경제학석사학위논문

Population Aging and Income Inequality in China

중국의 인구고령화와 소득불평등에 관한 연구

2019년 2월

서울대학교 대학원

경제학부 경제학전공

GAO XIAOWEI

Abstract

Population Aging and Income Inequality in China

GAO XIAOWEI
Department of Economics
The Graduate School
Seoul National University

Population aging and income inequality have been two hot issues in China during the past decade. According to the existing studies among developed countries, there might be a certain relationship between age and income inequality. Many scholars are also convinced that population aging has a great effect on the deepening of income inequality. In this study, we examined the age effect on income inequality and analyzed the relevant factors using the data of the Chinese Household Income Project. On the basis of the results calculated, population aging has deepened income inequality in China and cohort effect plays a great part. What's more, the marginal effect of age has increased over time which indicates that there's going to be a great challenge in the next decades with the increasing

proportion of the elderly. Population aging has contributed for about 1/5 of the deepening in income inequality. There also has disparities as a result of unfair market system in various dimensions, which announces great efforts of the government need to be implemented to reduce the income inequality for the steady development of social economy.

Keywords: Population Aging, Income Inequality,
Blinder-Oaxaca Decomposition, China
Student Number: 2016-27851

Contents

List of Tables

List of Figures

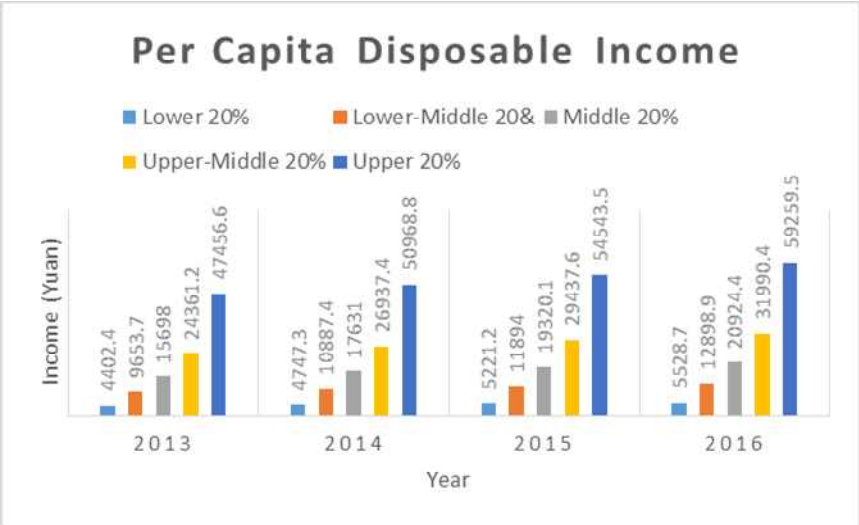
1、 Introduction

At present, the consumption of Chinese residents is showing a "grading" trend. The reason for the phenomenon is that there is a large income gap between Chinese residents, which leads to the different marginal consumption propensity of different income groups.

According to Wind data, the Gini coefficient of Chinese residents' income has risen first and then stabilized since it exceeded the warning line for the first time in 2000. However, it is noteworthy that the Gini coefficient has never been lower than 0.46 since 2003. And in the last three years, it has increased year by year from 0.462 in 2015 to 0.467 in 2017.

On this basis and according to the statistical calibre of China Statistical Yearbook, we can divide the population of the whole country into five groups under different income levels for further investigation. From the Figure 1below, it can be clearly seen that the top 20% of the residents with the highest income level in China have a per capita disposable income of 59,259.5 yuan in 2016, which is far ahead of the other 80% of the population. Even for the upper-middle income group in the second echelon, the per capita disposable income was just exceeding half of the high-income group with 31,990.4 yuan in 2016. The average disposable income of the lowest 20% of the population in 2016 was only 5,528.7 yuan per capita, less than 1/10 of the high-income population.

Figure 1 Annual Disposable Income



Data source: National Bureau of Statistics of China
http://www.stats.gov.cn

On the other hand, according to the existing research results, age is closely related to the income gap. At present, China has become the country with the largest elderly population in the world. According to the latest data of the National Bureau of Statistics, there are 240 million people aged 60 and above, accounting for 17.3% of the total population. Particularly, 158 million people aged 65 and above, accounting for 11.4% of the total population. When over-60s people of a country account for 10% of the total population, or 7% of the over-65s, it means that the country is in an aging society. The proportion of the elderly population in China is seriously exceeded this standard.

It is reported that in 2000, China's elderly population over 65 years old accounted for 7%. Since then, it has continued to increase. In 2005, the number of elderly people aged 65 and above in China

exceeded 100 million, reaching 105.5 million. In 2016, China's elderly population over 65 years old exceeded 150 million. In 2017, the elderly population in China increased further, reaching 158.31 million. The proportion of the elderly population over 65 years old soared to 11.4%. It is also reported that in the past ten years, the number of elderly people aged 65 and above has been growing rapidly, and the year-on-year growth rate has increased from 3.0% in 2008 to 5.5% in 2017.

This study used the Chinese Household Income Project (CHIP) data to verify whether there is a correlation between age and income inequality and examine the extent to which age contributes to income inequality. In order to track the dynamic change of China's income distribution, the Chinese Household Income Project (CHIP) has conducted five household surveys in 1989, 1996, 2003, 2008and 2014. They collected income and expenditure information and other household and personal information for 1988, 1995, 2002, 2007 and 2013, respectively. All CHIP data includes surveys for urban and rural households. In view of the increasingly important practical significance of rural migration to cities and towns, the 2002 survey began to increase the survey of migrants. In view of the serious lack of data samples before 2002 and the lack of perfect questionnaires, this paper mainly uses data from 2002, 2007 and 2013. The main research contents and methods of this study are as follows. First, the CHIP data were grouped according to the survey year and the age of the household head and the logarithmic variance of household income in each group was calculated as an indicator of household income inequality. In addition, based on the age distribution of household heads and the logarithmic variance of household income, the correlation between age and income inequality was examined. Second,

after controlling the fixed effect of the cohort and the annual fixed effect of the survey, the marginal effect of age among household head on income inequality was determined. Third, as time goes by, the marginal effect of age increases. We discussed whether this is another mechanism to deepen income inequality. Fourth, by decomposing the causes of income inequality, we measured the contribution of changes in family structure to income inequality in the past decade. Fifth, we analyzed the reasons for the deepening of income inequality in the middle-aged population and the countermeasures for the current situation of inequality.

According to the analysis results of this study, the degree of inequality after the age of 25 is increasing. We can also see that the increasing speed is also fast. After the age of 60, the level of inequality is sharply increased. This is similar to the trend among developed countries, and the trend of Chinese income inequality shows its unique characteristics. The head of household between the ages of 35 and 50 is the mainstay of social and economic development. So finds out the reason influencing income inequality of these people is quite important. And this will inevitably lead to the healthy development of the economy and society. To this end, we have thoroughly studied the reasons for the high level of inequality within this group, and further elaborated the income inequality caused by the current wage income gap and the discrimination against specific internal groups. An interesting aspect is that between 2007 and 2013, the proportion of employment of household heads in this group is rising with the increasing of income inequality in the meanwhile. According to the model of other countries, the degree of inequality is supposed to decline. But the situation in China is quite the opposite, the degree of inequality has risen a lot since 2007. After

thinking deeply about this issue, we unconsciously consider whether it is the income disparity between different occupations in China that has led to this outcome. Therefore, we also examined the income gap between different industries and the contribution of this to the increase in income inequality.

The 35~50-year old population is the backbone of social and economic development and the core group of social progress. At the same time, China is in a period of rapid transition to an aging society. If the income inequality of this group continues to deepen, it is bound to harm China's economic development 20 years later. Therefore, explore the reasons for the income inequality of the group at this stage and propose corresponding policies is conducive to the smooth transformation of the social economy. At the same time, for the imagination of the general poverty found in the elderly, this paper also strives to put forward reasonable suggestions to avoid the same phenomenon in the current working-age population 20 years later. At the present stage, China's social distribution policy and welfare policy are constantly improving, but there still have many problems. For example, while the absolute amount of transfer expenditure is increasing, this study found that the share of total transfer income in total revenue declined between 2007 and 2013. This shows that the country's efforts in dealing with income inequality are not enough, and the support of the social distribution to the poor needs to be further expanded. At the same time, in order to reduce the many other social problems brought about by the deepening of income inequality, such as health inequality caused by income inequality, intergenerational transfer of income inequality and solidification of social class, this paper also strives to bring positive solutions.

2、 Methodology and Literature Review

Population aging and income inequality are two hot topics in China. After more than 40 years of economic reforms and opening up to the outside world, China's gross domestic product and people's living standards have improved rapidly. However, as the economy grows, the income gap continues to widen. The problem of widening income disparities has attracted widespread attention from academia, international organizations, government agencies as well as the public. Different studies have different estimates of the degree of income inequality in China, but they all agree that the income gap has increased significantly since the 1980s (Benjamin et al, 2008; Griffin and Zhao 1993; Gustafsson, Li, and Sicular 2008; Ravallion and Chen 2007; Riskin, Zhao and Li 2001; WorldBank 2009; Zhang 2010).

In a competitive market environment, the widening of the income gap usually occurs in the early stages of economic growth and transformation, and it will not continue indefinitely. As the economy develops and matures, economic growth can be spread to other industries and departments through various channels (Hirschman 1958). Employment will increase and the benefits of economic growth will spread even further. Economic growth may also improve people's health and education. Government policies can play an important role in strengthening inter-sectoral and inter-regional linkages and increasing investment in health and human capital to promote equal opportunities. Therefore, under the guidance of correct policies, sustained economic growth can also bring abouta decline in the income gap. In the context of economic transformation, whether the initial rise in income inequality will moderate or decline depends on the specific factors of different countries. Using data from 25 former

communist countries in Europe and Central Asia, Milanovic and Ersado (2008) examine the impact of different ways of economic transformation on income inequality. They found that the relationship between economic transformation and income inequality depends on the way of transformation. For example, economic liberalization and marketization can not only bring about an increase in the income gap, but also bring about a narrowing of the income gap. The give up of half-way marketization and the control of interest group during this process not only leads to the expansion of income gap, but also leads to more unfair income distribution. Since the 1980s, China's income gap has increased sharply. However, compared with the 1995 and 2002 survey data, the process of slowing down of the income gap has already appeared. China's income gap seems to be stabilizing (Gustafsson, Li and Sicular2008). This trend has brought about a new question. Has the Chinese economy reached an inflection point of changing in the income gap, that is, will the income gap tend to stabilize or even decline as the economy grows? We will ask about the changes in the income gap between 2007 and 2013 to provide an explanation. Widely known, China adopted a new development strategy in the early 21st century. In the past few decades, the growth of gross domestic product (GDP) has been the top priority of governments at all levels, and the government has also achieved rapid growth in GDP. However, by the end of the 1990s, China's growing income inequality had become a matter of concern. In recent years, the Chinese government has proposed new landscape strategies and policies that emphasize sustainable and equitable economic growth. With the introduction of the new strategy and after the implementation of a series of policies, the phenomenon of increasing in income gap has slowed down.

Since Kuznets's (1955) creative paper, numerous studies have examined the relationships between income inequality and factors related to development. The process of population aging have been unfolding only since the last 20th century. Compared to other factors, the effects of population aging on income inequality have catched little attention in China so far. Existing researches of the relationship between population aging and income inequality have mainly studied on the basis of developed countries, of which most of the scholars found that population aging accounts for only a small fraction of the overall increase of income inequality (Barrett et al. 2000; Bishop et al. 1997; Jantti 1997). The contributions of our paper can be concluded as follows. It can be said that this is one of the first studies discussing the relationship between population aging and income inequality on the basis of a developing economy especially of China. As the largest developing country in the world, understanding the causes and consequences of income inequality in China and any progress in its changes will not only play a positive role in China's social development, but also provide reference for other countries in the world. Further more, the former studies on population aging and income inequality in China are mostly descriptive, the causes of this phenomenon need more attention.

As for the problem of income inequality among the elderly, statistics from the National Bureau of Statistics show that the incidence of poverty in China has dropped from 10.2% in 2012 to 3.1% in 2017. However, compared with other groups, the survival and development of the elderly are more vulnerable because of the physiological characteristics, family status and social roles. With the rapid development of the aging trend, low income level and increased medical costs, the incidence of poverty among the elderly is still high.

Some studies have shown that the incidence of poverty among the elderly in China is as high as 20%, and the characteristics of uneven distribution between urban and rural area(Qiao et al. 2005). Yu(2003) applied the Engel Coefficient Method, the International Poverty Line Standard and the Subjective Sensation Method to calculate the incidence of poverty in the elderly population in China in 2000 is between 28% and 35%. Qiao et al. (2005)used the indicators of relative poverty and absolute poverty to calculate the incidence of poverty among the elderly in China in 2000, which was about 17.5%. Based on the 2010 National Minimum Living Security Data, Yang (2011) used the rural poverty line and the "one day with one dollar" standard to calculate the size of the rural elderly poor population of more than 14 million; using urban minimum living security and the standard of "two dollars a day" measured the size of the urban elderly poor population of about 3 million. In 2010, the incidence of elderly poverty in China was more than 10%. According to a study of poverty among the elderly in OECD countries, the average incidence of poverty among the elderly in OECD member countries in 2014 was 12.5% (OECD. Pensions at a Glance 2017).From the perspective of income sources of the elderly population, labor income accounts for the highest proportion of the top 25% of income in the United States, and social security transfer expenditure accounts for the highest proportion of the post-income 25% of the population(Whitman and Purcell 2006). In China, the proportion of transfer expenditure is relatively low, and the general poverty of the elderly is serious. Among the representative articles (Deaton and Paxson 1994), the income inequality of people around 65 years old is the highest, based on the data of the United States, the UK and Taiwan. From the domestic experience study, Qu and Liu (2008)

agree that population aging has less impact on income inequality in rural areas. The difference is that Qu believes that the income and consumption difference brought by experience or age is the main cause of income inequality. And Liu (2014) believes that the increase of inequality among different cohort is the main cause of income inequality. Zhong (2011) used data from China Health and Nutrition Survey (CHNS) in 1977, 2000 and 2006, found that population aging will significantly increase income inequality in rural China, possibly due to industrialization and labor shortages. Guo et al. (2014) used the data of China Urban Household Survey (UHS) from 1988 to 2009 to find that the effect of population aging is shrinking gradually. The cohort effect plays a leading role in the change of income inequality. That is, the difference of birth age is the most important factor causing the change of income inequality. The later the birth age is, the more unequal the income within the group is. This may be closely related to China's social and economic transition. Using provincial panel data, Dong et al. (2012) found that aging will worsen income inequality. Lan et al. (2014) used panel data from 76 countries to draw similar conclusions.

3、Population Aging and Income Inequality

3.1、Data and Variables

This study used data from the Chines Household Income Project (CHIP) for 2002, 2007 and 2013. In order to track the dynamic change of China's income distribution, the Chinese Household Income Project (CHIP) has conducted five household surveys in 1989, 1996, 2003, 2008 and 2014. They collected revenue and expenditure information for 1988, 1995, 2002, 2007 and 2013, as well as other household and personal information. These surveys were jointly organized by Chinese and foreign researchers, and the components of the "China Income and Inequality Study" were completed with the assistance of the National Bureau of Statistics. All CHIP data includes surveys for urban and rural households. In view of the increasingly important practical significance of rural migration to cities and the subsamples of urban and rural households that do not fully cover all migrants, the 2002 survey increased the survey of migrants. Due to the rationality of the questionnaire and the lack of data information, this paper only uses the data of 2002, 2007 and 2013 to examine the economic changes of Chinese families in the first decade of this century. The contents of each round of investigation mainly include: demographic information of family members, household registration, education, health, living conditions, social security status, adult

employment information, hours of labor, wage work and business work status; family income, property Information such as expenditures, parents, children, siblings of major members of the family. For specific periods, demolition, retirement, borrowing, land management status are also included. The questionnaires of different rounds are not identical, but the main information is basically the same and can be used as an important reference for cross-period comparison. The core theme of the CHIP project is "Residents Income Distribution". Against this background, each round of surveys collected detailed household income, expenditures and related information. Since the CHIP project began to investigate residents' property information in 1995 (the second round), it is the earliest project to conduct nationwide household property surveys and conduct property distribution research based on this. The CHIP team extracted the CHIP samples according to the scientific sampling method with considering the eastern, middle and western stratification. Compared with other social survey data, this database contains different types of household income sources. In addition, analyzing the long-term changes in inequality is one of the purposes of this paper. This database is also quite suitable.

The aimed populations of this study are families with a 22-69 year-old household head. Therefore, the earliest cohort group head was born in 1933, and the most recent cohort group was the head of the family born in 1991. Due to the increase in the number of elderly people living alone in recent years, the use of this part of the data has a tendency to overestimate the income inequality in the elderly. Therefore, this part of the sample is removed. However, adding this part of the sample will not have a big impact on the results.

The main variables are the total income of each family. When

necessary, the income sources include labor income, business income, asset income, transfer income and non-recurrent income are also used. All income variables are converted into actual income based on the GDP deflator in each year (base year = 2002), and then take natural logarithm of actual income for analysis. Secondly, the samples with a total household income of 0 and the sample with missing part of the information were excluded, and a total of 42,133 data samples were obtained.

In order to measure the degree of income inequality quantitatively, information such as the logarithmic variance of household income classified according to the age of the household head and survey year are used. That is, the income inequality within each group is calculated by classifying all households according to the "Annual × Household Age". In determining the degree of income inequality, the indicators we usually use are variance of logarithms, Gini index, variation index, and decile dispersion ratio. The most commonly used of these is the Gini index, which can generally reflect the distribution of the entire social class, and is used to compare the distribution of different countries or different periods. But there is a disadvantage that it does not reflect the distribution of a particular class. The variation index is calculated by dividing the standard deviation by the average value to make it easier to compare the two distributions with different units. It is not necessary for this study. The decile dispersion ratio is a measure of the polarization of income by dividing the income of the highest income by 10% by the income of the lowest 10%. Although there is a certain significance, there is a disadvantage that the income distribution of other classes is ignored. At the same time, the logarithmic variance of income applies not only to the income distribution of the entire social class, but also to the

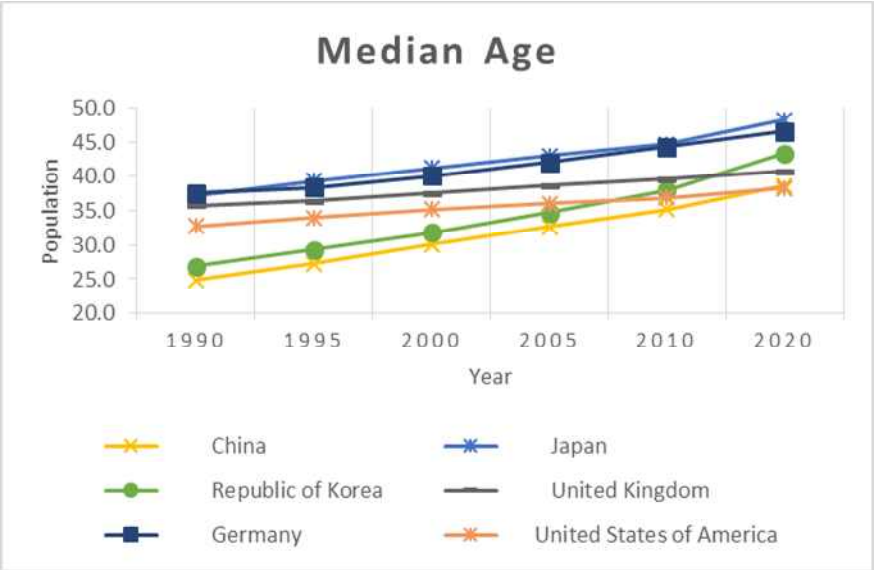
analysis of different ages and different classes. Although the logarithmic variance has further exaggerated problems for the data that differ greatly from the average, the focus of this study is to analyze the income distribution of different classes and ages. It can be estimated that the logarithmic variance is most consistent with the research purpose of this study.

3.2、The Long-Term Trend of Population Aging and Income Inequality

Before analyzing the impact of changes in population structure on the deepening of income inequality, we will first examine the long-term trends of demographic changes and income inequality. In the past two decades, China's population structure has a low birth rate due to the one-child policy, and the average life expectancy has risen rapidly due to rising medical technology and income levels. These various reasons have led to a rapid progress in China's population aging. According to United Nations data, the median age of population in 1990 was 24.9 years old, rising to 35.2 years old in 2010, which was an increase of about 41%. And it is expected that this number will rise to 48 years old by 2050. The United Nations population projections show that from now on until 2030, the Chinese elderly population (60 years old and above) will increase by 10 million each year. By 2030, the number of elderly people in China will reach to358 million, accounting for about 25% of the total population. In 2050, this proportion will further increase to 36.5%, when China will step into a highly aging society. The phenomenon of population aging

in China is progressing rapidly compared with other countries. In order to avoid further deepening of the phenomenon before the "non-rich aging first", this issue is worthy of further investigation.

Figure 2 Changes of Median Age over Years



Data Source: United Nations World Population Prospects
https://population.un.org/wpp/

Figure 3 Changes of Gini Coefficient

Data source: National Bureau of Statistics of China
http://www.stats.gov.cn

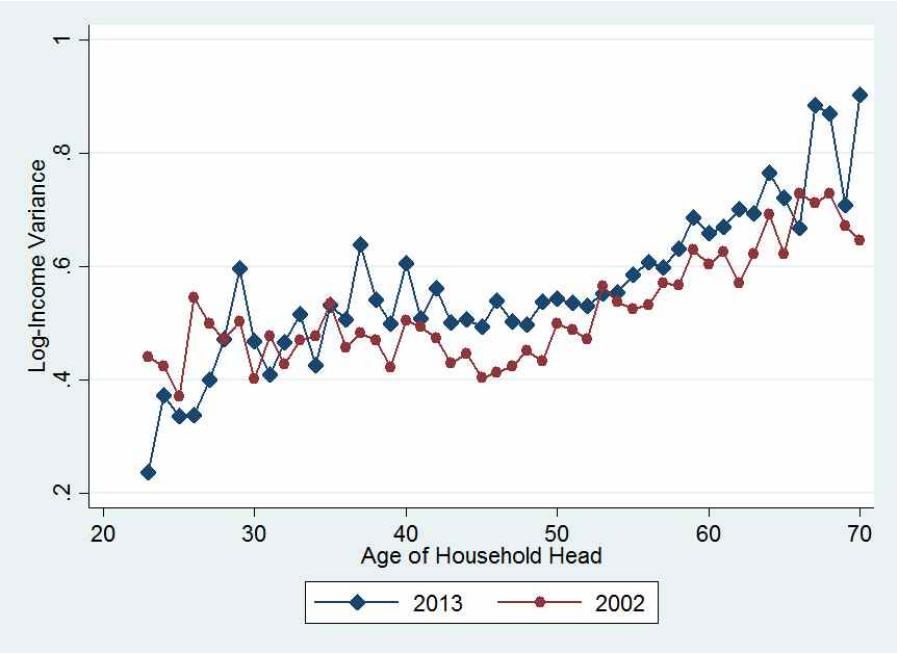
On the other hand, the Gini coefficient measured in each year is used to express the degree of income inequality. That is, from the perspective of the inequality trend from 1990 to 2010, the long-term trend of the two indicators has certain similarities. It can also be said that the level of income inequality in China has risen sharply over the past 20 years. One of the reasons for the depression in the middle was a certain degree of decline due to the financial crisis in the late 1990s. After the impact of the financial crisis, income inequality has risen sharply. Although there are shocks such as the economic crisis, from a long-term perspective, there is a high possibility that population aging is closely related to the trend of deepening in the income inequality.

3.3、Income Inequality and Age Effect

If the population aging trend is one of the reasons for the deepening of income inequality, it is because the income inequality of the elderly population is higher than that of the younger population, and the proportion of the elderly population increases correspondingly with the passage of time. This is also the main way that the previous study found that population aging affects income inequality. Using the survey data from CHIP, it can be seen that the degree of inequality in 2002 and 2013 has generally increased with age. But the difference is that there's no big difference before 45 years old though fluctuations in 2002. The income inequality after 45 years old to 65 years old has increased significantly, and the overall trend is that income inequality increases with age. The 2013 data is also gradually rising after a brief decline in peace between the ages of 40-50. And then the degree of income inequality increased deeply even more than the year of 2002. At the same time, the income inequality of the elderly has greatly improved compared with 2002 in general.

But when we analyse the data with the average household income per head, this phenomenon becomes obscure. Since a family is the basic unit of social life and all members of a family share risks and support each other commonly. Further more, family wealth can not be equally distributed among family members. Therefore, it is more reasonable to analyze the social income inequality from the total family income.

Figure 3 Trends of Income Inequality with Age of Household Head



In general, family income is determined by the number of family members participating in economic activities, the level of human capital such as the education level of family members, and the socio-economic characteristics such as occupations. Meanwhile, it is affected by the size of transfer payments such as public annuities and the amount of funds accumulated. Therefore, as the age of household heads increases, the degree of income inequality also increases because the older households are more affected by the reasons listed above. In this section, we call the effect of increasing of income inequality with age as "age effect". Let's examine the significance of age effect. The reason for age effect is studied in the next chapter.

On the other hand, unlike the age effect, the income levels of people born in different periods are also very different. The specific group of people born in the same period has similar effects on the formation of human capital due to similar economic environment, education system, cultural background, etc. This chapter refers to this effect as the "cohort effect". At the same time, changes in the socio-economic environment will lead to differences in the level of education, technical proficiency and workforce level after adulthood, which is also the reason for income equality in different periods.

In summary, the income inequality of a certain age group can be decomposed into the age effect and the cohort effect in a certain period of time, and each effect can be determined by the following regression equation.

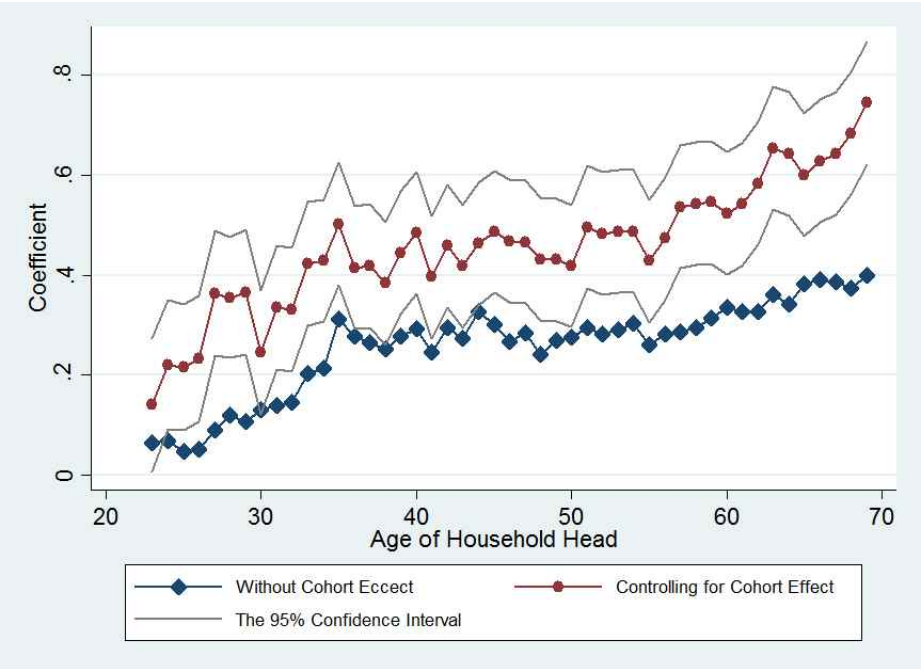
$$Var \ln Y_{i,t} = \alpha + \sum_{i=23}^{69} \beta_i I(AGE = i) + \sum_{j=1934}^{1991} \gamma_i I(YOB = j) + \epsilon_{i,t} \qquad (1)$$

In the above equation, i denotes the age of the household head, j denotes the birth year of the household head, and I(AGE)and I(YOB) represent the dummy variables of each age and birth year, respectively. In order to avoid multiple collinearity, the age group based on the selected age is 22 years old, and the basis of the birth year is the head of the family born in 1933, which was removed during the return. In addition, $Var \ln Y_{i,t}$ is a logarithmic variance of family income for each year and each age according to different combinations of i and j.

The regression coefficient of the age effect and the standard error of the 95% reliability measured in the regression equation (1) are used, and the results are shown by Figure 4. Compared with the 22-year-old household head, after the age of 26, the older the age, the greater the inequality of family income is. The age effect of 35 to

50 years old is larger than that of before 35 years old and 50-60 years old. After 60 years old, the age effect increases with age, and the age effect is statistically significant. This result is very similar to the case of the United States, the United Kingdom, and Taiwan studied by Deaton and Paxson (1994), and the case of Japan studied by Ohtake znd Saito (1998). The Hong (2011) study also yielded similar results. Although there are certain differences, the overall trend is the same. It can be said that the increase in the age of household heads is one of the reasons for the deepening of household income inequality.

Figure 4 The Impact of Age on Household Income Inequality



As shown above, In Figure 4, the lower line is the coefficients of regression using regression equation (1) without considering the effect

of cohort, but only controlling the regression coefficients of age dummy variables. Without considering the effects of the cohort, it can be observed that the coefficient increases with age, but overall it can be seen that the age effect is not very large. This is because a considerable portion of the age effect observed by the actual values in (Figure 3) are contained of the effects of the cohort. On average, age and birth year show a negative correlation, which is because older people are born earlier in the year. Therefore, the above result is that the more recent the population is born, the higher the degree of income inequality is. And the result of the regression about the birth year also shows that the larger the birth year, the higher the degree of inequality is. And the result is statistically significant as might have been expected.

In the above picture, we can see that the age effect of people aged 40-50 is not small compared to those aged 50-60, regardless of the effect of the cohort. It is still about the same after considering the effects of the cohort. The inequality in the first half of the 40-year period in Figure 3 is also greater. Therefore, this phenomenon between the ages of 40-50 years will be broken down in more detail in the future.

However, referring to the previous literatures, the regression equation (1) has the problem of missing the macroeconomic factors of the year. For example, the sudden economic depression such as the 1997 financial crisis widened the income gap across all sectors and increased income inequality in the year. We can observe this from Figure 2. That is, over time, there is an annual effect of changes in income inequality. However, if a control dummy variable is added to the regression equation (1) in order to reflect the annual effect, it is particularly difficult to identify the influence of one effect from the

regression results of the three dummy variables.

In order to solve this problem, we directly regress the age as a numerical variable determining the linear relationship between age and inequality as well as the marginal effect, and put the birth year dummy variable together with the survey year dummy variable into the regression equation (2) for regression. The magnitude of the two effects was determined separately.

$$Var \ln Y_{i,t} = \alpha + \beta AGE + \delta_{cohort} + \delta_{surveyyear} + \epsilon_{i,t} \quad (2)$$

In the above formula, i represents each age, t represents each year, δ_{cohort} represents the fixed effect of the cohort, and $\delta_{surveyyear}$ represents the fixed effect of the survey year. In order to make full use of the income inequality deviation within the cohort and the survey year, making the cohort variable into a virtual variable group on a ten-year basis, and then regress the factors together with the survey year effect.

There is a view in academia that the effect of cohort does not exist. In the case of excluding the effect of cohort and reserving only the effect of age and the effect of survey year, the degree of income inequality is still increasing with the increase of age. Therefore, no matter which method is adopted, there will be no big deviation in estimating the trend of age effect. Here, we adopted the method generally accepted by the academia to take the effect of cohort into account.

Table 1 Age/ Cohort/ Survey Year Effect

	(1)	(2)	(3)
	model_1	model_2	model_3
Age	0.0078*** (0.0001)	0.0152*** (0.0001)	0.0080*** (0.0002)
Birth decade 1940s		0.0700*** (0.0037)	-0.0358*** (0.0033)
Birth decade 1950s		0.0745*** (0.0041)	-0.0767*** (0.0044)
Birth decade 1960s		0.1812*** (0.0051)	-0.0915*** (0.0060)
Birth decade 1970s		0.3530*** (0.0061)	-0.0191** (0.0075)
Birth decade 1980s		0.3140*** (0.0076)	-0.1291*** (0.0095)
Survey year 2007			0.2771*** (0.0017)
Survey year 2013			0.2196*** (0.0024)
_cons	0.1858*** (0.0027)	-0.3330*** (0.0106)	0.0280** (0.0125)
R^2	0.3208	0.4351	0.6586

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The model (1) in Table 1 is the result of controlling only age using regression equation (2). Model (2) controls birth year, and model (3) controls survey year additionally. As with the previous results, the more recently born in model (2), the higher the level of

income inequality. Especially for the people born in the 1970s, the cohort effect was the most effective. At the same time, after adding the effect of the cohort, the marginal effect of age has increased. But the household head born after the 1980s was slightly lower than that of the 1970s. After adding the annual effect of the survey in model (3), the cohort effect has generally become the opposite direction. The more recently the population is born, the degree of inequality is reduced. However, we noticed that the direction of the group born in the 1970s was positive. At the same time, the marginal effect of age is smaller than that of model (2). On the other hand, the coefficient of the dummy variable for the 2007 and 2013 surveys has increased compared with 2002, but the coefficient for 2007 is larger than that for 2013, and the degree of inequality is higher in 2007 compared with 2002 and 2013. This is in agreement with the case of the Gini coefficient of Figure 2.

The results of model (3) can be summarized and explained as follows. First, the more recent the population born, the lower the income inequality is because the fairness of human capital formation such as education level has been greatly improved compared with the past, and the opportunities and rights of each person are more equal. Secondly, with the passage of time, the degree of income inequality rises first and then falls because the income gap between different strata and occupations has increased due to technological progress and open policies in the early stage of development. However, the government has taken note of this phenomenon and then adopted income redistribution. And transfer payments can reduce income inequality too. However, the time dummy variable also reflects the trend of population aging. It is somewhat reluctant to say that the coefficient reflects the fixed effect of the survey year. Of course,

there are other aspects to explain the reasons. We will do more specific discussions in future research.

If the regression coefficient of the model (3) is used, the logarithm variance of the household income will increase by 0.08 for each additional ten years of age. The average of the logarithmic variance of household income during the survey year is 0.5381. Therefore, for every 10 years of age increase, it can be said that the inequality of family income is increased by 15%.

3.4、Increase in Marginal Effect of Age

The age effect predicted by the regression equation (2) is the average marginal effect of all data from 2002 to 2013. If the positive age effect also reflects the increase in the gap between individual economic variables (eg, employment, transfer payments, property income) as the age increases, then the marginal effect of age on income inequality also changes over time. Especially with the change of time, the changes in the social and economic environment will increase the income gap in the elderly population, and the marginal effect of age may also become larger. If the marginal effect of age becomes larger with the passage of time, it is also another way for population aging to deepen income inequality.

In order to determine whether the increase in age effect over time is statistically significant, the test is performed using the following equation.

$$Var \ln Y_{i,t} = \alpha + \beta_1 AGE + \sum_{j=2}^{3} \beta_j AGE_{i,t} \times D_j + \delta_{cohort} + \delta_{surveyyear} + \epsilon_{i,t} \quad (3)$$

That is, the cross term $AGE_{i,t} \times D_j$ of the age and the survey

year dummy variable is added to the regression equation, and the regression coefficient β_j is a coefficient reflecting whether the age effect based on 2002 is changed.

Table 2 The Increase of Age Effect

	(2)	(3)	(4)
	model_2	model_3	model_4
Age	0.0152***	0.0080***	0.0020***
	(0.0001)	(0.0002)	(0.0002)
Birth decade 1940s	0.0700***	-0.0358***	-0.0779***
	(0.0037)	(0.0033)	(0.0030)
Birth decade 1950s	0.0745***	-0.0967***	-0.1048***
	(0.0041)	(0.0044)	(0.0039)
Birth decade 1960s	0.1812***	-0.0715***	-0.1167***
	(0.0051)	(0.0060)	(0.0053)
Birth decade 1970s	0.3530***	-0.0191**	-0.0006
	(0.0061)	(0.0075)	(0.0066)
Birth decade 1980s	0.3140***	-0.1291***	-0.1251***
	(0.0076)	(0.0095)	(0.0083)
Survey year 2007		0.2771***	-0.2437***
		(0.0017)	(0.0060)
Survey year 2013		0.2196***	-0.4486***
		(0.0024)	(0.0064)
Age×Year 2007			0.0108***
			(0.0001)
Age×Year 2013			0.0136***
			(0.0001)
_cons	-0.3330***	0.0280**	0.5479***
	(0.0106)	(0.0125)	(0.0122)
R^2	0.4351	0.6586	0.7360

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

According to the regression results of model (4) in Table 2, the positive marginal effect of age on income inequality has a significant increase over time. For every 10 years of age increase, the average household income inequality increased by 5.6% in 2002, an average increase of 17.3% in 2007, and an average increase of 21.4% in 2013. This can be understood as not only the aging of the population, but also the increase in the marginal effect of age, which also has a great impact on the deepening of income inequality in society.

3.5、Decomposition of Reasons for the Deepening of Income Inequality

Generally speaking, if the income inequality increases significantly when the household head age increases, even if other factors are fixed, the increase of the elderly population will increase the overall inequality of the society. The average degree of inequality in 2002 calculated using CHIP data is 0.3540, and the inequality calculated in 2013 is 0.5838, during which the average is increased by about 65%. On the other hand, the Figure 5 is a long-term trend of the age distribution produced by the sample of the household head of 22-69 years old of CHIP data. The distribution of households under the age of 45 has declined between 2002 and 2013, and the proportion of households over the age of 45 has increased significantly at the same time. In 2002, the proportion of the population over 45 years old accounted for 46.3% of the total population. In 2013, the proportion was 64.9%, an increase of about 40%. Based on this fact, this chapter

examines the extent to which the increase in ageing population and the increase in age have contributed to the deepening of income inequality between 2002 and 2013.

First, calculate the change in the actual income inequality between the two periods. The variables we used are the distribution ratio of each age in each year and the actual income inequality. By multiplying the actual income inequality withthe weight of the population distribution, and then look at the differences of the two periods.

$$\sum_a S_a^{t2} V_a^{t2} - \sum_a S_a^{t1} V_a^{t1} \tag{4}$$

Based on the above equation, it can be written in the following form

$$\sum_a s_a^{t2} \widehat{V_a^{t2}(B_{t2})} - \sum_a s_a^{t1} \widehat{V_a^{t1}(B_{t1})} \tag{5}$$

B_t is the regression coefficient of the age effect of t year, that is, the meaning of β_1 and β_j of the regression equation (3). That is, after obtaining the estimated values of the annual regression analysis, the difference between the population distributions of each age multiplying the estimated income inequality is used to calculate the changes. The above equation can be decomposed into the annual/ cohort effect contribution part, the age effect increase contribution part, and the population aging contribution part.

$$\sum_a s_a^{t2} \left[\widehat{V_a^{t2}(B_{t2})} - \widehat{V_a^{t1}(B_{t2})} \right] + \sum_a s_a^{t2} \left[\widehat{V_a^{t1}(B_{t2})} - \widehat{V_a^{t1}(B_{t1})} \right] + \sum_a \left[s_a^{t2} - s_a^{t1} \right] \widehat{V_a^{t1}(B_{t1})} \tag{6}$$

The first part is the part of annual/ cohort effect contribution, the second part is the contribution of the increase of age effect, and the third part is the part of population aging contribution. The annual/ cohort effect contribution part utilizes the regression

coefficient of population structure and age effect in 2013. The contribution of the age effect increasing part utilizes the population structure of 2013 and the regression coefficient of annual/ cohort effect in 2002. The contribution of population aging part utilizes the coefficient of annual/ cohort effect and age effect in 2002.

The degree of inequality in 2002 calculated using equation (5) is 0.3517, and the degree of inequality in 2013 is 0.5624, an increase of about 0.2107. After three parts, the contribution of the population aging is about 0.038, accounting for about 18% of the total increase. It can be said that the contribution of demographic changes due to the increase in the elderly population to the growth of income inequality in the past decade or so accounted for about 1/5 of the total increment. In the next few years, China's aging population will further increase substantially, and the possibly the income inequality will remain at a high level or further increase if the government doesn't do great efforts.

4、 Causes of Income Inequality with Age

The reasons for the changes in income inequality in existing research mainly focus on macroeconomic reasons such as technological progress and open policies, or changes in family structure such as the increase in the ageing population and the small family trend, or government taxation, transfer expenditures, and public social services which reflects the changes in social distribution. In particular, these reasons are closely related to the aging of the population. As technology advances have made education and training investment important, there is more discrimination in employment and income for elderly populations with lower adaptive capacity. The increase in the ageing population and small family is the main result of the aging population. A large part of the elderly population belongs to the poor, and the small family has led to a smaller proportion of people participating in economic activities within the family, resulting in a decline in household income. Therefore, changes in the social macroeconomic conditions and changes in family structure caused by the aging of the population will increase the overall inequality of society. On the other hand, transfer expenditures and social security expenditures are mostly tilted like old age and poor people, assuming that the redistribution of income through this kind of society can reduce income inequality.

In particular, the situation in China is mainly due to the increase in social inequality caused by the aging of the population. This chapter uses the various factors mentioned above as representative variables to analyze the reasons for the deepening of income

inequality. However, the basis of these analyses is the aforementioned deepening of income inequality due to ageing and the increase in the marginal effect of age over time. In addition, based on the results of the analysis, attempts were made to propose a mitigation of income inequality.

First finding representative variables that cause income inequality from CHIP data. In order to examine the effect of employment rate change with age, the proportion of employment of family head of all ages is used. In addition, in order to analyze the effect of the type of work, the proportion of technical occupations and physical occupations of the family members who participate in economic activities at various ages is used. Then, in order to analyze the effect of human capital differences at various ages, the proportion of college degree or above is used. Finally, in order to analyze the effects of the characteristics of the family structure, the average number of family members of each household head and the average number of working family members were used.

Before analyzing the cause of the age effect, the above effect is referred to as the "factor effect", and the cause coefficient is added to the following regression equation (7) to examine the change in the regression coefficient of the age effect.

$$Var \ln Y_{i,t} = \alpha + \beta AGE + \gamma FACTOR_{i,t} + \delta_{cohort} + \delta_{surveyyear} + \epsilon_{i,t} \qquad (7)$$

If the trend of income inequality increasing with age is consistent with that of all factors changing with age, the regression coefficient of age effect will be smaller or the statistical significance of regression coefficient will be lower.

Table 3 Analysis of the Reasons for the Increase in Inequality with Age

Explanatory variable	Basic model	Employment proportion	Skilled occupation proportion	Above college degree proportion	Average number of family members	Average number of working family members
		Total	Household	Income		
Age	0.0080*** (0.0002)	0.0035*** (0.0002)	0.0075*** (0.0003)	0.0009*** (0.0002)	0.0042*** (0.0002)	0.0031*** (0.0002)
Control variables		−0.0474*** (0.0058)	0.6178*** (0.0342)	−0.7598*** (0.0151)	−0.0299*** (0.0015)	−0.0814*** (0.0026)
R^2	0.6586	0.4591	0.6779	0.4646	0.4646	0.4758
		Labor	Income			
Age		0.0215*** (0.0009)	0.0450*** (0.0010)	0.0187*** (0.0009)	0.0186*** (0.0008)	0.0186*** (0.0008)
Control variables		−0.3951*** (0.0236)	−0.4802*** (0.1270)	−0.2247*** (0.0062)	−0.2247*** (0.0062)	−0.6670*** (0.0099)
R^2		0.6645	0.8548	0.6742	0.6755	0.7060

Based on the above regression results, it can be seen that a variety of factors are closely related to income inequality. Under the premise of controlling the age effect, the higher the proportion of households' employment, the higher the proportion of college degree or above, the more of average family members, and the more family members participating in economic activities, the lower the income inequality. This is because the degree of income inequality has a great dependence on employment and family structure. On the contrary, the higher the proportion of technical work, the higher the level of inequality. This shows that the income gap between technical jobs in different industries is large. At the same time, after adding these factors, the coefficient of age effect is smaller than the coefficient in regression equation (2), which shows that our analysis is reasonable.

When analyzing data from labor income, it is basically similar to the above results. However, the coefficient of age effect has increased significantly, and the effects of various factors have become more apparent. The decline in the proportion of employment is closely related to age. The higher level of inequality in the elderly with a low proportion of employment is directly related to the decline in the proportion of employment in the elderly population. It can be said that with the increase of age, the proportion of employment is getting lower and lower, and this situation contributes a lot to income inequality. The older the age, the greater the difference in the situation of employment due to the large differences in health, education, and technical proficiency. The income gap between employed and unemployed households in the elderly population keeps their income gap at a high level. Therefore, reducing the income gap of the elderly population can through the re-employment of the

elderly population, which can also prevent new inequalities in health conditions.

5、 Income Inequality and Discriminations in Middle-Aged People

The situation we analyzed earlier is that the degree of inequality increases with age. We analyzed the age of 10 as a unit and found that the 40-year-old population had the highest income inequality changes. So we briefly analyze the income inequality in the 40s population and the discriminations in income.

A common method of studying labor market outcomes is to decompose the average difference of logarithmic wages in a counterfactual way based on regression models. In the literature, this process is called Blinder-Oaxaca decomposition (Blinder 1973; Oaxaca 1973). The wage gap between the two groups is divided into groups with productivity characteristics such as education or work experience explained and the remaining part that cannot be explained by this difference in wage determinants. This "unexplained" part is usually used as a discriminant measure, but it also includes the effect of population differences in unobserved predictors. Most applications of this technology can be found in the labor market and discrimination literature. However, this method can also be used in other fields. Generally speaking, this technique can be used to study group differences in any (continuous and unbounded) outcome variable.

Think for 2 groups such as males and females, wage is the explained variable and other indicators such as education and work experience are explanatory variables. And our purpose is to see the disparity between them.

$$D = E(Y_A) - E(Y_B) \tag{8}$$

Based on the linear model

$$Y_i = X_i^{'}\beta_i + \epsilon_i,\ E(\epsilon_i) = 0,\ i \in \{A, B\} \tag{9}$$

Then

$$D = E(Y_A) - E(Y_B) = E(X_A)^{'}\beta_A - E(X_{B)})^{'} \tag{10}$$

Since

$$E(Y_i) = E(X_i^{'}\beta_i + \epsilon_i) = E(X_i^{'}\beta_i) + E(\epsilon_i) = E(X_i)^{'}\beta_i$$

in which $E(\beta_i) = \beta_i$ and $E(\epsilon_i) = 0$ by assumption.

In order to clarify the part that can be explained by the differences in the endowments. The formula (10) can be transformed into

$$\begin{aligned} D = & \left[E(X_A) - E(X_B)\right]^{'}\beta_B + E(X_B)^{'}(\beta_A - \beta_B) + \\ & \left[E(X_A) - E(X_B)\right]^{'}(\beta_A - \beta_B) \end{aligned} \tag{11}$$

The difference is divided into three parts:

$$D = E + C + U$$

The first part

$$E = \left[E(X_A) - E(X_B)\right]^{'}\beta_B$$

accounts for the part of the differences due to differences in the endowments between groups.

The second component

$$C = E(X_B)^{'}(\beta_A - \beta_B)$$

accounts for the contribution of differences in the coefficients.

The third part

$$U = \left[E(X_A) - E(X_B)\right]^{'}(\beta_A - \beta_B)$$

is an interaction term accounting for the fact that differences in endowments and coefficients exist simultaneously between the two groups.

Decomposition (11) is investigating from the standing point of Group B. Specifically, the group differences in the explanatory

variables are weighted by the coefficients of Group B to determine the endowments effect (E). That is to say, the E component examines the expected change in Group B's mean outcome, if Group B had Group A's explanatory variable levels. Similarly, for the second component (C), the differences in coefficients are weighted by Group B's explanatory variable levels. That is, the second component measures the expected change in Group B's mean outcome, if Group B had Group A's coefficients.

On the basis of the above equation, decomposition is carried out according to urban and rural areas, industries, and departments.

Table 4 The Circumstances of Discrimination from Different Dimensions

Year / Ln(income)	2007	2013
Urban areas	10.68692	11.26252
Rural areas	9.884913	10.3636
Differences	.8020044	.898915
Endowments	.1414572	.174708
Discrimination Part	.6195801	.70361

Year / Ln (income)	2007	2013
First Industry	10.2928	10.77316
Non-First Industry	10.15952	10.42428
Differences	.133275	.3488794
Endowments	.058278	.1257475
Discrimination Part	.0561527	.1543473

Year / Ln (income)	2013
Private Sectors	10.94559
Public Sectors	10.61903
Differences	.3265595
Endowments	.1949709
Discrimination Part	.1058513

According to the above results, in terms of income distribution, China has serious discrimination against rural population, primary

industry, and private sector workers. The urban-rural income gap in 2007 was 0.82, and in 2013 it was 0.89. As the income gap widens, discrimination also becomes more serious. The proportion of discrimination in 2007 was 0.62, and in 2013 it was 0.70. Under the condition that the rural population and the urban population have the same endowment, if the rural population applies the regression coefficient of urban population income, the logarithmic income will increase by 0.70. It can be said that discrimination against the rural population accounts for more than 70% of the urban-rural income gap.

In 2007, the income gap between the primary industry and the secondary and tertiary industries was 0.13, and it expanded to 0.34 in 2013. In terms of discrimination, the proportion in 2005 was 0.056, and in 2013 it was 0.15. It can be said that discrimination against the primary industry accounted for more than 40% of the total income gap of different industry groups.

In the private sector and the public sector, the private sector earns 0.32 less than the public sector. In the case of the same endowment conditions, the public sector income coefficient is applied, and the private sector income is increased by 0.11. Discrimination against the private sector is accounted for. About one-third of the income gap.

The population of 40 to 50 years old is one of the backbones of social and economic development. The income gap of this group is crucial to the overall stability of society. Moreover, after another 10-20 years, this part of the population will become an elderly population. If the current income gap continues, it will inevitably have a great impact on the widening income gap of the elderly population.

6、 Conclusions

From the perspective of the industry, the income gap of people from different industries is quite different. Since wages are the main source of income for the vast majority of people, we can examine the changes in the average wage level in various industries. According to the standard of industry division in China Statistical Yearbook, it can be clearly seen that since the reform and opening up, the industries with the highest per capita wage include electric power and gas, mining, finance and information computer software industry, while in recent years, the financial industry and information computer software industry are the main industries. These industries generally show two characteristics: one is knowledge and capital intensive, the other is monopolistic and resource-intensive. In contrast, the average wage of agriculture, forestry, animal husbandry and fishery is almost always the lowest in all industries, which may be related to the low added value of agricultural products and labor-intensive characteristics.

However, from the perspective of relative ratio since 2005, the relative gap between the highest and the lowest industries of average wage level in China has gradually narrowed to 3.65 in 2017. However, this figure is still much higher than before 2000, reflecting that the wage income level among industries in China is still widening on the whole.

The income gap between Chinese residents is also reflected in urban and rural area. Since the reform and opening up, the income level of both urban and rural residents has been greatly improved. However, it can not be ignored that the income gap between urban

and rural residents is increasing year by year.

However, from the perspective of urban-rural residents' relative income ratio, after a long-term rise, there has been a downward trend in recent years. The relative ratio is 2.71 in 2017, which is much lower than 3.23 in 2010. This shows that the absolute difference of income between urban and rural residents is increasing, but the relative difference has eased.

Generally speaking, China's urban and rural development is still unbalanced, the dual economic structure is still serious, the level of rural productivity is lower than that of cities and towns for a long time, and the household registration system restricts the rural population's migration to cities and towns. At the same time, due to the characteristics of agriculture itself, the added value of agricultural products is lower than that of industrial and service products, resulting in farmers' income is relatively low.

So far, through the above several dimensions of investigation, we have a whole grasp of the income situation of Chinese people. Whatever the analysis, the excessive income gap is unfavorable to the long-term development of the national economy. It will not only cause insufficient domestic demand, but also may affect the further optimization of the economic structure. Therefore, it is necessary for China to make more efforts in adjusting the distribution of national income, such as optimizing redistribution links, rationally using fiscal and taxation tools, speeding up the pace of urbanization, and promoting the equalization of basic public services, etc.

In terms of the relationship between age and income gap, we have established a model analysis. The situation in China is similar to that in other countries. The degree of income inequality is increasing with age. After controlling the effects of the cohort and

investigating the annual effect, the age effect still shows statistical significance. At the same time, the marginal effect of age has an increasing trend with time, which is closely related to the deepening of population aging. The aging of the population is one of the main problems facing China at present and in the future. From the above analysis, the greater the age, the higher the income inequality. What is probably true is that China may have a high level of income inequality for a long time to come. In particular, China is still in the stage of development, and the income level has not reached the level of developed countries. But there has been a situation in which is non-rich aging first, which makes the situation in our country even worse. In order to alleviate income inequality in the elderly population, one way is to expand income redistribution and increase pension fund expenditures, and the other is to promote re-employment of the elderly population. In terms of income distribution, China has already faced a large pension fund gap, and increasing spending will inevitably increase the national financial burden. In promoting re-employment of the elderly population, re-employment of the elderly is closely related to a variety of factors, such as health, technical proficiency and education. At the same time, there is also a problem that the employment of the elderly may cause the unemployment rate of young people to rise. Therefore, there is still a long way to explore in mitigating social income inequality.

Inequality in income among middle-aged people affects all aspects of social life, and middle-aged people are the main source of income for families. The analysis of income inequality in the middle-aged layer shows that the existence of the current urban-rural dual structure and the income inequality in different sectors are serious social problems. In order to eliminate these discriminations in

employment as much as possible, we must accelerate the construction of urban and rural integration system, narrow the income gap among different industries, and create a more equal competitive environment. In 2050, China will enter a super-aged aging society. In order to alleviate the high level of income inequality in the elderly population in the future, aimed from middle-aged groups and even young people may be a good approach.

References

[1] Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. International economic review, 14(3), 693-709.

[2] Deaton, A. S., & Paxson, C. H. (1998). Aging and inequality in income and health. The American Economic Review, 88(2), 248-253.

[3] Wan, G. (2004). Accounting for income inequality in rural China: a regression-based approach. Journal of Comparative Economics, 32(2), 348-363.

[4] Sicular, T., Ximing, Y., Gustafsson, B., & Shi, L. (2007). The urban - rural income gap and inequality in China. Review of Income and Wealth, 53(1), 93-126.

[5] Zhong, H. (2011). The impact of population aging on income inequality in developing countries: Evidence from rural China. China Economic Review, 22(1), 98-107.

[6] Kuznets, S. (1955). Economic growth and income inequality. The American economic review, 45(1), 1-28.

[7] Bourguignon, F. (1979). Decomposable income inequality measures. Econometrica: Journal of the Econometric Society, 47(4), 901-920.

[8] Kanbur, R., & Zhang, X. (1999). Which regional inequality? The evolution of rural - urban and inland - coastal inequality in China from 1983 to 1995. Journal of comparative economics, 27(4), 686-701.

[9] Krueger, D., & Perri, F. (2006). Does income inequality lead to consumption inequality? Evidence and theory. The Review of Economic Studies, 73(1), 163-193.

[10] Ohtake, F., & Saito, M. (1998). Population aging and consumption inequality in Japan. Review of Income and Wealth, 44(3),

361-381.

[11] Jann, B. (2008). The Blinder-Oaxaca decomposition for linear regression models. The Stata Journal, 8(4), 453-479.

[12] 홍석철, & 전한경. (2013). 인구고령화와 소득불평등의 심화. 한국경제의 분석, 19(1), 72-114.

[13] 김학주. (2006). 노인가구 대 비노인가구의 소비불평등에 관한 연구. 사회보장연구, 22(4), 141-161.

[14] 김경아. (2008). 국내 노인가구의 소득불평등 현황 및 공적연금의 소득불평등 개선효과에 관한 연구. 사회복지정책, 32(0), 79-107.

[15]鄧曲恒.(2007).城鎭居民与流動人口的收入差异-基于Oaxaca-Blinder和Quantile 方法的分解. 中國人口科學, 2007(2), 8-16.

[16]喬曉春, 張愷悌, 孫陸軍, &張玲.(2005).對中國老年貧困人口的估計. 人口研究, 29(2), 8-15.

[17]于學軍.(2003).從上海看中國老年人口貧困与保障.人口研究, 27(3), 33-38.

[18]楊立雄.(2011).中國老年貧困人口規模研究. 人口學刊, 2011(4), 37-45.

[19]劉華.(2014).農村人口老齡化對收入不平等影響的實証研究. 數量經濟技術經濟研究, 31(4), 99-112.

[20]郭継强,陸利麗,&姜儷.(2014).老齡化對城鎭居民收入不平等的影響. 世界經濟, 2014(3), 129-144.

[21]董志强,魏下海,&湯燦晴.(2012).人口老齡化是否加劇收入不平等?. 人口研究, 36(5), 94-103.

[22]藍嘉俊,魏下海,&吳超林.(2014).人口老齡化對收入不平等的影響: 拉大還是縮小?. 人口研究, 38(5), 87.

국문초록

인구고령화와 소득불평등은 지난 10년간 중국에서 뜨거운 이슈였다. 선진국의 기존 연구에 따르면 연령과 소득불평등 사이에는 어떤 관계가 있을 수 있다. 또한 많은 학자들은 인구고령화가 소득불평등의 심화에 큰 영향을 미친다고 확신하고 있다. 본 연구에서는 중국 가구소득 프로젝트의 데이터를 사용하여 인구고령화가 소득불평등의 심화에 미친 영향을 분석한다. 연구결과에 의하면 인구고령화가 중국 국민의 소득불평등을 심화시켰고 코호트 효과가 큰 부분을 차지한다. 더불어, 연령이 소득불평등에 미치는 한계효과가 시간이 지남에 따라 증가해왔으며, 노인들의 비율이 점차 증가하기 때문에 향후 수십 년 동안 큰 도전이 있을 것이라는 것을 시사한다. 인구고령화는 소득불평등이 심화되는 것에 약 1/5 가량을 기여했다. 따라서 사회 경제의 지속적인 발전을 위해서는 소득불평등을 줄이기 위한 정부의 많은 노력이 필요하고 불공정한 시장 제도를 완화시킬 수 있는 다양한 차원의 정책을 도입해야 한다.

주요어: 인구고령화, 소득불평등, 오하카 분해법, 중국
학 번: 2016-27851