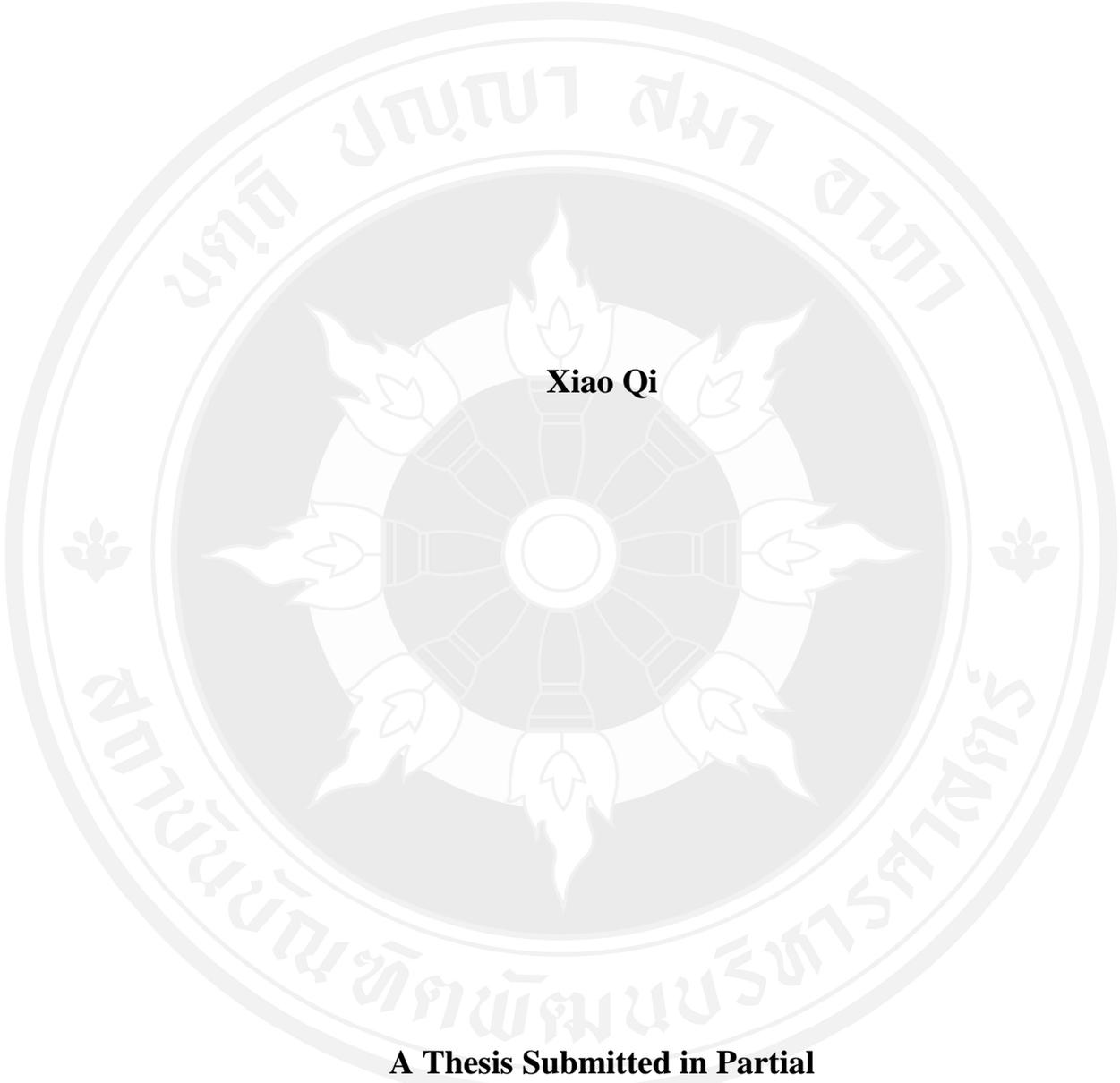# THE IMPACT OF POPULATION AGING ON CONSUMPTION STRUCTURE: A CASE OF SOUTHWEST AND SOUTH CHINA

Xiao Qi

A Thesis Submitted in Partial
Fulfillment of the Requirements for the Degree of
Master of Economics (Economics and Management)
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THE IMPACT OF POPULATION AGING ON CONSUMPTION STRUCTURE: A CASE OF SOUTHWEST AND SOUTH CHINA
Xiao Qi
School of Development Economics

.... Major Advisor
(Assistant Professor Athakrit Thepmongkol, Ph.D.)

The Examining Committee Approved This Thesis Submitted in Partial Fulfillment of Requirements for the Degree of Master of Economics (Economics and Management).

.... Committee Chairperson
(Assistant Professor Pongsak Luangaram, Ph.D.)

.... Committee
(Assistant Professor Athakrit Thepmongkol, Ph.D.)

.... Committee
(Associate Professor Yuthana Sethapramote, Ph.D.)

.... Dean
(Associate Professor Amornrat Apinunmahakul, Ph.D.)

_____/_____/_____

ABSTRACT

Title of Thesis	THE IMPACT OF POPULATION AGING ON CONSUMPTION STRUCTURE: A CASE OF SOUTHWEST AND SOUTH CHINA
Author	Xiao Qi
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Since China entered an aging society at the end of the twentieth century, the proportion of the elderly population has been increasing and the aging rate has been accelerating, and it has become one of the countries with the fastest population aging development in the world. The deepening of population aging means the gradual disappearance of the demographic dividend, which will have an important impact on my country's economic development. Since 2008, world economic growth has slowed down. With the tightening of the international market, my country's economic growth model that mainly relies on investment and import and export has been affected, and the problem of insufficient domestic consumption has begun to become prominent. The lack of domestic consumption will make economic growth lack of robustness and sustainability. Therefore, increasing domestic consumption is very important for stimulating economic growth. Especially in the context of the gradual deepening of the aging of the population in our country, the elderly, as a special consumer group, have different consumption patterns from people of other ages. The elderly has special needs for various goods and services, so the accelerating rate of population aging is bound to affect my country's consumption structure.

China has a vast territory, and previous studies on population aging have used the entire country as the research object. The empirical results obtained cannot be well applied to specific provinces and regions, due to the important strategic and economic status of Southwest and South China, to understand the impact of population aging on the consumption structure of urban residents in southwest and south China has great significance. Therefore, this article uses consumption as a starting point to study the impact of population aging of southwest and south China on urban residents' consumption structure, and corresponding suggestions based on the results of the

research which are intended to play a certain reference role in coordinating the development of population and economy.

This article first introduces the mechanism of population aging on the consumption structure of residents in detail and explains the impact of population aging on the consumption structure of residents from a theoretical level; secondly, The present situation and characteristics of population aging and resident consumption structure in southwest and south China are described in detail.Next, with urban residents in the southwest and south of China as the main body, select the panel data of five provinces in southwest and south of China from 2000 to 2018, Through the establishment of a suitable dynamic panel regression model to explore the impact of population aging on seven types of consumption expenditure of urban residents. Here is not only a regression on the proportion of commodity consumption, but also a regression on consumption expenditures to make the regression results completer and more reliable. The main conclusions are as follows: First, China's aging population has reduced the overall consumption of food, clothing and daily necessities and services, education, and entertainment. Second, China's aging population will increase consumer spending on housing, healthcare, transportation, and communications. Finally, based on the theoretical and empirical analysis, the paper puts forward relevant policy recommendations according to the empirical results of the impact of population aging on the consumption structure of urban residents in southwest and south China.

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Xiao Qi

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INTRODUCTION

1.1 Research Background and Significance

1.1.1 Research Background

The aging of the population is caused by the country's low birth rate and low mortality rate, because with the total population unchanged, the increase in the number of aging populations will further accelerate the entry into an aging society. with the rapid development of economy, population aging worldwide is presented in its unique way. In the 1940s, the United States, Japan, Canada, and other countries also joined the ranks of the aging population. In 1999, China entered the aging society, with the proportion of the elderly population being 7.1%. Since China's reform and opening, along with the implementation of the one-child policy, fertility and mortality rates have fallen sharply, the average life expectancy has been extending. China witnessed a major change in the age structure of the population. The aging of the population has deepened. The population rose to 123 million in 2011, accounting for 9.1% of the population. The sixth population census showed by the end of 2010, China's population aged 65 or above accounted for 8.92%. According to the latest data released by the National Bureau of Statistics, the number of people aged 60 and above in China reached 249 million in 2018, accounting for 17.9%, 7.9% higher than the standard set by the United Nations, which is enough to show that China's aging situation is serious. Experts in this field predict that China's aging population will increase to 480 million by 2050, accounting for a quarter of the global population.

The aging of the population will not only change the population structure but also have a certain impact on social and economic development.

With the deepening of the aging population, the level of consumption of China's residents is insufficient. After the global financial crisis, China is faced with the deterioration of the external economic environment, the appreciation of RMB, the slowdown of export growth, and the need to improve the domestic investment environment. Small and medium-sized enterprises are heavily indebted, and they are difficult to survive. Consumption is the driving force of economic growth and the head of "Three Troika" of economic transformation. It has rapidly become the main object of national macro-control and stimulating consumption has also become an important means to transform the model of economic development. However, the consumption level of Chinese residents has been declining. It can be seen from the fact that China's household consumption rate from 2000 to 2018 published by the World Bank is lower than the world average (household consumption rate is the ratio of total household consumption to GDP), which reflects that the structure of China's economic growth is seriously unreasonable. The lack of domestic consumption will lead to the lack of robustness and sustainability of economic growth. Compared with the production sector, the slow growth of the consumption sector has become one of the important factors restricting the sustainable development of China's economy and society. The consumption pattern of the elderly population is completely different from that of the population of other age groups. Compared with the population of other age groups, the elderly has special demands for goods and services. Therefore, in the context of gradually deepening population aging, with the change of China's population structure, the consumption structure of Chinese residents should also be appropriately adjusted to promote the sound development of the economy.

Will the aging population affect the consumption level of Chinese residents? Consumers of different ages have their unique consumption habits and thinking

patterns, so will this preference that vary from person to person affect the consumption level of Chinese residents? If so, how is it affected? China is now in the background of the deepening of the aging population, how to break through the low level of consumption limit is very important. This paper combines theory with empirical analysis and takes the inter-provincial panel data of five provinces in southwest China from 2000 to 2018 to make an empirical analysis.

Here are five provinces in southwestern and southern China as examples. Why should these five provinces be used as the research object? The first point is that scholars did not analyze a few provinces individually. This is not only innovative, but also able to solve problems in a targeted manner. The research results can also guide the relevant adjustments in the consumption structure of these five provinces. The second point is that these five provinces are in the southwest and south of China, and they are adjacent to each other and have a prominent strategic position. The five provinces border the southeast coast to the east, the central inland to the north, and Vietnam, Laos, and Myanmar to the southwest. India and other countries are adjacent to Malaysia, Brunei, and the Philippines across the sea. At the same time, it is located along the coast, river, and border. It is China's only frontier opening to the outside world with the advantages of coastal, river and border regions. At the same time, it is in the southwest and south China. As the economic link between the east and the west, the province plays an important role in economic development. The third point is the level of aging. According to the seventh national census, among the five provinces, the level of population aging in Sichuan ranked among the top, while that in Guangdong, Yunnan, Guizhou, and Guangxi was relatively low. The level of population aging in these provinces is at a medium level, so the five provinces in southwest China and south China are representative. The study on the impact of population aging on consumption structure is comprehensive. At the same time,

research can also improve the adjustment of the consumption structure in southwestern and southern China to promote economic development.

1.1.2 Research Significance

At present, most of the consumption theories in China were introduced from western developed countries. These theories were abstracted from the western countries based on summarizing their own practical experience, with a strong "foreign flavor". Although there are a lot of models about residents' consumption, such as Keynesian consumption function relative income hypothesis, absolute income hypothesis, all of them have expounded the consumption level from different angles. But in practice, these theoretical models support empirical data. Consumption is an important area of macroeconomic research, so we must improve the consumption level of residents.

As the aging of China's population continues to deepen, the impact on the economy and other aspects is gradually increasing. Since the 2008 economic crisis, the international market has begun to shrink, posing a challenge to China that achieved economic growth by relying on exports and investment. Therefore, it is very important to transform the economic growth mode, promote industrial upgrading, and expand domestic demand. Because people of different age groups have different consumption habits, preferences, and concepts, when society enters the aging of the population, it will inevitably change the age structure of the entire population, which will affect the consumption level and structure of residents. Consumption is an important driving force of economic operation and development because China is a market economy system, which needs to promote economic operation by stimulating consumption. For different consumer subjects, there will be different types of consumption. The consumption of the elderly population is completely different from that of people of other ages, and there is a big difference in consumption demand.

Therefore, the rapid development of China's population aging will inevitably affect the consumption structure of residents, which in turn will affect the overall social consumption. Therefore, what kind of impact will the development process of population aging have on the current consumption structure of residents? Can this impact be reasonably applied through effective policy measures? Therefore, this paper empirically studies the impact of my country's population aging on the consumption structure of residents, and puts forward targeted countermeasures and suggestions, which are of great significance to promote consumption upgrading and national economic development.

Based on the previous research results of this paper, combined with the unique environmental conditions in China, and starting from the variables such as disposable personal income of urban residents and consumer price index, this paper develops a theoretical model suitable for local practical experience, and further discusses the influence mechanism of population aging on residents' consumption level. Then on this basis, the econometrics method is used to prove its hypothesis, and it is concluded that there is a certain relationship between population aging and consumption. Finally, according to different correlations, constructive suggestions were put forward for corresponding cases.

1.2 Introduction to the Five Provinces in Southwestern and South China

1.2.1 Geographical Environment of Five Provinces in South and Southwest China

The five southwestern provinces mainly refer to the three provinces of southwestern China, namely Sichuan, Yunnan, Guizhou, and the two provinces of southern China, namely Guangdong, and Guangxi. Here, I will mainly talk about the general situation of southwestern and southern China. The southwestern region is

traditional Chinese geography. One of the divisions, bordering the central and southern regions in the east, the northwestern regions in the north, and mountains in the southwest region, this region has complex topographic structure, rich natural resources, dense population, and relatively developed transportation economy. Among them, the development of Sichuan is more advanced than that of Yunnan and Guizhou. At the same time, southwestern China is in the southwest border of China, southeast of the Qinghai-Tibet Plateau. The topography of the southwestern region planned by the administrative district is relatively complex, but it is more significantly divided into three topographic units. The first is the Sichuan Basin surrounded by mountains, which mainly includes most of the Chongqing municipality. The second is Yunnan-Guizhou Plateau with high mountains and many hills, mainly including the entire Guizhou and Yunnan province in the south-central and east-central regions, and the third is the Qinghai-Tibet Plateau with the alpine and mountainous areas, which mainly includes the entire territory of Tibet, northern, western, and southwestern Sichuan, and the northwestern part of Yunnan Province. Guangdong and Guangxi are in the south of China. Here we focus on understanding the South China Economic Circle, which is a concept of economic cooperation and industrial network across political and administrative boundaries and across regions. Its geographical scope includes the South China region of Mainland China, Hong Kong, Taiwan, and Macau (according to China's administrative divisions, the South China region includes the four provinces of Guangdong, Guangxi, Hainan, and Fujian, and according to economic links, it also includes parts of Hunan and Jiangxi.). The content of economic cooperation is mainly export-oriented industries or export processing industries. Its structural layout is characterized by the continuous transfer of production links, capital, technology and other elements in Hong Kong, Macao and Taiwan to south China, forming a division of labor. The former is mainly to assume the role of service industry center, science and technology research and development

center, and international trade network, while the latter is responsible for the production base. As a result, between the "two sides of the Taiwan Strait" there is one of the highest levels of export mass production in the world, creating an integrated network of factory-style, vertically divided production. In contrast, Guangdong and Guangxi will do much better than the three provinces in the southwest. The development achievements of the three southwestern provinces and the problems encountered in the later period will also be discussed.

1.2.2 Overview of Economic Development and Population Aging in Five Provinces of Southwest and South China

Over the past 70 years, Sichuan's achievements in economic and social development have been remarkable. The overall strength of Sichuan has greatly leaped. In 70 years, the total economic volume of Sichuan has achieved a historic leap from 2 billion Yuan to 4 trillion Yuan. In 2015, Sichuan's economic aggregate jumped to sixth in the country and has since steadily ranked sixth in the country and first in the western region. The economic structure continues to upgrade. In 1978, only six cities in the province had a GDP of more than one billion Yuan. By 2018, 16 cities and states in the province owned a GDP of more than 100 billion Yuan. The rural poor population decreased from 6.25 million at the end of 2013 to 710,000 at the end of 2018, and the incidence of poverty dropped to 1.1%. After 70 years of hard work, Yunnan has undergone earth-shaking changes. A series of economic development achievements have witnessed the development process from standing up, getting rich, to getting stronger under the leadership of the CPC.

The main data of the seventh national census in Sichuan Province will be released. In the permanent resident population of Sichuan, 14,167,600 people aged 65 or above accounted for 16.93%. Compared with the sixth national census in 2010, the proportion increased by 5.98%. According to the internationally accepted

classification standard, Sichuan's population aged 65 or above accounts for more than 14%, which means that it has entered a deeply aging society. Chen Zhi, deputy director of the Sichuan Provincial Bureau of Statistics and a member of the Party Leadership Group, said that the aging of the population was the result of economic development and a variety of factors, which also brings some challenges and opportunities to economic and social development. Population aging will reduce the supply of labor force and increase the burden of family care and the pressure on the supply of basic public services.

Over the past 70 years, Yunnan has closely followed the pace of national development and insisted on focusing on economic construction. It has achieved a transformation from the poor to the rich, from the wasteful to the prosperity of the industry, from the high shortage of materials to the extremely rich products, from closed and backward to open and developed. The total economic volume has achieved a historic leap. The GDP of Yunnan increased from 893 million Yuan in 1949 to 1,788.112 billion Yuan in 2018, and the per capita GDP increased from 56 Yuan to 37,136 Yuan. The scale of the economy has expanded significantly.

The main data from the seventh National population census of Yunnan Province shows that the population aged 0-14 in the province was 9.237 million, accounting for 19.57% of the total population. The population aged between 15 and 59 was 30,934,000, accounting for 65.52% of the total population; The population aged 60 or above was 7.038 million, accounting for 14.91% of the total population, among which 5.073 million or 10.75% were aged 65 or above. Compared with the sixth national census in 2010, the proportion of people aged 0-14 decreased by 1.16%, that of people aged 15-59 decreased by 2.68%, that of people aged 60 and above increased by 3.84%, and that of people aged 65 and above increased by 3.12%.

During the "Thirteenth Five-Year Plan" period, Guizhou's economy continued the good momentum of the "Twelfth Five-Year Plan" and continued to maintain rapid

growth. The growth rate remained in the forefront of the country and the Yangtze River Economic Belt, creating a "golden decade" of catching up and surpassing. The annual GDP growth of Guizhou exceeded 100 billion Yuan. From 2016 to 2020, the province's regional GDP increased by an average of 145.711 billion Yuan, with an average annual growth of 26.947 billion Yuan during the "Twelfth Five-Year Plan" period. The economic scale continued to leap to a new level. In 2018, the total economic volume of the province exceeded 1.5 trillion Yuan. In 2020, the province's regional GDP was 1,782.656 billion Yuan, and its ranking in the country jumped from 24th in 2015 to 20th. The proportion of the province's regional GDP in the national total increased from 1.53% in 2015 to 1.75% in 2020.

According to the main data of the seventh national census in Guizhou Province, the proportion of the population aged 0-14 was 23.97%, that of the population aged 15-59 was 60.65%, that of the population aged 60 and above was 15.38%, and that of the population aged 65 and above was 11.56%.

Since the 18th National Congress of the Communist Party of China, China, which has entered a new economic normal, has made globally renowned achievements in economic and social development, among which Guangdong, the largest economic province, has made outstanding contributions. The report "Guangdong's Economic and Social Development Achievements since the Eighteenth National Congress", exclusively provided by the Provincial Statistics Bureau to the Nanfang Daily, shows that from 2013 to 2016, Guangdong achieved an average annual GDP growth rate of 7.9%. The total economic output even exceeded 6 trillion Yuan and 7 trillion Yuan, and in 2016 it was close to 8 trillion Yuan. Since the 18th National Congress of the Communist Party of China, the contribution rate of Guangdong's economy to the national economic growth has exceeded 10%.

At the end of 2018, the main age groups of the province's permanent population were 19,492,400 people aged 0-14, 84,187,300 people aged 15-64, and

9,780,300 people aged 65 and over, respectively accounting for 17.18%, 4.20% and 8.62% of the total permanent population. The age structure of the population continues to show the characteristics of "low at both ends and high in the middle", that is, the proportion of children (0-14 years old) and the elderly (65 years old and above) is relatively low, while the proportion of adult (15-64 years old) is higher. Although the proportion of people aged 60 and above in Guangdong's permanent population was lower than the national average, the absolute number of elderly people was huge. At the end of 2018, the province's permanent population aged 60 and above was 14,726,700 and 9,780,300, accounting for 5.90% and 5.87% of the population of the corresponding age group in the country during the same period.

The economic operation of the whole region of Guangxi Province continued to stabilize and improve, and the pace of economic growth accelerated. In the first three quarters, the region's GDP was 1,599.907 billion Yuan, a year-on-year increase of 2% at comparable prices. The per capita disposable income of residents was 18,026 Yuan, with a nominal year-on-year increase of 5%. The per capita disposable income of urban residents was 26,679 Yuan, with a nominal increase of 3%. The per capita disposable income of rural residents was 10,661 Yuan, with a nominal increase of 7.9% and an actual increase of 3.1%.

By the end of 2019, Guangxi had 56.95 million registered residents and 49.6 million permanent residents. Among them, the population aged between 15 and 64 was 33.713 million, accounting for 67.97%. There were 4.96 million people aged over 65 years old, accounting for 10% of the total population.

From Table 1.1, we can see the changes in the five provinces: urban residents' disposable income and urban residents' disposable income were increasing, but the increase range was different. Many problems are worth studying. The recent rise of aging will directly affect our consumption structure, which is influenced by many factors. Per capita disposable income is a key factor, and the next step is to study the

consumption structure of each province with the degree of the aging population as the entry point.

Figure 1.1 Per Capita Disposable Income of Urban residents in Five Provinces of Southwest China and South China

Source: National Bureau of Statistics (2014-2019)

1.3 Definition of Related Concepts

1.3.1 Definition of Concept and Measurement Indicators of Population Aging

Population aging refers to a state in which the age structure of the population changes. It is mainly manifested in the process of increasing the proportion of the elderly population in the overall population of a country or region, or the decreasing proportion of the youth population. It reflects the growth trend of the elderly population in a country or region. The United Nations' interpretation of population aging is that population aging refers to population aging, which refers to a dynamic

change in which the proportion of the elderly in the total population continues to increase over time. The definition of population aging given by the United Nations shows that when a country or region enters an aging society, there are two definitions. One is that the population aged 60 and over accounts for more than 10% of the total population, and the other is that the population aged 65 and over accounts for more than 10% of the total population. In the literature on population aging, most of the indicators used to measure the degree of population aging are the old-age dependency ratio, the ratio of the young and the young, and the proportion of the elderly population. The index selected in this paper is the aging rate, which is composed of the population aged 65 and over. The proportion of the total population is calculated.

1.3.2   Definition and Classification of Consumption Structure

In social life, people have a variety of consumer needs. To meet this demand, people will consume under the constraints of their economic conditions and the price of consumption materials. The consumption structure refers to the consumption of materials in the process of consumption. This proportion relationship is expressed in money. All kinds of living consumption expenditure are the concrete performance of residents in their real life. According to the statistical caliber of the National Bureau of Statistics of China, household consumption is divided into eight categories. These eight categories of consumption expenditure are food, tobacco, and alcohol consumption expenditure, clothing consumption expenditure, residential consumption expenditure, daily necessities and service consumption expenditure, transportation, and communication consumption expenditure, educational, cultural and entertainment consumption expenditures, medical and health care consumption expenditures, and other supplies and services consumption expenditures.

1.4   Theoretical Basis

1.4.1   Hypothesis of Absolute Income

Keynes first proposed the concept of consumption function in 1936. Later, Western economists' research and supplements on consumption were all based on that consumption is determined by income. The simplest form of absolute income consumption function was first published in "Employment, Interest and currency" , he absolute income hypothesis was later put forward by Keynes, who believes that income is the only factor that determines consumption, and that there is a stable functional relationship between the two. First, the hypothesis holds that consumption is only related to current income and that current income is the main factor affecting people's consumption. Secondly, the absolute income hypothesis believes that the consumption demand of residents conforms to the law of diminishing marginal effect, that is, as income increases, people's consumption demand decreases. Finally, the absolute income hypothesis believes that consumption is completely changeable, which changes with changes in income, and that current consumption depends on current net income.

1.4.2   Hypothesis of Lasting Income

The permanent income hypothesis was put forward by Friedman in 1957. This hypothesis is different from Keynes's absolute income hypothesis. The concept of rational consumers was put forward in this theory, and it is believed that their consumption expenditure is not determined by current income, but by long-term fixed income. Friedman believes that consumer income is divided into two parts, namely permanent income and temporary income. Permanent income is the weighted average of all the income consumers can expect in this life, while temporary income refers to the non-recurring income of a consumer in a lifetime or the income obtained by

chance. The permanent income hypothesis holds that although people's temporary income will change due to some accidental events, long-term income still determines people's consumption expenditure, that is, permanent income. Changes in temporary income have no significant impact on residents' consumption expenditure.

1.4.3   Life Cycle Hypothesis Theory

The economist Modigliani is one of the main representatives of the life cycle hypothesis theory, which he proposed in 1954. Life cycle consumption theory believes that personal consumption behavior or saving behavior is not only related to current income, but people also always expect their income to be the most useful, so they are accustomed to putting all their life's income between consumption and investment according to their wishes. According to the different stages of a person's life, the income of rational consumers is relatively small when they are young, but they expect that their income will increase in the future, so they will have the impulse to consume, and most of their income during this period will be lost. Consumption sometimes even exceeds income and leads to debt; middle-aged consumers' income will increase, but their income will be significantly greater than consumption, mainly because repaying debts when they are young will occupy part of their income, and part of their income will be saved as preparing for the old age. When one gets old, retirement will lead to a significant decrease in their income. At this stage, consumption is greater than income, which will lead to a certain amount of negative saving.

1.4.4   Precautionary Savings Theory

The precautionary savings theory refers to the savings generated by consumers to prevent future needs. When consumers believe that there are risks in the future, the amount of permanent income is within their consideration, and the changes in

permanent income are also considered, namely the magnitude of the risk in the future is mainly caused by the uncertainty about the future. Bello believes that changes in labor income can reflect the magnitude of the risk. If a consumer does not consider the risk, then his consumption will change with the change in permanent income, but if it takes into account the magnitude of the risk, then it must be carried out at the same time. Precautionary savings means that changes in consumption can only be smaller than those in income. Another scholar Zades believes that the obvious precautionary saving motive is what consumers have, especially some groups with unstable labor income and few financial assets who will overreact to the predicted changes in income. The precautionary savings motives are significant. In other words, the more uncertain consumers are about the future, the stronger their preventive motivation will be, and they will save their wealth for future needs. Regardless of the pension system, the longer the life expectancy of consumers, the greater their uncertainty about the future, and the greater the precautionary savings. It can be seen the aging of the population will reduce precautionary savings and dilute its negative influences on consumption.

1.5 Development Status and Characteristics of Population Aging

Due to China's special development process and national conditions, the change of population structure in modern times presents unique characteristics. Influenced by decades of low fertility rate and low mortality rate, China has an aging population. The data released by the National Bureau of Statistics shows that at the end of 1999, China's population aged 60 and above accounted for 10% of the total population. According to the standard of the United Nations, China has entered a new era of population structure, that is, the age of the aging population. The transformation of China's population structure is not stable, mainly due to the impact of family

planning. The transformation of population structure is not as natural and stable as other developed countries. China's aging population shows the characteristics of rapid development and large scale with large regional differences in population aging.

1.5.1   The Aging of Population Develops Rapidly and on a Large Scale

Due to the family planning policy implemented in the 1980s, the birth rate of the population has been restrained. In addition, the improvement of living standards has led to a significant decline in the death rate, showing an aging situation where the proportion of the young population has decreased, while that of the elderly population has increased. The population structure of China has gradually evolved into a trend of taking the elderly as the main force. At the same time, according to the United Nations standard, the society in which the population aged 65 or over accounts for 7% should be an aging society.

Table 1.1 Different Age Group's Population Proportions and Size in 2000 and 2010 in China

Age structure	2000		2010	
	Population size	Proportion (%)	Population size	Proportion (%)
0-14-year-old	284527594	22.90	221322621	16.61
15-64-year-old	869810610	70.00	992561090	74.47
Age more than 65 year	88274022	7.10	118891224	8.92

Source: public information of China's fifth and sixth population censuses

Table 1.1 is drawn according to the data of China's fifth and sixth censuses. It can be seen from the table that by the end of 2000, the proportion of the population aged 65 or above reached 7.1%, which indicates that China has officially entered an

aging society. From 2000 to 2010, China's population structure has been constantly changing during the decade of entering the aging society. According to the sixth census in 2010, China's population aged 65 and above accounted for 8.92%, which is a very huge growth rate. The following is a comparison of the proportion of the population aged 65 and over in China and the world

Figure 1.2 The Changing Trend of the Proportion of Population Aged 65 and Above in China and World (unit: %)
Source: World Bank (1960-2018)

From Figure 1.2, I can see that before China entered the aging society, that is, during the period of 1960-2000 in the figure, the birth rate in China was limited and the death rate was greatly reduced due to the implementation of the family planning policy and the improvement of economic level. Therefore, the proportion of the population aged 65 and above in China was gradually shrinking compared with that in the world. Since China's population structure entered the aging state in 2000, the proportion of the elderly population is constantly rising, especially in recent years, the number of the elderly population proportion rapidly increased. The distance between

China and the world is rapidly widening, the degree of population aging is deepening, and its growth rate is constantly improving.

Figure 1.3 The Total Number and Proportion of the Population Aged 65 and Above in China

Source: National Bureau of Statistics (1999-2018)

By the end of 2018, China's total population has reached a quarter of the world's total population, becoming the country with the largest population. Meanwhile, the number of the elderly in China has also become the largest in the world. As can be seen from Figure 1.3, the number of people over aged 65 and reached 166.58 million at the end of 2018. China has been a populous country since ancient times, and other external factors, such as the family planning policy implemented since the reform and opening, have led to the increasing number and proportion of the elderly population in China, resulting in the situation of the largest scale of the elderly population. As can be seen from Figure 1.3, China's elderly population has gradually increased from 86.79 million in 1999 to 166.58 million in

2018, and this trend has been particularly evident in recent years. The number of the elderly population has remained the same, and the large number is enough to see the size of the elderly population in our country. In addition, as shown in Figure 1.3, the proportion of the population aged 65 to the total population has been increasing in recent years and reached 15.6% by the end of 2018, suggesting that the situation of aging population in China is serious.

1.5.2   The Aging of China's Population Is Developing Rapidly

Figure 1.4 Ratio of Elderly Dependency in the Five Provinces of Southwest and South China (unit: %)
Source: National Bureau of Statistics of China

According to Figure 1.4, the degree of population aging in the five provinces of southwest China is deepening, and from 2000, the five provinces have completely stepped into an aging society. The aging of the population has been accelerating. As can be seen from Figure 1.4, elderly dependency ratio in town is growing at a steady rate from 2000 to 2018. Except for Sichuan, the other four provinces demonstrated a

basic growth rate of 2-3%, and the elderly dependency ratio in Sichuan increased by 4.88% from 12.82% to 17.70%. The regional difference also shows that the growth rate is very large, which is inseparable from the implementation of family planning and population mobility. With more and more labor flowing to cities, the urbanization rate is getting higher and higher. There is surely a large difference among different regions.

Figures 1.5, 1.6, and 1.7 are the geographical distribution maps of the elderly dependency ratio of various provinces and cities in China by five levels in 2000, 2010, and 2018, among which Hong Kong, Macao, Taiwan, and Nansha Islands are classified as the lowest due to lack of data. As can be seen from the geographical map, in 2000, when China just entered the aging society, the most serious population aging problem was in the eastern region, in which the elderly dependency ratio of Shanghai, Jiangsu, and Zhejiang was 15.11%, 12.23%, and 12.11% respectively, ranking the top three; secondly, the degree of population aging in the central and eastern regions and Yuchuan was slightly weaker than that in the eastern coastal areas, but the problem of population aging is still serious. The least aged population is in the western region. In 2000, the degree of aging population in China's eastern, central, and western regions showed a downward trend. By the time of the sixth census in 2010, the degree of aging of China's population has been further deepened. From the figure, i can see intuitively that the population aging problem is more serious in eastern China and Sichuan and Chongqing regions.

Figure 1.5 Aged Dependency Ratio by Province in China in 2000 (Unit: %)

Figure 1.6 Aged Dependency Ratio by Region and Province in China in 2018 (Unit: %)

Figure 1.7 Aged Dependency Ratio by Province in China in 2010 (Unit: %)

1.6 Present Situation and Characteristics of Consumption Structure of Urban Residents

Figure 1.8 Engel Coefficient of Urban Residents and the Proportion of All Types of Consumption Expenditure (Unit: %)

Figure 1.8 is a combined chart of the Engel coefficient of urban residents and the proportions of various consumption expenditures in China. Engel's coefficient is the proportion of household food consumption expenditure to the total consumption expenditure. It is an important variable reflecting the living standard of residents. The smaller the value, the higher the living standard of residents. According to the standard proposed by the Food and Agriculture Organization of the United Nations, the Engel coefficient of 20%-30% indicates that the standard of living is high. From the figure, it can be seen the Engel coefficient of urban households in China decreased from 37.9% in 2008 to 27.7% in 2018, which reflects that the consumption structure of urban residents was improved. Moreover, according to the data in the figure, the

Engel coefficient of urban residents in 2014 was 30%, marking that they have entered the range of affluent living standards since then.

From Figure 1.8, we can see that the proportion of urban residents' consumption expenditure on food, tobacco, and alcohol has been showing a downward trend. The downward trend and changes in the Engel coefficient of urban residents reflect the conclusion that urban residents' living standards have been improved. The proportion of clothing consumption expenditure of urban residents has shown an increasing trend, but the trend is relatively stable. This is mainly because China's economy has been growing steadily. The rich variety of clothing market products makes people gradually increase clothing consumption expenditure, but consumption is rising. At the same time, people's income is also increasing, so the proportion of clothing consumption expenditure in the consumption structure of urban residents tends to rise steadily. The proportion of residential consumption expenditure of urban residents is rapidly growing mainly for two reasons. One is the increasing demand for living conditions due to the increase of people's income, and the other is the rapid growth of urban housing prices in China in recent years.

The growth of urban residents' consumption expenditure on daily necessities and services has been relatively slow. As can be seen from the data in Figure 1.7, the proportion of expenditure on daily necessities and services accounted for 6.15% in 2008 and 6.24% in 2018, with a change of 0.09%. The durability of household equipment has kept consumer spending from changing significantly. The proportion of consumption expenditures on transportation and communications has increased from 12.6% in 2008 to 13.3% in 2018. The growth rate is also obvious. The increase in income and technological advancement has allowed people to increase their consumption of electronic equipment such as travel, mobile phones, and computers. The increase in the proportion of education, culture, and entertainment consumption expenditure is also attributed to people's greater emphasis on spiritual enjoyment. The

proportion of urban residents' medical and health consumption expenditure has always been showing an increasing trend. With the improvement of people's living standard, people pay more attention to their own maintenance, and the consumption expenditure of medical care has also increased.

1.7　Research Framework and Content

This paper intends to study the impact of population aging on the consumption structure of urban residents in the five provinces in southwestern China. This paper is roughly divided into three parts: The first part explains from the theoretical level how population aging affects the consumption structure of residents; the second part gives a detailed explanation of the current situation and characteristics of my country's population aging and urban consumption structure; the third part explores the impact of population aging on the consumption structure of residents in cities and towns by establishing a reasonable panel regression model based on empirical analysis. The results put forward suggestions from the perspective of alleviating the aging of our country's population and increasing consumption of the elderly population. Based on the perspective of cities and towns, this paper explores the impact of aging on residents' consumption, and through comparative analysis of the empirical results of cities and towns, and then proposes corresponding countermeasures and suggestions to promote the upgrading of residents' consumption structure, stimulate the development of aging industries, and promote economic growth. Consumption involves a wide range of fields and types, and the research on the impact of population aging on the consumption level of residents has been relatively mature, and it is generally believed that as the population ages, all parts of the body will decline, and the income will decrease. The total consumption of China will decrease, but the fact is that it will change the consumption structure as the

population ages. This paper studies the aging problem in the five provinces of southwestern China in the framework of the consumption structure with cities and towns as the main body and uses the panel regression method to explore the specific impact of population aging on various types of consumption expenditures. After comparative analysis, the five provinces and cities in southwestern China are analyzed. The actual situation of population aging and the consumption structure of residents, and constructive countermeasures and suggestions based on domestic and foreign experience can tap the consumption potential of the elderly market and achieve the effect of promoting consumption.

1.8   Research Methods and Innovation

1.8.1   Research Method

1) Literature analysis method: The topic of this paper is selected based on the research literature of related topics at home and abroad, and the topic is determined based on summarizing the existing research literature, which also lays the foundation for the subsequent work.

2) Quantitative analysis method: This method refers to the quantitative analysis of the scale and degree of the research object, which can give people a more intuitive feeling. The data in the paper is based on the current situation and characteristics of the aging population and the consumption structure of urban residents. This method is used for analysis.

3) Econometric analysis method: In the chapter of empirical analysis, this paper selects appropriate variables and uses panel data to establish a multiple panel regression model while considering the endogenous issues, and then selects the dynamic GMM panel regression model to study the effects of various factors on

different types of consumer expenditure and to quantify the impact of population aging on urban consumption structure.

1.8.2 Innovation

1) Predecessors' research on population aging and consumption focused on one subject and did not analyze it specifically by region. Based on China's unique regional structure, this paper takes the most important provincial capitals connecting the central and western regions as the object to analyze the impact of population aging on the consumption structure of urban and rural residents.

2) Gray correlation analysis and correlation analysis are the most used methods to study the impact of population aging on the consumption structure of residents, but such methods can only verify that population aging has an impact on consumption structure and cannot measure the size of the impact. This paper choose consumption proportion and consumption of goods as depend variable, which will give the better understanding of consumption behavior once Chinese economy becomes aging.

CHAPTER 2

LITERATURE REVIEW

2.1 Review of Domestic and Foreign Research

2.1.1 International Level

International level: Leff (1969) mainly used cross-sectional data from 74 countries to conduct quantitative analysis and concluded the higher the burden coefficient of the elderly population, the higher the savings rate, that is, population aging is conducive to the growth of family consumption. Keynes (1937) proposed a traditional consumption function model, which closely linked consumption and income, and explained the mutual influence between consumption and income. The formula: $C = a + bY$ can be used to express this model, which is the most classic short-term consumption model. Duesenberry (1949) put forward the relative income hypothesis, which believes that household consumption is not only affected by current income, but also by the previous period's income, and may also be affected by relatives and friends around them. It believes that consumption has a "ratcheting effect". At the same time, this hypothesis affirms the stabilizing effect of consumption on the menstrual cycle and generally introduces a lag term as an explanatory variable in the consumption model. The American economist Friedman first proposed the permanent income hypothesis, which believes that residents' consumption depends not only on the current income and the previous maximum income but also on the residents' continuous income. Samuelson (1958) and Neher (1971) established a "family savings demand model". The model equates children with savings. Childbirth is to prepare for the elderly. The authors suggest that households with more children

may save less and thus increase consumption. Loayza (2000) used data from multiple countries to empirically study the factors behind the differences in savings and concluded that an increase in the dependency ratio of the elderly would affect the savings rate. Schultz (2005) used panel data from 16 Asian countries and regions to establish a dynamic panel regression model based on the theory of life-cycle savings and conducted an empirical analysis of the impact of changes in population age structure on savings rates. The conclusion is consistent with the view that population aging affects household consumption in life cycle theory. Cutler (1990) introduced the impact of population aging on savings into the Ramsey model and pointed out that the savings rate would drop sharply at the beginning, and then rise with the rise of the actual consumption level, but still lower than the initial steady-state level. Paul and Ralph (1990) conducted a study on the aging of the population in Germany and Japan. The study showed that the elderly population consumed more disposable income, required higher government expenditures, and reduced labor supply. Kraay (2000) used the two-stage least squares method to investigate the situation in China and found that whether it was a full sample or a sub-sample, aging of population and household consumption coefficients were not significant, and the two were not strongly correlated. Modigliani (2004), based on his life cycle theory, believes that the consumption of a country should be negatively correlated with the population of children and the elderly. He used cross-sectional data across countries and supported his hypothesis with empirical research.

2.2   Domestic Level

Zhang Hengli (2009) summarized the main characteristics of the consumption level of Chinese residents: consumption is shifting to commercialization and marketization; the consumption level of some products has increased, especially cultural and entertainment products and daily necessities; the gap in consumption levels has gradually widened, The Research Group of the People's Bank of China (1999) used time-series data to study the factors affecting residents' savings, including residents' income level and dependency ratio. Empirical research shows that savings and residents' income are positively correlated, namely the higher the income, the more sources of funds for savings, and that the dependency ratio and savings show a negative correlation, namely the larger the dependency ratio, the greater the place where money is needed, and the smaller the savings. Yuan Cheng Gang and Song Zheng (2000) conducted a study on the saving behavior of Chinese urban residents and found that changes in the age structure of the population would increase residents' saving awareness, which in turn would weaken the residents' consumption level. Liu Guoguang (2006) probably summarized several factors affecting the low level of consumption of Chinese residents: the influence of the Chinese people's long-term advocates of light consumption and heavy construction; at the beginning of reform and opening, the development of heavy industries was one-sidedly increased; the income distribution was not even. The factors such as consumption policies and environment will inhibit the consumption level of residents. Luo Chuliang (2004) analyzed the impact of income, unemployment risk, medical expenditure, and education expenditure on the consumption of urban residents. The results showed that these factors had a significant negative effect on the consumption level of urban residents in China, but the size would change with predictability. Xu Yongbing (2005) used factor analysis to identify the two main factors that determined

the level of consumption of residents, namely the proportion of residents' total income in GDP and the average propensity to consume. Wang Dewen (2004), Yang Zhongxin (2005), Li Yang (2007), etc. believe that income is the factor leading to the low consumption level of Chinese residents. The specific changes are in the following aspects: economy grows rapidly, but residents' income is at an inconsistent pace. The unfair secondary distribution of income has led to extremes of the rich and the poor, and the taxation policies formulated by the state have not played a corresponding role in serving people. Kong Wenqing (2002) conducted an in-depth analysis of the consumption level of Chinese residents. The study showed that the household consumption of urban residents was mainly composed of children's education and housing consumption, and that consumption increased with the increase of income. He Juhuang (2004) established an economic dynamic model with a life cycle hypothesis by adding factors. The results indicated that an increase in population aging would increase the consumption level of residents. Fu Zhigang (2006) used a modified generational overlap model to study population aging and consumption. Here the author selects students who are pure consumers and suggests reducing the number of years of education of students and expanding students through various channels. To reduce the pressure caused by aging, the existing pension model should be revised. Wang Jinying (2006) used time-series data since the reform and opening up to discuss the relationship between population aging and consumption. The most important thing was that he introduced the concept of standard consumer and introduced a variable representing population in the consumption function. As the aging of China's population continues to deepen, the consumption level and consumption structure of the aging population will play a vital role in total consumption. Wang Jinying and Fu Xiubin (2006) focused on the difference between the impact of children and the elderly on consumption. In his article, the concept of "standard consumer" was introduced. The standard consumer here refers to working

age. He believes that the spending power of children is about 0.6 times that of the working population, while that of the elderly is 0.8 times that of the working population. Therefore, the entire population is divided into three parts, and the consideration of heterogeneity is eliminated. After regression analysis, it is found that the increase in the population of children and the elderly will reduce the consumption level of residents. Li Wenxing (2008) used national data from 1989-2004 and GMM to estimate the impact of the change in China's population age structure on residents' consumption. The results showed that the child support coefficient had a negative relationship with it, while the elderly support coefficient was not significant, so the demographic structure was not the main reason for the low level of consumption in China. Qu Zhaopeng and Zhao Zhong (2008) are particularly interested in consumption and population aging in rural areas of China. Based on the "life cycle theory", he used three years of valid data for key research in which the explained variable was residents' consumption, and the explanatory variables were the residents' age, years of education, and income. Through empirical analysis, it was found that population aging had a certain inhibitory effect on consumption, but this restriction was negligible, and the population was aging. The uneven consumption would also lead to uneven consumption of residents. Wang Sen (2010) used relevant data to study the correlation between population aging and consumption in China. The indicators he used were per capita consumption, per capita GDP, and aging rate, which were also based on the Keynesian function and added to the most basic model. The demographic change factors were based on the time-series data since 1990, with fixed effects and error correction models as the theoretical basis. After empirical analysis, it was found that there was a long-term and stable relationship between the three. The aging of the population affects the consumption of residents. The impact of the power is positive and negative and needs to be determined according to the specific situation, which has a high degree of uncertainty.

CHAPTER 3

METHODOLOGY

3.1 Models and Variables

3.1.1 The Basis of Model Construction

The study of the relationship between income and consumption in Western economics is mainly based on the assumption of the quantitative relationship of consumption income function, that is $C = F(Y)$. The absolute income consumption function proposed by Keynes for the first time is the simplest form of the Western consumption function. In his view, income only determines consumption, and there is a stable functional relationship between the two. First, consumption is only related to current income, and the amount of household consumption depends on income. Furthermore, the increase in people's consumption is attributed to the increase in income, but the increase in income is always higher than the increase in consumption. In the end, the current consumption of residents is mainly determined by the current net income of consumers, which is also called "absolute income." Although Keynes did not give the exact functional relationship between consumption and income. Here is a simple establishment of the following consumption function relationship:

$$C_t = a + bY_t + U_t$$

Where C_t is the consumption expenditure in period t; Y_t is the absolute income in period t; a and b are parameters to be estimated; a is spontaneous consumption ($a>0$); a is the marginal propensity to consume ($1>b>0$); u_t is a random disturbance item.

3.1.2   Selection and Description of Variables

Based on the theory of absolute income consumption function, this chapter adds the aging factor, chooses the appropriate variables, establishes the model of the impact of population aging on the consumption structure, and discusses the impact of population aging on the consumption structure of urban and rural residents.

Explained variable: This paper uses urban and rural consumption structure as the explained variable. According to the statistical caliber of the eight major categories of consumption by the National Bureau of Statistics, consumption is divided into food, tobacco, and alcohol, clothing, housing, daily necessities and services, transportation and communication, education, and culture, entertainment, healthcare, as well as other goods and services. The explanatory variable consumption structure used here refers to the proportion of the eight categories of consumption expenditures. Since there is no clear division of consumption types in consumption of other goods and services, this paper will not analyze it here. The data on consumption structure in this paper is the panel data of five provinces (Sichuan, Yunnan, Guizhou, Guangdong, Guangxi) at the urban level from 2000 to 2018 (China Statistical Yearbook).

Explanatory variable: The main explanatory variable used in this paper is the aging rate, which is an indicator used in the most current literature on population aging to measure population aging and incorporates it into the model for analysis.

The aging rate index is calculated using the proportion of the population aged 65 and over in the total population. The data comes from the "China Population and Employment Statistics Yearbook". Because the population survey data in this yearbook was divided into cities and regions collected separately by town, in this paper, the research on the impact of population aging on the consumption structure of residents in cities and towns required the use of urban-related data, so a lot of time was spent on calculating and collating the data. Since this paper introduced the aging

factor based on the absolute income consumption function, the per capita disposable income was used as an explanatory variable. The data on the per capita disposable income of urban residents were from the National Bureau of Statistics and China Statistical Yearbook.

Main control variables: This paper studied the impact of population aging on consumption structure. To ensure the robustness of the model built, in addition to population aging and income, some other control variables that might have an impact on the consumption structure of residents were also introduced. Based on previous studies on population aging and consumption issues, representative indicators were selected on the individual, family, and socioeconomic levels. (1) Child support ratio. Zheng Yanyan et al. (2013) studied the impact of declining birthrate on urban household consumption and found that the size of the child dependency ratio would affect the consumption structure of residents. The child dependency ratio is the ratio of the population aged 0-14 to the labor force aged 15-64. (2) Consumer price index. The index selection here is based on the article of Wang Yupeng (2011) on the impact of population aging on the consumption behavior of urban residents. Since the data obtained in the statistical yearbook is the consumer price index calculated based on the previous year, the base period is 2000. (3) Aging. The indicator was selected here with reference to Zhang Qing's study (2016) on the impact of China's population aging on the consumption structure of urban and rural residents. (4) Per capita disposable income. The reference here is Liu Huiling's (2014) study on the impact of population aging on the consumption level of urban residents. (5) The level of housing prices. The literature referenced here is Zheng Fenfen's (2020) research on the impact of housing prices on the consumption structure of urban residents. Table 3.1 is the related variables and the economic implications.

Table 3.1 Indicator System

Variables	Indicator	Symbol
Aging rate	The proportion of the population aged 65 and over (%)	AR
Child supported ratio	The child supported ratio is the ratio of the population aged 0-14 to the labor population aged 15-64(%)	CSR
Per capital disposable income	Residents' discretionary income (Yuan)	PDI
Price consumer index	The final price level of social goods and services	PCI
Technology investment ratio	The proportion of R&D investment in fiscal expenditure (%)	TIR
Housing price level	The price of house (Yuan)	HPL

The above-mentioned control variable index data of the provinces and cities were the National Bureau of Statistics, "China Statistical Yearbook", "China Provincial Statistical Yearbook", and "China Population and Employment Yearbook".

3.1.3 Model Setting and Data Description

When studying the impact of population aging on residents' consumption structure, most scholars used the grey relational model. This model will draw the correlation between the two and compare the degree of correlation between population aging and various types of consumption, but it is impossible to measure

the size of the impact. Later, some scholars used micro-survey data to conduct research, but due to the relevant micro-survey in China, the survey data has a serious lag. In recent years, the data is seriously missing. Even some surveys are not random in the selection of survey objects, and the time series data contains less information. Therefore, this paper chooses the macro panel data. However, the data from the whole country and individual provinces and cities appear to be relatively small in the sample size for studying the impact of population aging on the consumption structure of urban and rural residents.

According to the selected variables, the panel regression model constructed here is as follows:

$$y_{it}^k = \beta_0^k + \beta_1^k y_{i,t-1}^k + \beta_2^k ar_{it} + \beta_3^k csr_{it} + \beta_4^k lnpdi_{it} + \beta_5^k cpi_{it} + \beta_6^k tir_{it}$$
$$+ \beta_7^k lnhpl_{it} + u_i + \varepsilon_{it}$$

where Superscript k represents the estimation equation expression of commodity expenditure of class k, while subscript i and t represent different regions and different periods respectively. Since the panel estimation equation above includes the lag term of the explanatory variable, to avoid endogeneity, the dynamic panel generalized moment estimation (GMM) method is adopted here. y represents the consumption structure, including the proportion of food, tobacco and alcohol consumption expenditure (fe), the proportion of clothing consumption expenditure (ce), the proportion of residential consumption expenditure (rce), the proportion of consumption expenditure on daily necessities and services (dse), and transportation The proportion of communication consumption expenditure (tce), the proportion of education, culture and entertainment expenditure (cee), and the proportion of health care consumption expenditure (he). ar represents aging rate, csr represents child dependency ratio, pdi represents per capita disposable income, cpi represents the consumer price index, tir represents the technology investment rate, hpl represents the level of housing prices, β_0 represents the intercept term, and β is the regression

coefficient, u_i represents the individual effect of the region, and ε represents the random error term.

3.2 Expected Results

Food-Aging rate: As the aging rate increases, with the increase of age, the physical functions of the elderly will decline and their metabolism will slow down, which will make the elderly population relatively reduce their food intake. Therefore, the food consumption expenditure will deccrease.

Clothing-Aging rate: The elderly no longer pursues fashion and variety but pay more attention to practicality and comfort. On the other hand, since many elderly people had a difficult life in the past, their current consumption habits are more inclined to be economical and reluctant to buy new clothes. Therefore, when aging rate increasere the consumption proportion on clothing will be relatively reduced.

Residence-Aging rate: With the increase of aging rate, the elderly who want a more comfortable living environment in their old age will increase residential consumption expenditure. so, it will inevitably lead to the increase consumption of residence.

Daily use and services-Aging rate: With the increase of aging rate, due to physical conditions and their own reasons, the elderly are not easy to move, and they use some daily goods and services relatively less than young people, so the proportion of daily goods consumption will also be relatively reduced

Healthcare-Aging rate: As aging rate increases, the population of eldery will go up too, after people reach old age, their physical functions will decline and they will be more concerned about their physical and mental health. Due to the improvement of their living standards, the elderly's awareness of self-health care is gradually increasing, which will increase the consumption of healthcare equipment

and healthcare drugs. The natural aging of body functions will have a higher risk of disease than the young, which will also force the elderly to spend more on healthcare.

Transportation and communication-Aging rate: With the popularization of the Internet, online consumption is growing rapidly. People using the Internet for chatting, shopping, etc. have become fashionable, and online consumption has gradually become popular among the elderly. On the other hand, as transportation methods become more diverse and convenient, travel for the elderly is no longer a problem. More and more elderly people choose to go out to exercise and other activities, and the phenomenon of elderly travel is becoming more and more. Therefore, as the aging rate increase, the consumption of transportation and communication will go up.

Education and recreation-Aging rate: Although the elderly have enough time to entertain after retirement, these recreations will be reduced due to the physical condition of the elderly and insufficient recreational facilities. In terms of education, the elderly has little chance of receiving re-education. Therefore, the increase in aging rate will lead to a decrease in education and recreation consumption.

Since my main research is the impact of population aging on various consumption sectors, here is a simple analysis of the possible consequences of population aging on the consumption structure, so that other factors such as child dependency ratio, housing price level, consumer price index, per capita disposable income, and technology input rate on the consumption structure, I have obtained the expected results for these variables, and I will make relevant explanations in the regression results.

CHAPTER 4

EMPIRICAL ANALYSIS

4.1 Descriptive Statistics

According to the indicator data in Table 4.1, the average value of urban residents' consumption expenditure on food, tobacco, and alcohol from 2000 to 2018 was 38.05, and the standard deviation was 3.84. Therefore, such consumption varied greatly among urban and township regions, clothing consumption expenditure accounts for the proportion of consumption expenditure. The average value was 8.37 and the standard deviation was 1.88. The clothing consumption expenditure of urban residents varied greatly from region to region; the average proportion of residential consumption expenditure was 13.58, and the standard deviation was 2.61. Urban residential consumption expenditure varied greatly from region to region; the average value of the proportion of consumption expenditures on services and services was 6.36, and the standard deviation was 1.24. The regional differences in consumption expenditures for urban daily necessities and services were small; the average proportion of consumption expenditures for transportation and communications was 13.23, and the standard deviation was 2.88. The expenditures on urban transportation and communications were quite different among regions; the average proportion of education, culture and entertainment consumption expenditure was 12.42, and the standard deviation was 1.97. The urban education, culture and entertainment consumption expenditure varied greatly from region to region; the average proportion of healthcare consumption expenditure was 6.11, and the standard deviation was 1.24,

The medical and health consumption expenditure of urban residents differed slightly from region to region; the average urban aging rate was 8.24, and the standard deviation was 1.38, implying that the aging of urban population varied greatly among different regions.

Table 4.1 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std.deviation
Food	95	27.03	47.06	38.05	3.84
Clothing	95	5.13	12.34	8.37	1.88
Residence	95	8.95	19.56	13.58	2.61
Daily use andservices	95	3.85	9.2	6.36	1.24
Helthcare	95	4.12	9.2	6.11	1.24
Transcommuni	95	6.27	20.68	13.23	2.88
Edu_recre	95	6.41	18.72	12.42	1.97
Aging rate	95	5.55	12.73	8.24	1.38
Child supp ratio	95	16.41	36.77	24.52	4.46
Per capita dis_in	95	5122.2	44341	17729.34	9619.87
CPI	95	97.25	159	123.83	18.59
Tech invest ratio	95	1.54	7.57	2.48	1.19
Housing price level	95	1026	12932	3853.01	2392.84

4.2 Unit Root Test

To avoid "false regression" in the process of regression, it is necessary to carry out panel unit root test on the estimated variable to investigate its stationarity. The panel unit root tests selected here were homogeneous LLC test and heterogeneous IPS test. The lag order of LLC test and IPS test was selected according to the information

criterion AIC. The mean value of each section unit was subtracted from the panel data to alleviate the existing cross-sectional problems. The test results are shown in Table 4.2.

Table 4.2 Unit Root Test

Varibles	LLC TEST		IPS TEST	
	Statistic	p-value	Statistic	p-value
DlnFood	-5.0978	0.0000	-4.2325	0.0000
DlnClothig	-3.4186	0.0003	-2.6444	0.0041
DlnResidence	-4.8321	0.0000	-3.6893	0.0001
DlnDaily use and services	-2.4646	0.0069	-2.1646	0.0152
DlnHealthcare	-3.694	0.0001	-2.3242	0.0101
DlnTrans_ commu	-4.2296	0.0000	-1.9084	0.0282
DlnEdu_recre	-6.7324	0.0000	-5.0549	0.0000
DlnAging rate	-1.8501	0.0321	-2.2889	0.0110
DlnChild supp_ratio	-3.6696	0.0001	-3.0610	0.0011
DlnPer capita dis_in	-3.6543	0.0001	-1.6847	0.0460
DlnCPI	-6.4708	0.0000	-1.4499	0.0735
DlnInterest rate	-7.0912	0.0000	-5.7393	0.0000
DlnTech_invest_ratio	-4.1026	0.0000	-3.2399	0.0006
DlnHousing price levle	-3.9104	0.0000	-3.4885	0.0002

It is observed that most of the P-values obtained by the homogeneity test LLC and heterogeneous test IPS were less than 1%, and all of them were significant at the level of 5%, which strongly rejects the null hypothesis. Therefore, the data series is stable, and the next step of regression can be carried out.

4.3 Co-integration Test

After the data were found to be stationary at the first difference level, the testing was continued with cointegration analysis. If the p-value is lower than 5%, the mean data are significant, and the null hypothesis is rejected. Kao test was used here. Kao (1999), Kao and Chiang (2000) proposed to test panel co-integration by using the generalized DF and ADF tests. The null hypothesis of this method is that there is no co-integration relationship, and the residual of static panel regression was used to construct the statistics. The specific data are shown in the following Table 4.3.

Table 4.3 Co-integration Test

Categories of regression		Statistic	P-value
Food	ADF	-3.4919	0.0002
Clothig	ADF	-1.7571	0.0395
Residence	ADF	-2.2343	0.0127
Daily use and services	ADF	-2.1488	0.0158
Healthcare	ADF	-2.2093	0.0136
Trans_commu	ADF	-2.7101	0.0034
Edu_recre	ADF	-2.1585	0.0024

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As can be seen from the above Table 4.3, in the seven regression equations, the values of p-value were all small, remaining at 5%, which strongly rejects the null hypothesis, and passes the co-integration test, indicating that there is a long-term stable equilibrium relationship between variables, and the regression residual of the equation is stable. Therefore, the original equation can be directly regressed on this basis, and the regression result is more accurate.

4.4 Regression

4.4.1 Regression Method

In this paper, the system GMM (Generalized moment estimation) method was used to estimate the dynamic panel model for two reasons. First, according to economic theory, due to consumption inertia, current consumption expenditure depends on the past, so it is more reasonable to introduce the lag value of the dependent variable into the model, and dynamic panel is a model that contains the lag term of the dependent variable in the independent variable. Secondly, to avoid the problem of weak instrumental variables that might exist in the difference method, this paper selected a more efficient system method for estimation. The prerequisite for using the dynamic panel generalized moment estimation method is that the first-order difference of the disturbance term has the first-order autocorrelation, but there is no second-order or higher-order autocorrelation. Therefore, the first order and second-order autocorrelation tests were performed on the difference terms of the disturbance term to identify the feasibility of GMM estimation of the system. At the same time, the second-order lag term of various commodity expenditures and the lag term of related variables were selected as the instrumental variable of GMM estimation, and the effectiveness of the instrumental variable was tested by Sargan overidentification

test and the null hypothesis of Sargan test is valid for all instrumental variables.

Table 4.4 The Regression on Consumption Proportion of Food, Clothing, Residence, and Daily Use and Services

Var	y1 Food	y2 Clothing	y3 Residence	y4 Daily use and services
L. y	0.794	0.728	0.527	0.674
	(0.064) ***	(0.074) ***	(0.049) ***	(0.056) ***
Aging rate	-0.440	-0.212	0.664	-0.334
	(0.135) ***	(0.102) **	(0.058) ***	(0.060) ***
Child supp_ratio	0.059	0.003	0.074	0.015
	(0.043)	(0.029)	(0.017) ***	(0.018)
LnPer capital dis_in	-3.822	-1.544	3.766	-1.950
	(2.015) ***	(1.498)	(0.914) ***	(0.928) ***
CPI	0.004	-0.060	-0.027	0.035
	(0.041)	(0.028)	(0.020)	(0.019)
Tech_invest_ratio	0.048	0.081	0.192	-0.054
	(0.133)	(0.096)	(0.057) ***	(0.060)
LnHousing price level	2.174	-0.497	0.940	0.709
	(1.128) **	(0.849)	(0.483) ***	(0.510)
_Cons	31.265	0.048	-29.434	15.860
	(10.753) ***	(1.98) ***	(3.304) ***	(3.283) ***
AR (1)	0.0000	0.0002	0.0004	0.0014
Sargan test	0.6962	0.3603	0.3082	0.1727

Note: The table is the coefficient value and *, **, *** respectively indicate that the level of 10%, 5%, 1% has passed the significance test

Table 4.5 The Regression on Consumption Proportion of Healthcare, Transportation and Communication, and Education and Recreation

Var	y5	y6	y7
	Healthcare	Trans_commu	Edu_recre
L.y	0.670	0.434	0.573
	(0.067) ***	(0.077) ***	(0.077) ***
Aging rate	0.338	0.076	-0.186
	(0.070) ***	(0.129) ***	(0.164) ***
Child supp_ratio	0.024	-0.032	-0.053
	(0.021)	(0.040)	(0.049)
LnPer capital dis_in	-1.316	6.595	0.459
	(1.106)	(2.042) ***	(2.618)
CPI	0.021	-0.097	-0.032
	(0.024)	(0.038) ***	(0.053)
Tech_invest_ratio	0.123	0.097	0.182
	(-0.064) **	(0.124) **	(0.169) **
LnHousing price level	-0.405	-2.480	-2.204
	(0.563)	(1.151) ***	(1.418)
_Cons	-0.692	-41.54	17.895
	(3.871) ***	(8.583) ***	(8.68) ***
AR (1)	0.0012	0.0000	0.0001
Sargan test	0.6605	0.4597	0.5976

Note: The table is the coefficient value and *, **, *** respectively indicate that the level of 10%, 5%, 1% has passed the significance test

The overall significance of the model was obtained by the corresponding values of Wald test being 0.0000. P values corresponding to AR(1) were respectively 0.0000, 0.0002, 0.0004, 0.0014, 0.0012, and 0.0000, 0.0001, all less than 0.05, indicating that there is a first-order auto-correlation; The corresponding P values of Sargan test were 0.6962, 0.3603, 0.3082, 0.1727, 0.6605, 0.4597 and 0.5976, all greater than 0.10, indicating that the corresponding null hypothesis that "all instrumental variables are exogenous" was accepted, indicating that the selected instrumental variables are valid. All these test results show that the model established in this paper is reasonable.

To further understand the impact of population aging on the consumption structure, the total expenditure of each type of commodity consumption is used as the dependent variable to perform regression.

Table 4.6 The Regression on Total Consumption of Food, Clothing, Residence, and Daily Use and Services

Var	y1 Food	y2 Clothing	y3 Residence	y4 Daily use and services
$L.y$	0.510	0.686	0.816	0.632
	$(0.100)^{***}$	$(0.071)^{***}$	$(0.066)^{***}$	$(0.065)^{***}$
$Aging\ rate$	-98.328	-2.428	79.491	-35.612
	$(46.878)^{**}$	$(11.001)^{*}$	$(20.31)^{***}$	$(9.577)^{***}$
$Child\ supp\_ratio$	8.892	1.870	14.470	-1.195
	(13.93)	(3.993)	$(6.664)^{***}$	(3.382)
$LnPer\ capital\ dis\_in$	0.022	0.009	0.037	17.412
	$(0.032)^{*}$	$(0.009)^{**}$	$(0.018)^{**}$	(159.57)
CPI	19.168	-2.781	-8.783	2.901

Var	y1	y2	y3	y4
	Food	*Clothing*	*Residence*	*Daily use and services*
	(8.812)	(2.537)	(4.448)	(2.090)
Tech_invest_ratio	-224.27	-3.813	-68.390	-30.325
	(55.14)	(13.405)	(22.26) ***	(10.252) **
LnHousing price level	0.362	0.021	0.066	0.039
	(0.092) ***	(0.0215)	(0.036) **	(0.177) **
_Cons	-480.27	-148.97	-347.29	-90.079
	(1089.) ***	(308.8) ***	(490.0) ***	(257.35) ***
AR (1)	0.0000	0.0005	0.0000	0.0011
Sargan test	0.1157	0.6081	0.2019	0.3065

Note: The table is the coefficient value and *, **, *** respectively indicate that the level of 10%, 5%, 1% has passed the significance test

Table 4.7 The Regression on Total Consumption of Healthcare, Transportation and Communication, and Education and Recreation

Var	y5	y6	y7
	Healthcare	*Trans_commu*	*Edu_recre*
L. y	0.785	0.478	0.699
	(0.077) ***	(0.086) ***	(0.073) ***
Aging rate	55.676	11.174	-24.599
	(10.626) ***	(20.433) *	(21.701) *
Child supp_ratio	3.964	3.433	-9.075
	(3.431)	(6.783)	(6.970)
LnPer capital dis_in	195.58	606.40	0.045
	(179.61)	(430.59) **	(0.018) **

Var	y5	y6	y7
	Healthcare	*Trans_commu*	*Edu_recre*
CPI	0.338	-12.874	-10.758
	(2.238) **	(4.737) *	(5.350) **
Tech_invest_ratio	-0.304	-81.293	-11.326
	(11.252)	(21.568) ***	(24.497)
LnHousing price level	0.009	0.183	0.036
	(0.018)	(0.045) ***	(0.041)
_Cons	-507.65	1132.3	1427.27
	(275.55) ***	(564.07) ***	(600.79) ***
AR (1)	0.0001	0.0000	0.0003
Sargan test	0.7381	0.4159	0.5786

Note: The table is the coefficient value and *, **, *** respectively indicate that the level of 10%, 5%, 1% has passed the significance test

Based on the regression, we can see that the results of Table 4.5 and 4.6 are different from Table 4.7 and 4.8. Because I choose consumption proportion and consumption of goods as depend variable, which will give the better understanding of consumption behavior once Chinese economy becomes aging. Basically, the results obtained by two different types of regressions are consistent.

4.4.2 Regression Result

Based on Table 4.6 and 4.7, firstly, higher aging rate leads to lower consumption on food, clothing, daily use and services, education, and recreation. Intuitively, the elderly naturally demands less food, clothing, daily use and services, education and recreation as compared to the young. Therefore, when the economy

becomes aging, the food, clothing, daily use and services, education and recreation sectors become relatively less important. Secondly, when the aging population increases, the consumption of healthcare, residence, transportation and communication increase, so the demand of the elderly for healthcare, residence, transportation and communication is greater than that of the young, which means as China enters aging society, the sectors of residence, healthcare, transportation and communication become relatively important. Finally, according to the result of total consumption regression explained above the result of consumption proportion in Table 4.4 and Table 4.5 can be well understood. Starting from the food, clothing, daily goods and services, education and recreation sectors, the aging economy brings about the decrease in food, clothing, daily goods and services, education and recreation consumption, while there are the increases in healthcare, residence, communication and transportation consumption, to the extent that the food, clothing, daily goods and services, education and recreation consumption proportion fall, and the healthcare, residence, communication and transportation consumption proportion go up.

I can see from Table 4.6 and 4.7, only residence sector has a significant positive correlation with child supported ratio, indicating that the higher the child supported ratio is, the sectors of residence, become relatively more important. That's because as the number of children increases, people will pay more attention to their children's learning and provide them with a better learning environment. Therefore, more school district houses will be purchased, and residence consumption will increase relatively. However, the estimates of other sectors are not significant. Consistently, it explains the results in Table 4.4 and 4.5 where only the proportion of residence consumption increases as the child-supporting ratio rises.

Secondly, the consumptions on food, clothing, residence, transportation and communication, education and recreation have significantly positive correlation on

per capita income, while the estimate of per capita disposable income towards per capita disposable income on healthcare, daily use and services are not significant. However, the result on consumption proportion of each good needs more careful interpretation. From Table 4.4 and 4.5, per capital disposable income has a significantly positive correlation with residence, transporation and communication, while it has a significantly negative correlation with food, and daily use and services. For the sectors of clothing, healthcare, education and recreation, per capita income has no effect. That's because theorectically as people are richer, they consume more as long as the normal is concerned. In addition, the rich will start to spend on the non-necessity and the luxury. Therefore, the proportion of consumption in the necessity sector is expected to decrease. The different results on the necessity sectors like food and daily and services against the luxury sectors like residence and transportation and communication in Table 4.4 and 4.5 confirms this hypothesis. For sectors of healthcare, clothing, education and recreation, the estimate of per capita income toward per capita consumption on healthcare, education and recreation are not significant. Regarding the healthcare, this means that the economy always spends a fixed proportion regardless of income level, which is intuitive. People go to the doctor because they are sick, not that they would love to.

Thirdly, the consumptions of food, residence, daily use and services, transportation and communication have a significantly positive correlation with housing price level, while the sectors of clothing, healthcare, education, and recreation are not affected. Regarding the consumption proportion, Table 4.4 and 4.5 show that the food and residence sectors have significantly positive correlation with housing price level, while transportation and communication have significantly negative correlation, and daily use and services, clothing, healthcare are not affected. that is because as for rising housing prices, there is wealth effect of housing, which means that rising housing prices promote consumption. The wealth effect is more

reflected among homeowners. As an investment product, when the price of real estate rises, it will increase the value of real estate, thus increasing household wealth (both realized and unrealized). When people feel richer, they may not save more immediately, but adjust their lifetime consumption plans to spend more on other goods. Therefore, the consumption of food, residence, daily use and services, transportation and communication increase. As for the consumption proportion, when people get richer, they will be more inclined to improve their living standards and invest in housing, because before people get richer, they always purchase rice, meat, or other something relatively cheap, when people get richer, they will purchase something relatively expensive. Besides, higher house price leads to higher collateral value, and it will increase the credit limit, so there will be more mortgage loan and more house purchase, therefore, the consumption proportion of food and residence will increase. On the other hand, as housing price level increase, it will bring about crowding out effect of housing means that the rise of housing price inhibits consumption, and the crowding out effect is more obvious among people who have the intention of buying a house or people who rent a house. As a kind of consumer goods, when the price of real estate rises, people with intention to buy a house may increase their savings in consideration of the cost of buying a house in the future, thus reducing the consumption of other goods. For homeowners, although the rise of housing price brings the increase of asset value, it also increases the cost of housing service. Therefore, to avoid the repayment pressure caused by the further rise of housing price, homeowners will strive to pay off the mortgage as soon as possible and reduce the consumption expenditure of other goods. It means as the housing price level increases, there are a lot of people will reduce their consumption on non-necessities and due to the consumption of houses is too much, people will relatively reduce the purchase of cars. Meanwhile, although the consumption of transportation and communication is increasing, it may be less than that of other sectors, thus the

consumption proportion of communication and transportation decrease. Besides, the estimate of housing price level toward housing price level on clothing, daily use and services, healthcare, education and recreation is not significant, it means no matter what the level of housing price is, people's consumption on clothing, healthcare, education and recreation will not be affected, because people's consumption on daily necessities and education and recreation is fixed, regardless of the level of housing price. It is possible that rising housing prices have both positive and negative effects on people's consumption, so that the proportion of consumption in these industries has not changed much.

To obtain more reliable regression results, this section carried out a robustness test on the above estimates. The prerequisite for this method was that all the independent variables lag by a first order and the dependent variables did not lag. In other words, we only considered the hysteresis of independent variables without considering the hysteresis of dependent variables. Finally, we tested with the method of normal panel regression. Table 4.8 and Table 4.9 are the results obtained by normal panel regression.

Table 4.8 The Normal Panel Regression on Consumption Proportion of Food, Clothing, Residence, and Daily Use and Services

Var	y1 Food	y2 Clothing	y3 Residence	y4 Daily use and services
Aging rate	-0.244	-0.200	0.575	-0.348
	$(0.141)^{**}$	$(0.111)^{**}$	$(0.059)^{***}$	$(0.066)^{***}$
L. Aging rate	-0.399	-0.019	0.027	-0.075
	$(0.212)^{**}$	$(0.237)^{**}$	$(0.131)^{***}$	$(0.136)^{**}$

Var	y1	y2	y3	y4
	Food	*Clothing*	*Residence*	*Daily use and services*
Child supp_ratio	-0.045	0.005	0.013	0.013
	(0.041)	(0.029)	(0.019) *	(0.019)
L. Child supp_ratio	-0.271	0.006	0.107	0.007
	(0.073)	(0.039)	(0.045) *	(0.048)
LnPer capital dis_in	-2.533	-1.382	3.424	-2.004
	(1.926) **	(1.511) *	(0.879) ***	(0.961) **
L. lnPer capital dis_in	-5.148	-5.446	3.695	-1.502
	(7.670) **	(5.967) **	(4.730) ***	(4.924) *
CPI	0.014	-0.058	-0.008	0.035
	(0.040)	(0.028)	(0.019)	(0.019)
L. CPI	0.906	0.077	-0.012	0.045
	(0.122)	(0.076)	(0.075)	(0.078)
Tech_invest_ratio	-0.025	0.089	0.189	-0.053
	(0.129)	(0.096)	(0.055) ***	(0.059)
L.Tech_invest_ratio	-0.225	0.044	0.080	-0.016
	(0.420)	(0.103)	(0.259) *	(0.228)
LnHousing price level	1.282	0.630	-0.954	0.771
	(1.055) *	(0.823) **	(0.455) **	(0.524) **
L.lnHousing price level	0.331	1.753	-1.628	0.121
	(2.258) *	(0.912) **	(1.532) **	(0.269) *
_Cons	29.318	14.609	-21.876	13.442
	(10.206) ***	(7.420) ***	(4.490) ***	(4.811) ***

Note: The table is the coefficient value and *, **, *** respectively indicate that the level of 10%, 5%, 1% has passed the significance test

Table 4.9 The Normal Panel Regression on Consumption Proportion of Healthcare, Transportation and Communication, and Education and Recreation

Var	y5	y6	y7
	Healthcare	*Trans_commu*	*Edu_recre*
Aging rate	0.270	0.263	-0.333
	(0.074) ***	(0.139) ***	(0.183) **
L.Aging rate	0.066	0.384	-0.536
	(0.167) **	(0.151) ***	(0.255) **
Child supp_ratio	0.025	-0.024	-0.061
	(0.207)	(0.037) *	(0.049) *
L.Child supp_ratio	0.029	-0.067	-0.076
	(0.060)	(0.060) **	(0.089) *
LnPer capital dis_in	1.302	8.742	0.263
	(1.061)	(2.128) ***	(2.583)
L.lnPer capital dis_in	8.512	13.024	21.603
	(7.228)	(7.066)	(11.295)
CPI	-0.156	-0.136	-0.033
	(0.023)	(0.039) ***	(0.052)
L.CPI	-0.053	-0.025	-1.370
	(0.097)	(0.086) **	(0.219)
Tech_invest_ratio	-0.121	0.130	0.161
	(0.064) *	(0.120) *	(0.166) **
L.Tech_invest_ratio	-0.123	0.958	0.156
	(0.280) *	(0.283) *	(0.463) *
LnHousing price level	-0.771	-2.911	-2.87
	(0.524)	(1.115) ***	(1.399)
L.lnHousing price level	-0.423	-2.390	-3.618
	(1.635)	(1.784) **	(2.474)

Var	y5	y6	y7
	Healthcare	*Trans_commu*	*Edu_recre*
_Cons	5.365	-37.149	20.674
	(5.424) ***	(10.120) ***	(12.133) ***

Note: The table is the coefficient value and *, **, *** respectively indicate that the level of 10%, 5%, 1% has passed the significance test

According to the table, the result of normal panel regression is basically consistent with the previous results. The aging of the population is negatively correlated with consumption expenditures such as food, clothing, daily necessities and services, education, and entertainment. And there is a positive correlation with consumption expenditures on housing, healthcare, transportation, and communications. Therefore, the results obtained by using the system GMM regression method in this chapter are robust.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

As the aging of China's population continues to deepen, it will have a huge impact on all aspects of economic and social life. The aging of the population will affect the total consumption and demand through income and consumer demand, and ultimately will lead to the change in the consumption structure of residents Starting with the current situation of population aging and residents' consumption structure in five provinces of southwest and south China, this paper discussed the impact of population aging on residents' consumption structure through the establishment of dynamic panel regression model, and put forward corresponding suggestions according to the empirical research results of the model. However, this paper also has shortcomings. First, the selected variables may not be comprehensive enough, and the conclusions drawn need to be improved; second, there is a lack of relevant survey data in the analysis of the impact of population aging on the consumption structure of residents. Obtaining more reliable data on the individual consumption status of the elderly will be more helpful to the study of the consumption of the people. The main conclusions are as follows:

First, the aging of population has reduced the overall consumption and proportion of food, clothing, daily necessities and services, education, and entertainment. Among them, the reduction in consumption expenditures and proportion on food, and daily necessities education, and entertainment are in line with the degree of aging society.

Second, the aging of population will increase the consumption expenditure and proportion of transportation, communication, healthcare, and residence. In other words, consumption expenditure and proportion of transportation, communication, healthcare, and residence will increase when China becomes aging society.

In general, the aging population has increased the proportion and consumption of transportation and communication, healthcare, and residence, meanwhile, the aging of population has reduced the consumption and proportion of food, clothing, daily necessities and services, education, and entertainment. It shows that as China enters aging society, the sector of transportation and communication, healthcare, residence will become more important. The government and enterprises should take measures and prepare for China's entry into an aging society.

5.2 Recommendations

This paper studied the impact of population aging on the consumption structure of urban residents in the five provinces of southwestern and southern China and explored the impact of population aging on the consumption structure of residents. Then the current situation and characteristics of population aging, as well as the consumption structure were described in detail. Finally, conduct a dynamic panel regression analysis was conducted to explore the impact of population aging on seven categories of consumption expenditure and their proportions. The corresponding countermeasures and suggestions were put forward according to the results of the empirical analysis as follows:

5.2.1 Appropriately Reduce the Size of Food, Clothing, Daily Necessities, Education, and Entertainment Sectors

The empirical results showed that the aging of the population is negatively correlated with consumption expenditures such as food, clothing, daily necessities, and entertainment. Therefore, after China steps into an aging society, the aging population continues to increase, and the demand and expenditure for food, clothing, etc will decline. To cope with this situation, companies can appropriately reduce the market development of food, clothing, daily necessities, and entertainment industries.

5.2.2 Seize the Opportunity to Actively Develop Real Estate Construction

The empirical results showed that the aging of the population is positively correlated with and housing consumption expenditure. When China enters an aging society and the number of elderlies continue to increase, their demand for housing and consumption expenditure will also increase. For enterprises, they should seize market opportunities to actively develop the real estate industry.

5.2.3 Actively Develop and Improve the Healthcare Industry

With the increase of age, the body malfunction and immunity deterioration naturally take place. Therefore, the consumption expenditure of medical care is closely related to the elderly. It is also indispensable. The conclusions of the empirical analysis also confirm this point. However, the elderly still finds it "difficult to see a doctor", which is a major problem faced by the elderly in China. Due to the large population, insufficient or even shortage of medical resources is a major feature of China. In the context of an aging population, the construction of the medical system should be accelerated.

5.2.4 Improve Rules and Regulations for Real Estate Development

According to the empirical results, when China enters an aging population, the housing consumption expenditure will increase, which will allow many real estate companies to compete. At this time, the government needs to improve the regulations and systems related to pension real estate. The monopoly in housing market will greatly hurt the social welfare of this aging economy. So, the government needs to revise the law and regulation. This will enable real estate developers to achieve healthy competition, but also protect the rights and interests of people.

5.2.5 Constantly Improve the Medical Security System and Actively Carry out Medical Reform

As the elderly get older, their physical fitness is getting worse, their chances of getting sick are higher than that of other age groups. Therefore, medical services are very important for the elderly. The aging population has increased demand for

medical and healthcare consumption, which will inevitably lead to an increase in medical and healthcare consumption expenditures. Therefore, the government can play a corresponding role, 1. Promote participation in health insurance so that people will be able to access the healthcare services when they become old. 2. Establish a national system for essential drugs to supply basic medicines for residents in the future. 3. Invest more in the public health facility to ensure sufficient supply of healthcare services in the future. The elderly is susceptible to disease, and their increasing number will inevitably lead to an increase in medical security funding. Therefore, China's social medical security system should be further improved to ensure healthcare for all the people.

5.2.6 Invest More on Transportation and Communication Infrastructure

As China enters an aging population, empirical results show that an increase in the elderly population will lead to an increase in transportation and communications consumption expenditures. This is due to the increase in free time after retirement, economic development and the popularization of the Internet, and changes in travel modes. At the same time, the Internet has also become a way for the elderly to spend their time, and the elderly are often lonely. Because they do not have their children for a long time, the way of life and entertainment is gradually reduced, and telephone communication is also essential. Therefore, to ensure the travel and communication of the people, the government should invest more on the infrastructure of transportation and communication to ensure the travel and communication needs.

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BIOGRAPHY

Name-Surname   Mr. Xiao Qi

Academic Background   Bachelor's degree
Tourism and cultural industry School,Chengdu University
Degree completed in 2019