inequality and growth. *J. Pension Econ. Financ.* **2012**, *11*, 53–70.
4. Van, G.W. Social protection for migrant workers: National and international policy challenges. *Eur. J. Soc. Secur.* **2013**, *15*, 209–221.
5. Scheibelhofer, E. Migrants' Experiences with Limited Access to Social Protection in a Framework of EU Post-National Policies. *Soc. Incl.* **2022**, *9*, 164–173. [\[CrossRef\]](#)
6. Phillips, J.F.; MacLeod, B.B.; Pence, B. The Household Registration System: Computer software for the rapid dissemination of demographic surveillance systems. *Demogr. Res.* **2000**, *2*, 6. [\[CrossRef\]](#)
7. Chan, K.W.; Buckingham, W. Is China abolishing the hukou system? *China Q.* **2008**, *195*, 582–606. [\[CrossRef\]](#)
8. Chan, K.W. China: Internal migration. In *The Encyclopedia of Global Human Migration*; John Wiley & Sons, Inc.: Hoboken, NJ, USA, 2013.
9. Guo, Y.; Wang, J.; Peeta, S.; Anastasopoulos, P.C. Impacts of internal migration, household registration system, and family planning policy on travel mode choice in China. *Travel Behav. Soc.* **2018**, *13*, 128–143. [\[CrossRef\]](#)
10. Wang, Y.; Fu, X.; Gong, T.; Sun, X. Does household registration control affect investment in education for left-behind children? Evidence from China. *Aggress. Violent Behav.* **2021**, 101700. [\[CrossRef\]](#)
11. Zhao, Q.; Li, Z.; Chen, T. The impact of public pension on household consumption: Evidence from China's survey data. *Sustainability* **2016**, *8*, 890. [\[CrossRef\]](#)
12. Chen, D.; Xiao, C.; Zang, J.; Liu, Z. Old-age social insurance and household consumption: Evidence from China. *Emerg. Mark. Financ. Trade* **2018**, *54*, 2948–2964. [\[CrossRef\]](#)
13. Been, J.; Rohwedder, S.; Hurd, M. Households' joint consumption spending and home production responses to retirement in the US. *Rev. Econ. Househ.* **2021**, *19*, 959–985. [\[CrossRef\]](#) [\[PubMed\]](#)
14. Wang, H.; Huang, J. How Can China's Recent Pension Reform Reduce Pension Inequality? *J. Aging Soc. Policy* **2021**, 1–15. [\[CrossRef\]](#) [\[PubMed\]](#)
15. Hua, Y.; Zhang, H.; Liu, H. Does pension affect labour supply? New evidence from large-scale rural pension policy reform in China. *Appl. Econ.* **2022**, *54*, 1212–1228. [\[CrossRef\]](#)
16. Huang, Y.; Guo, F. Welfare Programme participation and the wellbeing of non-local rural migrants in metropolitan China: A social exclusion perspective. *Soc. Indic. Res.* **2017**, *132*, 63–85. [\[CrossRef\]](#)
17. Wang, J.; Ai, S.; Huang, M. Migration history, hukou status, and urban household consumption. *Econ. Model.* **2021**, *97*, 437–448. [\[CrossRef\]](#)
18. Zhou, C.; Li, M.; Zhang, G.; Wang, Y.; Liu, S. Heterogeneity of internal migrant household consumption in host cities: A comparison of skilled migrants and labor migrants in china. *Sustainability* **2020**, *12*, 7650. [\[CrossRef\]](#)
19. Wen, L.; Paudel, K.P.; Chen, Y.; He, Q. Urban segregation and consumption inequality: Does hukou conversion matter in China? *Rev. Dev. Econ.* **2021**, *25*, 2298–2322. [\[CrossRef\]](#)
20. Modigliani, F.; Cao, S.L. The Chinese saving puzzle and the life-cycle hypothesis. *J. Econ. Lit.* **2004**, *42*, 145–170. [\[CrossRef\]](#)
21. Chamon, M.D.; Prasad, E.S. Why are saving rates of urban households in China rising. *Am. Econ. J. Macroecon.* **2010**, *2*, 93–130. [\[CrossRef\]](#)
22. Zhang, R.; Jun, M.; Palacios, S. M-shopping service quality dimensions and their effects on customer trust and loyalty: An empirical study. *Int. J. Qual. Reliab. Manag.* **2021**. [\[CrossRef\]](#)
23. Wei, S.J.; Zhang, X. The competitive saving motive: Evidence from rising sex ratios and savings rates in China. *J. Political Econ.* **2011**, *119*, 511–564. [\[CrossRef\]](#)
24. Modigliani, F.; Brumberg, R. Utility analysis and the consumption function: An interpretation of cross-section data. *Fr. Modigliani* **1954**, *1*, 388–436.
25. Leland, H.E. *Saving and Uncertainty: The Precautionary Demand for Saving. Uncertainty in Economics*; Academic Press: Cambridge, MA, USA, 1978.
26. Hubbard, R.G.; Skinner, J.; Zeldes, S.P. Precautionary saving and social insurance. *J. Political Econ.* **1995**, *103*, 360–399. [\[CrossRef\]](#)
27. Kantor, S.E.; Fishback, P.V. Precautionary saving, insurance, and the origins of workers' compensation. *J. Political Econ.* **1996**, *104*, 419–442. [\[CrossRef\]](#)
28. Samwick, A.A. Is pension reform conducive to higher saving. *Rev. Econ. Stat.* **2000**, *82*, 264–272. [\[CrossRef\]](#)
29. Rojas, J.A.; Urrutia, C. Social security reform with uninsurable income risk and endogenous borrowing constraints. *Rev. Econ. Dyn.* **2008**, *11*, 83–103. [\[CrossRef\]](#)
30. Gormley, T.; Liu, H.; Zhou, G. Limited participation and consumption-saving puzzles: A simple explanation and the role of insurance. *J. Financ. Econ.* **2010**, *96*, 331–344. [\[CrossRef\]](#)
31. Zheng, W.; Lyu, Y.; Jia, R.; Hanewald, K. The impact of expected pensions on consumption: Evidence from China. *J. Pension Econ. Financ.* **2020**, 1–19. [\[CrossRef\]](#)
32. Fuster, L.; Imrohoroglu, A.; Imrohoroglu, S. A welfare analysis of social security in a dynastic framework. *Int. Econ. Rev.* **2003**, *44*, 1247–1274. [\[CrossRef\]](#)

33. Cottle, H.E.; Caliendo, F.N. Social security and risk sharing: The role of economic mobility across generations. *Int. Tax Public Financ.* **2022**, *2022*, 1–34. [\[CrossRef\]](#)
34. Fehr, H.; Habermann, C.; Kindermann, F. Social security with rational and hyperbolic consumers. *Rev. Econ. Dyn.* **2008**, *11*, 884–903. [\[CrossRef\]](#)
35. Kumru, C.S.; Thanopoulos, A.C. Social security reform with self-control preferences. *J. Public Econ.* **2011**, *95*, 886–899. [\[CrossRef\]](#)
36. Hubbard, R.G.; Judd, K.L. Social security and individual welfare: Precautionary saving, borrowing constraints, and the payroll tax. *Am. Econ. Rev.* **1987**, *4*, 630–646.
37. Thaler, R.H. *Quasi Rational Economics*; Russell Sage Foundation: New York, NY, USA, 1994.
38. Gale, W.G. The effects of pensions on household wealth: A reevaluation of theory and evidence. *J. Political Econ.* **1998**, *106*, 706–723. [\[CrossRef\]](#)
39. Park, H.; Feigenbaum, J. Bounded rationality, life-cycle consumption, and social security. *J. Econ. Behav. Organ.* **2018**, *146*, 65–105. [\[CrossRef\]](#)
40. Van, S.P. Uncertain Pension Income and Household Saving. *Rev. Income Wealth* **2019**, *65*, 908–929.
41. Gechert, S.; Paetz, C.; Villanueva, P. The macroeconomic effects of social security contributions and benefits. *J. Monet. Econ.* **2021**, *117*, 571–584. [\[CrossRef\]](#)
42. Wilcox, D.W. Social security benefits, consumption expenditure, and the life cycle hypothesis. *J. Political Econ.* **1989**, *97*, 288–304. [\[CrossRef\]](#)
43. Parker, J.A. The reaction of household consumption to predictable changes in social security taxes. *Am. Econ. Rev.* **1999**, *89*, 959–973. [\[CrossRef\]](#)
44. Gao, Q.; Zhai, F.; Yang, S.; Li, S. Does welfare enable family expenditures on human capital? Evidence from China. *World Dev.* **2014**, *64*, 219–231. [\[CrossRef\]](#)
45. Han, H.; Gao, Q.; Xu, Y. Welfare participation and family consumption choices in rural China. *Glob. Soc. Welf.* **2016**, *3*, 223–241. [\[CrossRef\]](#)
46. Wang, F.; Wang, Y.; Wang, Y. An investigation of whether pensions increase consumption: Evidence from family portfolios. *Financ. Res. Lett.* **2021**, *47*, 102591.
47. Wu, H.X.; Zhou, L. Rural-to-urban migration in China. *Asian-Pac. Econ. Lit.* **1996**, *10*, 54–67. [\[CrossRef\]](#)
48. Constant, A.; Massey, D.S. Return migration by German guestworkers: Neoclassical versus new economic theories. *Int. Migr.* **2002**, *40*, 5–38. [\[CrossRef\]](#)
49. Webster, D. *On the Edge: Shaping the Future of Peri-Urban East Asia*; Stanford: Asia/Pacific Research Center: Stanford, CA, USA, 2002.
50. Fu, K.W.D.; Song, H.X. The resilience of migrant workers in Shanghai China: The roles of migration stress and meaning of migration. *Int. J. Soc. Psychiatry* **2008**, *54*, 131–143.
51. Liu, X.; Cao, G.; Liu, T.; Liu, H. Semi-urbanization and evolving patterns of urbanization in China: Insights from the 2000 to 2010 national censuses. *J. Geogr. Sci.* **2016**, *26*, 1626–1642. [\[CrossRef\]](#)
52. Au, C.C.; Henderson, J.V. How migration restrictions limit agglomeration and productivity in China. *J. Dev. Econ.* **2006**, *80*, 350–388. [\[CrossRef\]](#)
53. Han, J.; Miao, J.; Shi, Y.; Miao, Z. Can the semi-urbanization of population promote or inhibit the improvement of energy efficiency in China. *Sustain. Prod. Consum.* **2021**, *26*, 921–932. [\[CrossRef\]](#)
54. Wang, X.; Zhou, D.; Telli, Ş. The impact of semi-urbanization on carbon emissions: A spatial econometric perspective. *Environ. Sci. Pollut. Res.* **2022**, *29*, 1–15. [\[CrossRef\]](#)
55. Li, S. The Economic Situation of Rural Migrant Workers in China. *Chin. Perspect.* **2010**, *4*, 4–15.
56. Zhang, Z.; Wu, X. Occupational segregation and earnings inequality: Rural migrants and local workers in urban China. *Soc. Sci. Res.* **2017**, *61*, 57–74. [\[CrossRef\]](#) [\[PubMed\]](#)
57. Mukhopadhyaya, P. Trends in income inequality in China: The effects of various sources of income. *J. Asia Pac. Econ.* **2013**, *18*, 304–317. [\[CrossRef\]](#)
58. Luo, C.; Li, S.; Sicular, T. The long-term evolution of national income inequality and rural poverty in China. *China Econ. Rev.* **2020**, *62*, 101465. [\[CrossRef\]](#)
59. Meng, X.; Zhang, J. The two-tier labor market in urban China: Occupational segregation and wage differentials between urban residents and rural migrants in Shanghai. *J. Comp. Econ.* **2001**, *29*, 485–504. [\[CrossRef\]](#)
60. He, G.; Wu, X. Marketization, occupational segregation, and gender earnings inequality in urban China. *Soc. Sci. Res.* **2017**, *65*, 96–111. [\[CrossRef\]](#)
61. Ma, X. Labor market segmentation by industry sectors and wage gaps between migrants and local urban residents in urban China. *China Econ. Rev.* **2018**, *47*, 96–115. [\[CrossRef\]](#)
62. Zhou, J.; Lin, L.; Tang, S.; Zhang, S. To settle but not convert hukou among rural migrants in urban China: How does family-level eligibility for citizenship benefits matter. *Habitat Int.* **2022**, *120*, 102511. [\[CrossRef\]](#)
63. Gan, J. Housing wealth and consumption growth: Evidence from a large panel of households. *Rev. Financ. Stud.* **2010**, *23*, 2229–2267. [\[CrossRef\]](#)
64. Knight, J.; Yueh, L. Job mobility of residents and migrants in urban China. *J. Comp. Econ.* **2004**, *32*, 637–660. [\[CrossRef\]](#)
65. Song, Q.; Smith, J.P. The citizenship advantage in psychological well-being: An examination of the Hukou system in China. *Demography* **2021**, *58*, 165–189. [\[CrossRef\]](#) [\[PubMed\]](#)

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66. Zhu, B.; Li, L.; Downs, D.H.; Sebastian, S. New evidence on housing wealth and consumption channels. *J. Real Estate Financ. Econ.* **2019**, *58*, 51–79. [[CrossRef](#)]
  67. Hu, H.; Xu, J.; Zhang, X. The role of housing wealth, financial wealth, and social welfare in elderly households' consumption behaviors in China. *Cities* **2020**, *96*, 102437. [[CrossRef](#)]
  68. Arrondel, L.; Lamarche, P.; Savignac, F. Does inequality matter for the consumption-wealth channel? Empirical evidence. *Eur. Econ. Rev.* **2019**, *111*, 139–165. [[CrossRef](#)]