Intergenerational Mobility and Regional Differentiation in China's Population Structure, 2010–2020

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Abstract

The 20th National Congress of the Communist Party of China emphasizes promoting coordinated regional development and advancing a new type of urbanization centered on people. To better understand the evolution of the population pattern and the mechanisms behind it, GIS statistical analysis and mathematical statistical analysis were used. Combined with the data from the sixth national census in 2010 and the seventh national census in 2020, it was found that the overall trend of population growth was mainly concentrated in the eastern developed provinces such as Beijing and Shanghai, Jiangsu Province, Zhejiang Province and Guangdong Province. There was also a significant increase in resource-based provinces such as Xinjiang Uygur Autonomous Region and Tibet Autonomous Region, while the population in less developed provinces such as Henan Province, Gansu Province, the three northeastern provinces and Inner Mongolia Autonomous Region decreased significantly. The notable changes in the population pattern of the post-80s and post-70s generations are that some of them are moving out of Beijing and Shanghai, where the cost of living is high, and the post-60s generation is moving in to Sichuan and Chongqing. By group, young people with high knowledge mainly move to first-tier cities, but also to second-tier cities due to factors such as high housing prices and high living costs; Young ordinary college students are mainly concentrated in second-tier cities or positions within the system at all levels of counties and cities; Urban basic blue-collar workers are more likely to move to the local big cities; Older migrant workers are gradually returning to their hometowns to retire; The general living population in the central and western regions: all want to move to provincial capitals; The number of "new farmers" moving to the countryside is increasing. In light

of the flow patterns of different age groups and groups, this article puts forward policy suggestions from aspects such as strengthening the training of professional and technical talents, attaching importance to grassroots elderly care and making large and medium-sized cities "fertility-friendly", and formulating development strategies based on local conditions to promote sustainable development of people and society.

Keywords: Intergenerational; Population Pattern; Evolution

1. Introduction

The 20th National Congress of the Communist Party of China emphasizes promoting coordinated regional development and advancing a new type of urbanization centered on people. The population issue has always been a global, long-term and strategic problem facing our country (Duan and Qiu, 2023), as well as a prominent social feature in the process of urbanization and modernization and an important topic for high-quality development in various regions (Cai et al., 2024). In recent years, China's birth rate has continued to decline, while the aging rate has been increasing. In 2023, the number of new births in China was 9.02 million, a 49.07 percent decrease from 17.71 million in 2000. The birth rate was 6.39 per thousand, much lower than 14.03 per thousand in 2000. The aging rate was 15.4 per thousand, much higher than 7 per thousand in 2000. China is already a moderately aging society, and most areas have entered or are gradually entering deep aging. "Population" will become a key issue in development, which will have far-reaching effects in the long term. For economically underdeveloped regions, the continuous outflow of young and middle-aged rural labor force has led to a more pronounced "hollowing out" of local areas and a deeper and faster aging of the population. There have been significant changes in young people's fertility concepts. They no longer believe that having a child will guarantee their old age. They are worried that having children will lower their living standards. The high cost of raising children and the pursuit of personal quality of life by contemporary young people have led to a weak willingness to have children. In most areas, the willingness to have a second child is not high, and there is no positive response to the introduction of the three-child policy. The impact of aging is uneven. With young people moving to big cities and the elderly staying at the grassroots level, the national agricultural labor force was about 795.63 million in 2000 and dropped to around 285.44 million in 2020. With the overall population reduction in China and the aging of farmers, the decline in the agricultural population will accelerate further. In 2020, the proportion of people aged 60 and 65 and above in rural areas was 23.81% and 17.72% respectively. The number of people aged 60 and above in rural areas reached 121 million, and the number of people aged 65 and above reached 90.35 million. The problem of successors in agriculture is becoming more and more serious. Due to the overall contraction of the labor force, cities will enter a "zero-sum battle" for the labor force, and urban differentiation will intensify. The growing aging problem and the persistently low fertility rate have exacerbated the structural shortage of human capital. People are the source of urban vitality, and the continuous decline of the working-age population will inevitably lead to competition among cities for young talents.

In the past, academic research focused more on analyzing a certain group of people and less on analyzing the evolution of population patterns by age groups.The main issue of this study is to analyze the evolution of population patterns across different age groups. Based on the data from the sixth national census in 2010 and the seventh national census in 2020, summarize the population mobility patterns of the post-00s, post-90s, post-80s, post-70s, post-60s, post-50s and pre-50s from 2010 to 2020. Second, analyze the patterns of different types of population mobility. Summarize the mobility patterns of different types of people, such as young people with high knowledge, young ordinary college students, professional and technical people, urban basic blue-collar workers, older generation migrant workers, rural left-behind population, general living people in the central and western regions, and "new farmers". The third is to predict future population mobility trends. Predict the future population distribution in first-tier cities, second-tier cities, third-tier cities, cities within first-tier regions, general cities, general county towns, townships and general rural areas based on the laws of population mobility. Fourth, put forward policy recommendations based on the pattern and pattern of population evolution. Based on the population evolution patterns of different age groups, the patterns of different types of population mobility, and the prediction of future population mobility trends, relevant policy suggestions are proposed.

2. Literature Review

2.1. Theoretical Basis

2.1.1. Push-Pull Theory

In 1885, Ravenstein proposed the law of population migration, arguing that economic factors are important factors in population migration. Herber first put forward the concept of the "push-pull theory", arguing that population movement is the result of the combined effect of push and pull. The favorable economic conditions, good living environment, superior geographical location and good cultural atmosphere in the inflow area pull the migrants, while the limited educational and development opportunities and other unfavorable conditions in the outflow area push the migrants. In 1959, Bagne more systematically and comprehensively summarized the push-pull theory, arguing that low income levels, few job opportunities, poor living conditions, and scarcity of material resources in the place of origin are the driving factors of the place of origin. More job opportunities, higher economic levels, complete education and medical care, comfortable climate and environment, and well-developed infrastructure in the inflow area are all pulling factors that attract people (Bagne, 1969). In 1966, American scholar Lee further summarized the "push-pull theory" into four aspects: the factors of the destination, the factors of the destination, the intermediate barriers, and the individual factors. He argued that both the destination and the destination have a combined effect of pushing and pulling forces. The higher economic development level, more job opportunities, and better infrastructure and public service resources of the destination attract the floating population. However, high housing prices and living costs, deteriorating ecological and environmental quality, and low social integration can also act as pushing forces to suppress the inflow of people. Intermediate obstacles include mobility distance,

language barriers, cultural differences, and personal value judgments of the migrants themselves (Lee, 1966). The emergence of migration behavior is influenced by the push from the place of outflow and the pull from the place of inflow. The migration of labor in different regions is mainly for the pursuit of higher economic returns. With the development of the social economy, employment income is no longer the only factor influencing migration.

2.1.2. The New Theory of Migration Economics

The family is characterized by shared benefits and risks. The traditional migration theory, which is based on individual decision-making, has insufficient explanatory power for population mobility. In the process of family-based mobility, the factors considered are more complex and diverse, not only the inflow but also the outflow. In the 1990s, Stark (1985) proposed a new economic theory of migration based on the "push-pull theory", taking the mobile population family as the basic unit, arguing that family factors are taken into account when population flows, maximizing family benefits and minimizing risks through the joint decision-making behavior of family members, with some family members staying in their hometowns and others working outside. If the income of a family member in the hometown is lower than that in the inflow place, the family member will be moved to the inflow place to obtain higher economic benefits. By rationally allocating labor between the hometown and the inflow place to disperse risks, the overall income and stability of the family will be improved (Stark & Bloom, 1985). Stark (1989) points out that migrants will also move when they see an improvement in their economic status after other families move (Stark & Taylor, 1989). The reasons for migration are as follows: (1) Economic constraints: The economic development level in rural areas is not high, the social security and welfare systems are not sound, and the funds and technical levels provided are difficult to meet the development needs of individuals and families, thus achieving population migration for better development prospects. (2) Risk transfer: The economic development mode in rural areas is monotonous, with agriculture as the main industry. Coupled with the uncertainty of the natural environment and the complexity and variability of the market environment, agricultural income is highly unstable and low-yielding. To reduce family risks, some or all family members go out to work to increase income, thereby enhancing the family's risk resistance capacity. (3) Relative poverty: When making the decision to move, families should consider not only the expected income but also the income gap with the surrounding population. If their income level is significantly lower than that of other people, they will have a sense of "relative poverty", and under pressure, families are more likely to move.

2.2. Literature Analysis

Regarding the evolution of population patterns, scholars have viewed it from the national level (Wang et al., 2023), regional level (Gu et al., 2022), urban agglomeration level (Lai et al., 2023), provincial level (Lao et al., 2023), urban level (Xue et al., 2020), and county and village and town level (Lu et al., 2023; Jin et al., 2024), Tencent, Baidu Big Data (Huang et al., 2023; Hu et al., 2023). The pattern of population movement is closely related to the economic development level, city grade, and geographical location of the inflow city. The overall trend of population movement is bounded by the "Hu Huanyong Line", with a denser east and a looser west (Gu, 2022). The trend of population moving from the central, western, and northeastern regions to the

eastern regions is relatively strong, and this trend is relatively stable. The eastern coastal areas have become important gathering places for the floating population (Ke et al., 2022), and the population concentration areas in the developed eastern regions radiate from the core area to the surrounding areas, with a significant radiation-driving effect (Xu et al., 2023). However, with the implementation of national strategies such as the development of the western region and the rise of the central region, and with the accelerated pace at which the central region takes over industries, the trend of population return from the central and western regions has become more obvious in recent years. The population growth rate in inland provincial capitals and the urban areas of prefecture-level cities with better economies has been relatively fast, and the population has shifted from one-way flow to two-way flow (Zeng, 2023), while population outflow in Northeast China continues to intensify (Lao et al., 2023). Specifically, population mobility is more active in the Beijing-Tianjin-Hebei region, the Yangtze River Delta region and the Guangdong-Hong Kong-Macao Greater Bay Area, presenting a distinct multi-core-networked structure and center-periphery hierarchical structure, with obvious local agglomeration effects (Xiao and Hong, 2020; Xiao and Guo, 2021; Lu and Yin, 2023).

There are also obvious differences in mobility trends among different urban classes, with an overall trend towards cities with higher administrative classes and larger urban sizes. First-tier cities remain the polarization centers of the floating population. The larger the city, the higher the administrative rank, and the wider the radiation range, the more floating population from outside the province gathers (Liu & Wang, 2020; Lin & Zhu, 2022). Multiple inflow centers such as Beijing, Shanghai, Guangzhou, Shenzhen, Chengdu, Chongqing, Xi 'an, Wuhan and Changsha are formed, and the highly attractive regions are concentrated in urban agglomerations such as the Yangtze River Delta, Pearl River Delta, Beijing-Tianjin-Hebei, Chengdu-Chongqing, Guanzhong and Central Plains. Lower-tier cities attract floating population with obvious proximity at the prefectural level (Xue et al., 2020). The Yangtze River Delta urban agglomeration, as a highly concentrated area of population inflow, also has obvious divisions within it. Shanghai, Suzhou and Hangzhou are labor input areas, while Yancheng, Anqing and Chuzhou are labor output areas (Chen et al., 2020). With the development of urbanization, the population in urban areas has become overly concentrated, and a series of "urban diseases" such as environmental pollution, traffic congestion, and high land and housing prices have become prominent. Coupled with the transfer of some industries in urban areas and the implementation of rural revitalization policies, the infrastructure and living environment in rural areas have been continuously improved. Cities such as Shanghai, Nanjing, Wuhan and Chengdu have seen a shift in population concentration from the central urban area to the suburbs and rural areas (Zhang and Mei, 2020).

Economic factors are the primary cause that attracts the floating population to exhibit migration behavior (Yu et al., 2020). A high income level can meet the living requirements of the floating population in the inflow area, improve the living standard, and achieve the goal of a peaceful and prosperous life (Wang et al., 2022), cities with higher administrative levels have more abundant medical, educational, elderly care resources and more job opportunities, and the floating population tends to stay in cities with higher administrative levels for a long time (Xu and Wang, 2022; Tong, 2023), with better medical and educational resources closely related to the daily life

of residents, the floating population prefers to move to areas with abundant medical and educational resources for the sake of retirement and for the next generation (Liu et al., 2018; Song and Zhang, 2020).

3. Research Methods and Data Source

GIS analysis. Using Arcgis to visualize population changes at different age groups provides a more intuitive and vivid description of the evolution of population patterns in various regions at different time periods.

Mathematical statistics method. By collecting the statistics of the post-00s, post-90s, post-80s, post-70s, post-60s, post-50s, and pre-50s from the sixth national census in 2010 and the statistics of the post-10s, post-00s, post-90s, post-80s, post-70s, post-60s, post-50s, and pre-50s from the seventh national census in 2020 Analyze the evolution of population patterns in different time periods and age groups. The "00s" in the 2010 sixth national census data refers to the population aged 0-9 in the statistics, the "90s" refers to the population aged 10-19 in the statistics, the "80s" refers to the population aged 20-29 in the statistics, and the "70s" refers to the population aged 30-39 in the statistics. The "post-60" refers to the population aged 40-49 in the statistics, the "post-50" refers to the population aged 50-59 in the statistics, and the "before 50" refers to the population aged 60 and above in the statistics. The "post-10" in the 2020 seventh national census data refers to the population aged 0-9 in the statistics, and the "post-00" refers to the population aged 10-19. "Post-90" refers to the population aged 20-29, "post-80" to the population aged 30-39, "post-70" to the population aged 40-49, "post-60" to the population aged 50-59, "post-50" to the population aged 60-69, and "before 50" to the population aged 70 and above.

4. Intergenerational Analysis: Changes in Population Distribution Across Different Age Groups

Growth type: Only Guangdong, Hainan and Zhejiang provinces have seen significant growth in the population of major working ages such as the post-90s, post-80s, post-70s and post-60s, which fully demonstrates the economic potential of such regions. If the conditions are relaxed to the post-90s to post-80s generation, that is, the young and middle-aged group, then Jiangsu and Fujian provinces in the Yangtze River Delta, as well as the inland regions of Xinjiang Uygur Autonomous Region and Tibet Autonomous Region with fast economic growth, can be added.

Declining type: The provinces where the main working-age population, including the post-90s, post-80s, post-70s, and post-60s, all declined are: In the vast inland areas such as Hebei Province, Henan Province, Hubei Province, Hunan Province, Jiangxi Province, Liaoning Province, Jilin Province, Heilongjiang Province, Inner Mongolia Autonomous Region, Shandong Province, Qinghai Province, Shanxi Province, Shaanxi Province and Yunnan Province, there has been a significant decline in Northeast China, North China and Central China.

Municipalities directly under the Central Government: Attractive to young people born in the 2000s and 1990s, but the high cost of living has a push for people born in the 1980s and above.

There are Beijing, Shanghai and Tianjin. The situation in Tianjin is different, as the economic downturn has led to the outflow of people like the post-80s, and the new growth is mostly school-aged post-00s, associated with a large number of "college entrance examination migrants".

Return type: mainly provinces with a large outflow of population, which have a certain return attraction for migrant workers. The main phenomenon is that while a large number of people born in the 1990s are leaving, the number of people born in the 1980s and 1970s is increasing, mainly in the Yangtze River Basin provinces such as Chongqing, Sichuan, Guizhou and Anhui, as well as in many places such as Guangxi Zhuang Autonomous Region and Ningxia Hui Autonomous Region, there are cases of "returning home to get married after drifting".

Table 1. Changes in Population Layout by Age Groups

Provinces (Ten thousand people)	Post-2000s Changes	Post-90s Changes	Post-80s Changes	Changes in the 70s	Changes after the 1960s	Changes after 50	Changes before 50
Beijing City	8.87	168.38	-36.58	-32.42	-3.78	2.96	-74.27
Tianjin	35.51	55.84	-44.41	-14.16	-7.53	-9.95	-49.97
Hebei Province	51.04	-149.29	-95.59	-39.69	-55.86	-84.32	-328.88
Shanxi Province	-3.28	-127.11	-38.72	-53.37	-47.10	-44.83	-143.69
Inner Mongolia Autonomous Region	-6.84	-41.57	-17.72	-40.79	-42.02	-38.57	-102.18
Liaoning Province	15.26	-24.94	-30.89	-29.40	-39.82	-69.71	-245.69
Jilin Province	-2.71	-52.51	-83.57	-71.76	-77.21	-73.74	-149.39
Heilongjiang Province	-11.82	-96.31	-143.70	-127.20	-129.41	-118.09	-211.51
Shanghai	-5.11	204.20	-15.44	-41.56	-16.03	-11.21	-106.82
Jiangsu Province	89.32	75.06	42.29	-0.52	-6.86	-47.93	-395.80
Zhejiang Province	70.27	256.24	182.96	92.30	46.85	-8.07	-224.13
Anhui Province	18.85	-122.74	-10.62	-65.59	-78.93	-62.08	-304.14
Fujian Province	51.00	36.47	10.85	-8.33	-14.18	-23.39	-142.16
Jiangxi Province	17.25	-144.54	-102.34	-66.88	-32.76	-46.51	-177.86
Shandong Province	88.38	-115.83	-39.82	-27.45	-49.17	-96.66	-483.12
Henan Province	114.16	-319.65	-171.98	-63.56	-51.57	-73.30	-383.61

Hubei Province	25.75	-76.10	-50.87	-44.89	-42.74	-69.14	-263.37
Hunan Province	35.11	-134.93	-113.87	-88.97	-52.05	-67.19	-338.69
Guangdong Province	273.83	449.97	147.50	37.51	4.32	-40.11	-348.42
Guangxi Zhuang Autonomous Region	27.54	-140.39	4.90	-16.69	-12.24	-32.84	-211.95
Hainan Province	12.77	21.03	14.76	7.81	5.83	1.55	-8.82
Chongqing Municipality	53.80	-3.18	48.36	32.40	40.96	-11.36	-162.27
Sichuan Province	56.83	-117.33	0.73	-19.74	19.91	-56.25	-425.17
Guizhou Province	40.74	-137.65	56.82	6.05	-12.10	-29.99	-163.60
Yunnan Province	1.22	-92.15	-69.98	-64.69	-40.19	-39.52	-193.20
Xizang Autonomous Region	2.54	7.85	5.11	1.94	-1.41	-3.11	-10.30
Shaanxi Province	42.94	-40.09	-11.34	-23.93	-24.30	-36.35	-160.03
Gansu Province	5.01	-122.95	-46.91	-30.35	-35.26	-32.02	-122.23
Qinghai Province	0.86	-9.21	-0.91	-6.64	-8.27	-7.42	-21.30
Ningxia Hui Autonomous Region	5.86	-5.06	12.41	1.10	-0.57	-2.89	-19.25
Xinjiang Uygur Autonomous Region	30.13	18.32	35.58	-3.69	-17.73	-27.67	-82.87

4.1. After 2010s: Low Fertility Rates in Both Economically Developed and Underdeveloped Areas

Looking at the proportion of people born after 10 alone may not reflect the birth rate, because the proportion of people of childbearing age varies greatly in different regions. When comparing regional differences, the influence of this aspect must be excluded. The study combined the post-80s and post-90s populations as the base of the "childbearing age population" to calculate the proportion of the post-10s population to the "childbearing age population".

The results are as follows: 1) The national average is 43%. The number of post-10s is roughly the same as that of the post-90s, but significantly less than that of the post-80s, indicating a downward trend in fertility intentions. 2) The provinces with relatively high proportions include less developed provinces such as Guangxi Zhuang Autonomous Region, Guizhou Province, Hebei Province, Henan Province, Jiangxi Province, Hunan Province, Gansu Province and Anhui

Province. Among the eastern provinces, only Shandong Province, which has a relatively strong sense of fertility, has a higher proportion. 3) In economically developed cities such as Beijing, Shanghai, Jiangsu, Zhejiang and Guangdong, the intention to have children is also significantly lower, and Fujian Province, which has a strong sense of clan, has a relatively low proportion. 4) The three northeastern provinces, Inner Mongolia Autonomous Region, Shanxi Province and Tianjin Municipality, which are experiencing economic downturn, have generally low fertility intentions, entering a double decline of population and economy. 5) Xinjiang Uygur Autonomous Region, Tibet Autonomous Region, Qinghai Province, Ningxia Hui Autonomous Region and other places traditionally considered to have high fertility rates are actually not high either. It's just that the fertility policies of the previous generation of these ethnic minorities were relatively lenient, resulting in a larger base of people of childbearing age and a higher proportion of people born after 2010.
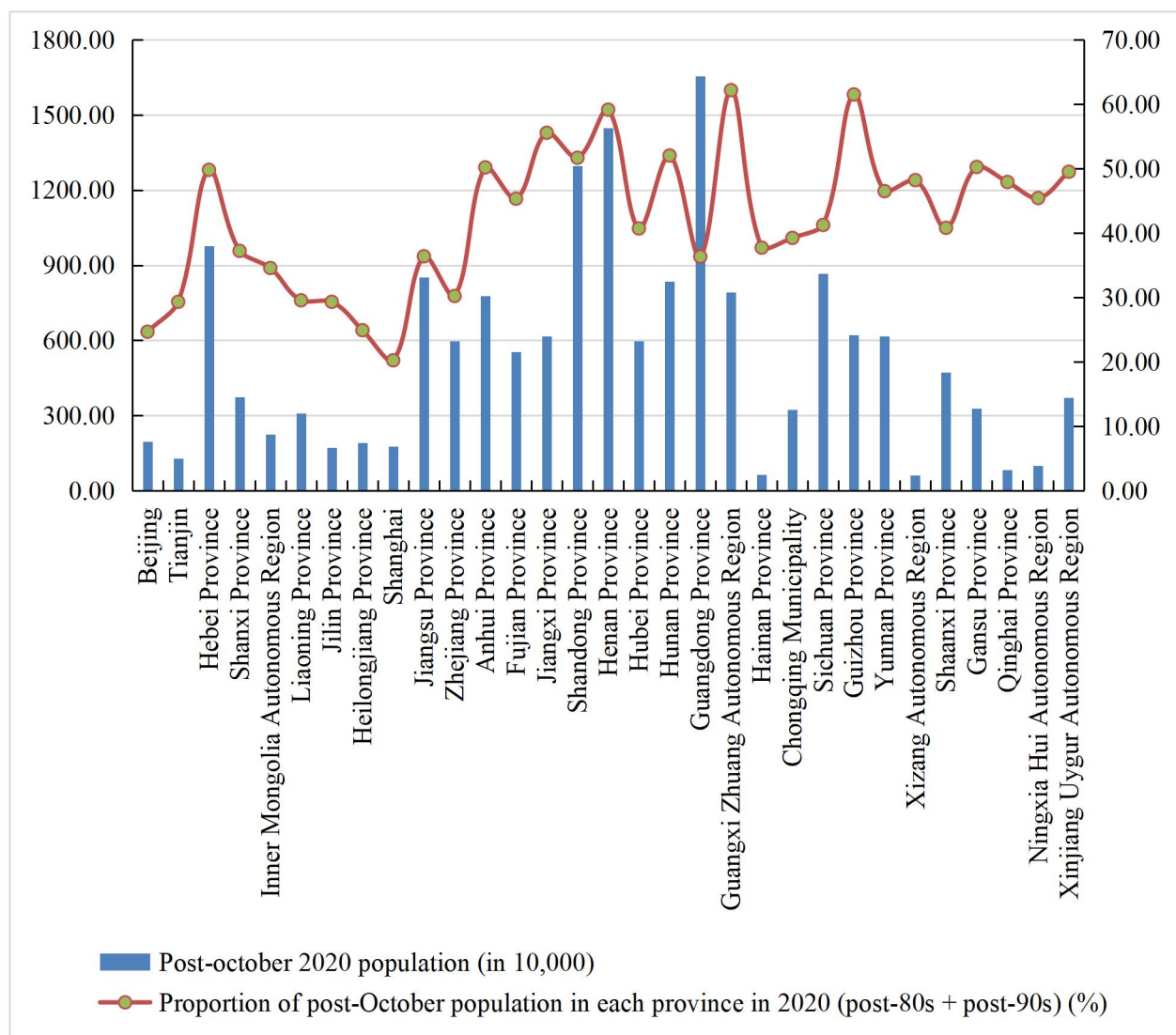
Figure 1. Changes in the proportion of post-10 population to the reproductive age population in each province

4.2. Post-2000s: Tianjin's Significant Growth Benefits From College Entrance Examination Migrants, a Strong Economic Province Attracts Migrant Children

Due to statistical population replenishment, the number of people born after 2000 increased from 146 million to 158 million during 2010-2020. At the time of the seventh census, the post-2000s generation was largely of school age. The mobility mechanism of this group is different from that of other age groups, either due to educational factors or following parents.

Counting the rate of change in the post-2000s population in 2020 compared to 2010, the results are as follows: 1) The fastest increase among provinces was in Tianjin, where the post-2000s population rose by an astonishing 41 percent, possibly due to a significant increase in "college entrance examination migrants". 2) In Guangdong, Zhejiang, Fujian, Jiangsu and other provinces, the number of post-2000s also increased, due to the good economic situation and the large number of school-age people moving with their parents; The increase in the post-2000s population in Xinjiang Uygur Autonomous Region may be due to both factors. 3) There is also growth in Chongqing, Shaanxi, Anhui, Henan and other places. The main reason may be related to the return of the population, with students returning home with their parents. As can be seen from Figure 3, the growth pattern of the post-2000s population shows a general trend of higher in the east and lower in the west.
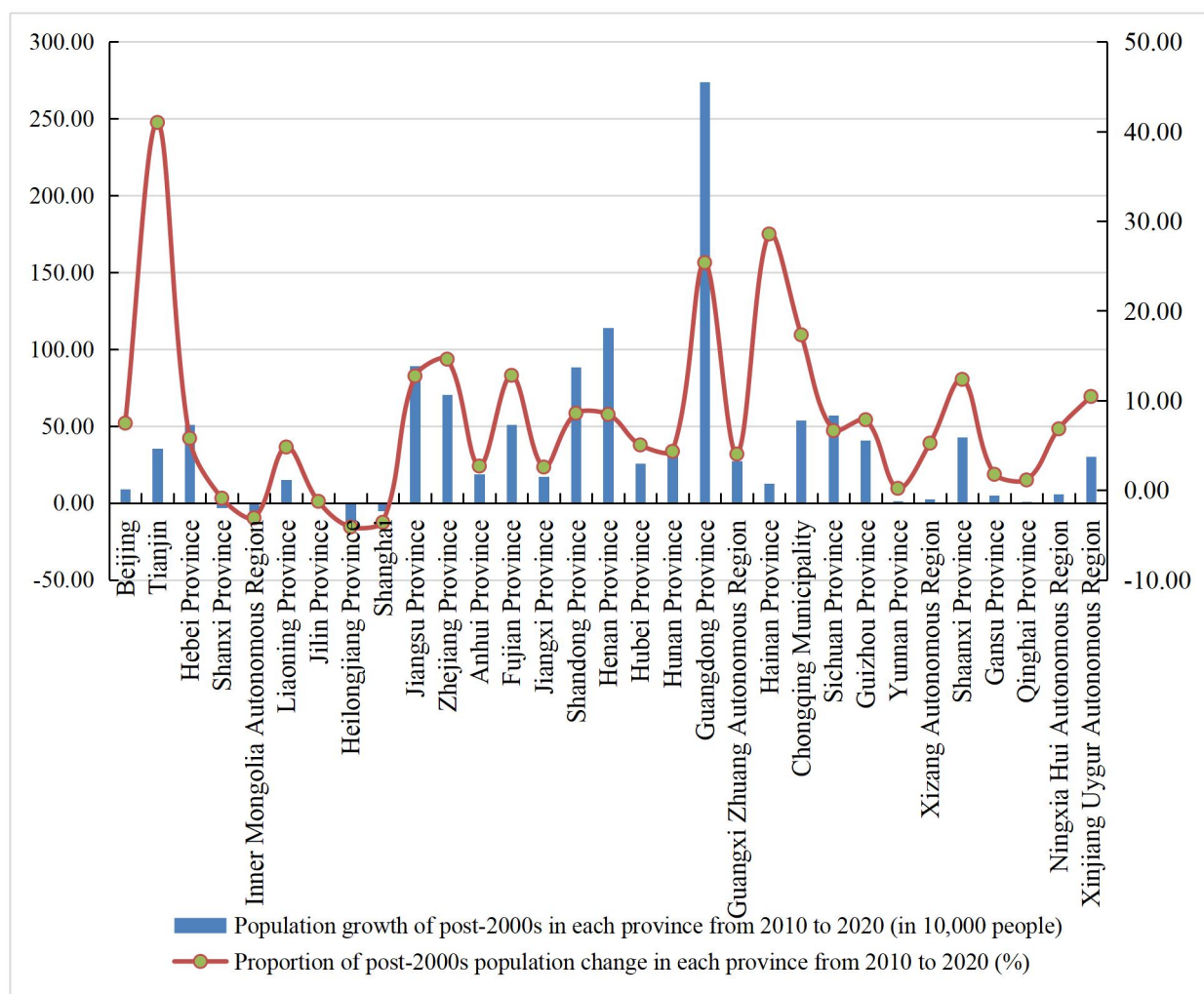

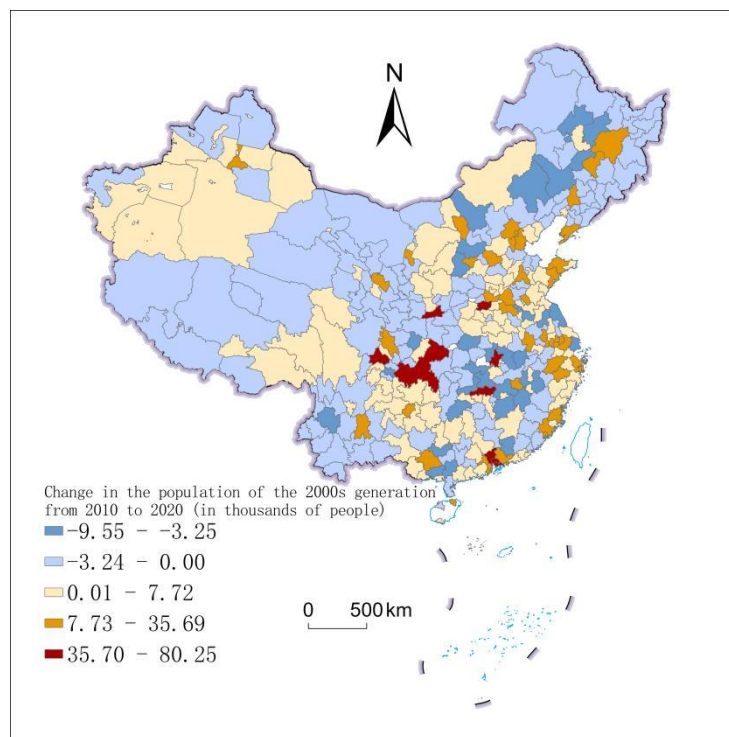**Figure 2. Changes in Post-2000 Population in Each Province from 2010 to 2020**

Figure 3. Changes in the post-2000s population from 2010 to 2020

Note: This map is based on the standard map with the review number GS(2023)2767 downloaded from the Ministry of Natural Resources' Standard Map Service website, and the boundaries of the base map have not been modified.The data for Taiwan region, China is not included in the map.

4.3. Post-90s: Young People are Highly Concentrated in Developed Areas, with Beijing and Shanghai Doubling in Growth

The post-90s generation is the most mobile generation in Chinese history. Between 2010 and 2020, post-90s mobility included both economic migrations and those to pursue higher education, as well as migrations for a better quality of life. These have made the geographical migration of the post-90s even more intense.

Calculate the changes in the post-90s population during 2010-2020, as well as the proportion of the changes. The results show significant differences among provinces, and the disparity is much greater than that among other age groups: 1) Both Shanghai and Beijing have more than 100 percent of their post-90s population, which means that the number of post-90s in the two major cities has doubled over the past 10 years. This is due to economic factors as well as factors related to further education. Tianjin, as a municipality directly under the Central Government, also saw an increase of more than 40 percent. 2) The eastern developed provinces such as Jiangsu, Zhejiang, Guangdong and Fujian, as well as the resource-based provinces of Xinjiang Uygur Autonomous Region and Tibet Autonomous Region, all saw significant growth, indicating that economic factors are highly attractive to young people. 3) There is a significant increase in the number of post-90s in economically underdeveloped provinces, which indicates that the "potential growth" of the economy in some areas is not enough to influence the choices of young people. According to Figure 5, the growth pattern of the post-90s population shows an overall trend of concentrating in the southeast coastal areas.
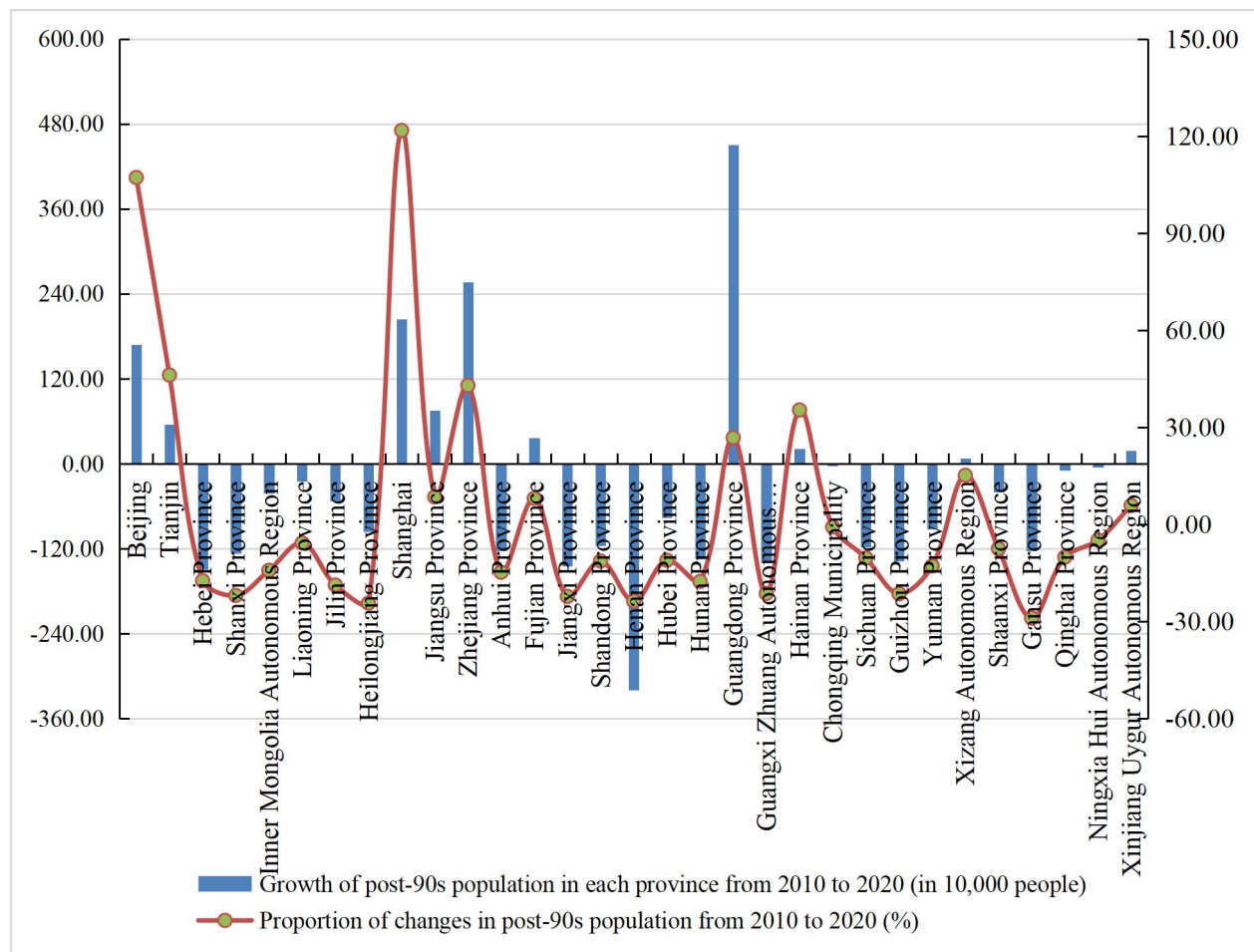
Figure 4. Changes in the Post-90s Population in Each Province from 2010 to 2020
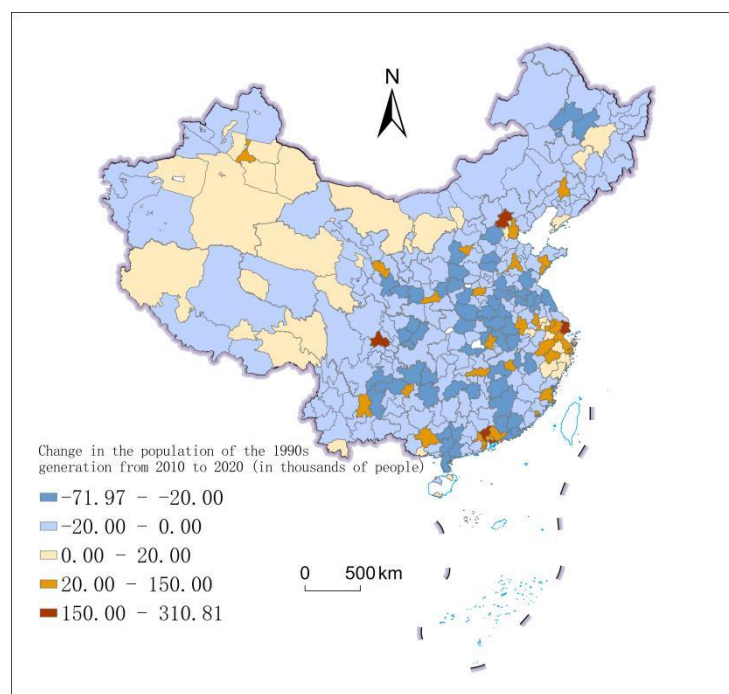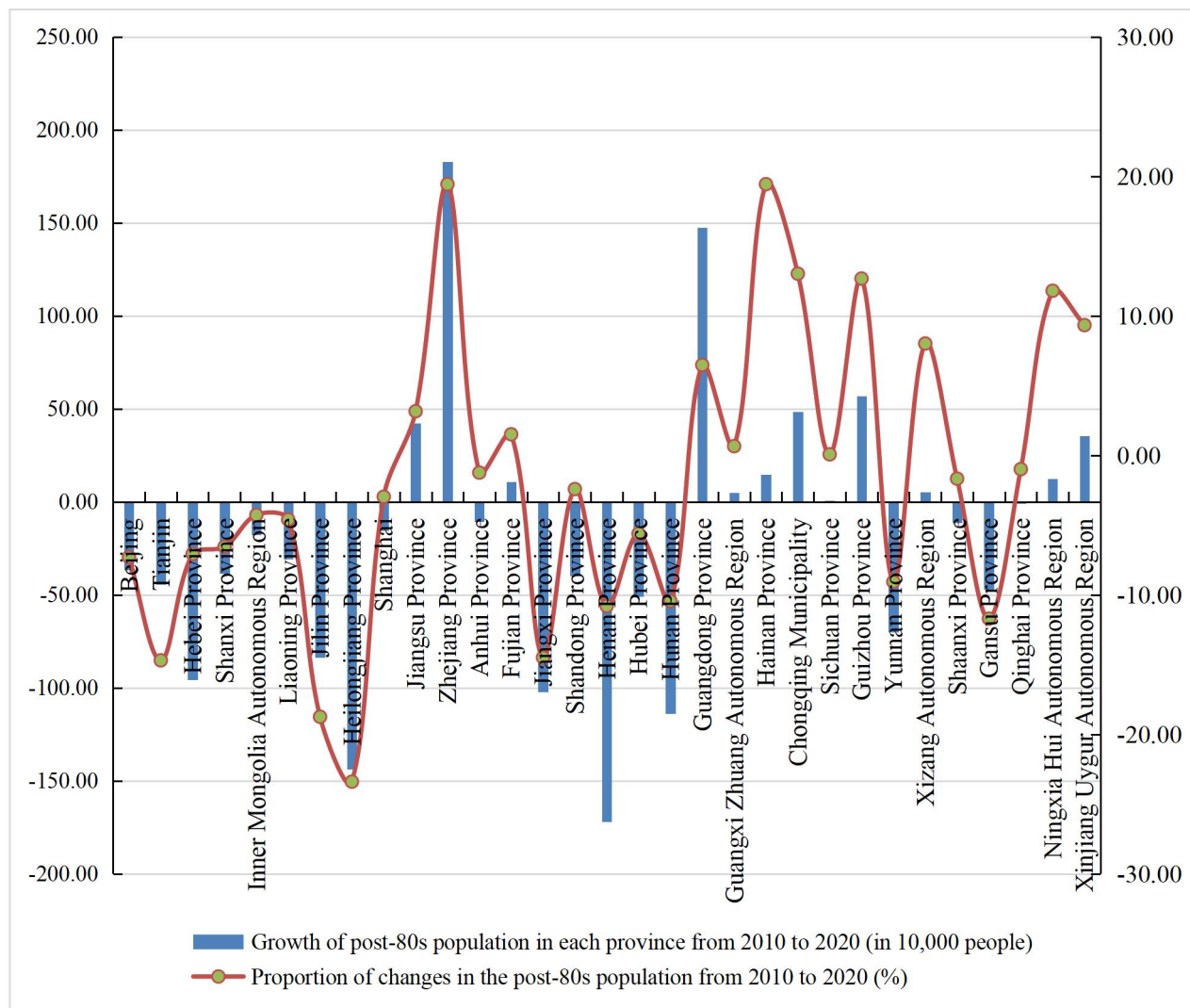

Figure 5. Changes in the post-90s population from 2010 to 2020

Note: This map is based on the standard map with the review number GS(2023)2767 downloaded from the Ministry of Natural Resources' Standard Map Service website, and the boundaries of the base map have not been modified. The data for Taiwan region, China is not included in the map.

4.4. Post-80s: Flowing to the Coastal Areas as well as Chongqing and Guizhou, While Flowing Out of Beijing and Shanghai, Where the Cost of Living is High

The post-80s generation is also a highly mobile one. But many of them had already moved and settled in economically developed provinces by 2010, and the migration between 2010 and 2020 was not as significant as that of the post-90s generation. Looking at the trend of the post-80s population in each province during 2010-2020, the results are as follows.

Figure 6. Changes in the Post-80s Population in Each Province from 2010 to 2020
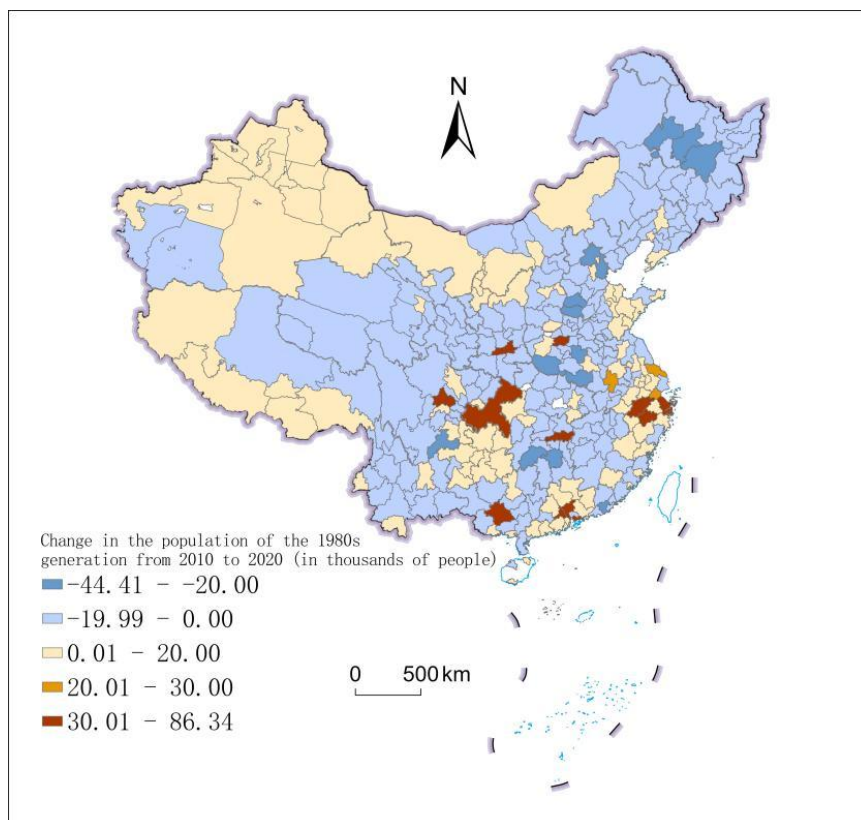
Figure 7. Changes in the post-80s population from 2010 to 2020

Note: This map is based on the standard map with the review number GS(2023)2767 downloaded from the Ministry of Natural Resources' Standard Map Service website, and the boundaries of the base map have not been modified.The data for Taiwan region, China is not included in the map.

The divergence among different regions is quite complex: 1) The post-80s population in Beijing and Shanghai has declined to some extent, which is related to the push of high housing prices and high living costs in the cities, and many of the people who moved out have gone to other big cities; Among the coastal provinces, Zhejiang Province saw the most significant increase in the post-80s population, followed by Guangdong Province and Hainan Province, with a large number of migrants coming from Beijing and Shanghai. 3) Among the inland provinces, Guizhou and Chongqing saw the fastest growth, mainly due to the return of the population. Many people who have been on the move for a long time chose to return to their hometowns to start families and live, which is also related to the high cost of living in coastal cities. 4) The post-80s generation in Xinjiang Uygur Autonomous Region, Ningxia Hui Autonomous Region and Tibet Autonomous Region is also growing rapidly, which is related to the attractiveness of the resource-driven economy; 5) The significant loss of the post-80s generation in Henan Province, Hunan Province, Gansu Province, Hubei Province, Shaanxi Province, Hebei Province and Jiangxi Province indicates that the trend of young people moving to economically developed regions has always been obvious; 6) In the three northeastern provinces, Inner Mongolia Autonomous Region and Tianjin, the number of young and middle-aged people has decreased due to economic decline. In Tianjin, the number of post-80s has shrunk while the number of post-00s and post-90s has increased significantly.

4.5. Post-70s: the Pattern of Change is Highly Similar to that of Post-80s, but the Extent of Change is Relatively Small

The post-70s are more likely to engage in technical jobs, which is significantly different from the previous post-60s floating population, but they are less educated and less mobile than the post-80s. Looking at the changes in the post-70s population from 2010 to 2020, it was found that their mobility patterns were highly similar to those of the post-80s: 1) Beijing and Shanghai also squeezed out some of the post-70s due to high living costs, similar to the situation of the post-80s. 2) In the economically developed coastal provinces such as Zhejiang, Guangdong and Hainan, the post-70s population has grown significantly, demonstrating the attractiveness of economic advantages to people. Some of the post-80s who have moved in are the same as those who have moved out of Beijing and Shanghai. 3) Chongqing and Guizhou have seen a considerable number of people return, which is related to the large-scale investment at the national level in the previous stage. 4) Resource-rich provinces such as Xinjiang Uygur Autonomous Region and Tibet Autonomous Region have attracted a large number of migrant workers from outside. 5) The number of people born in the 1970s in central provinces such as Jiangxi, Hunan, Shanxi, Hubei and Henan has decreased significantly, reflecting the tendency of labor outflow from less developed provinces. 6) In the three northeastern provinces, Inner Mongolia Autonomous Region, Tianjin and other places, the post-70s generation has left due to the economic downturn.
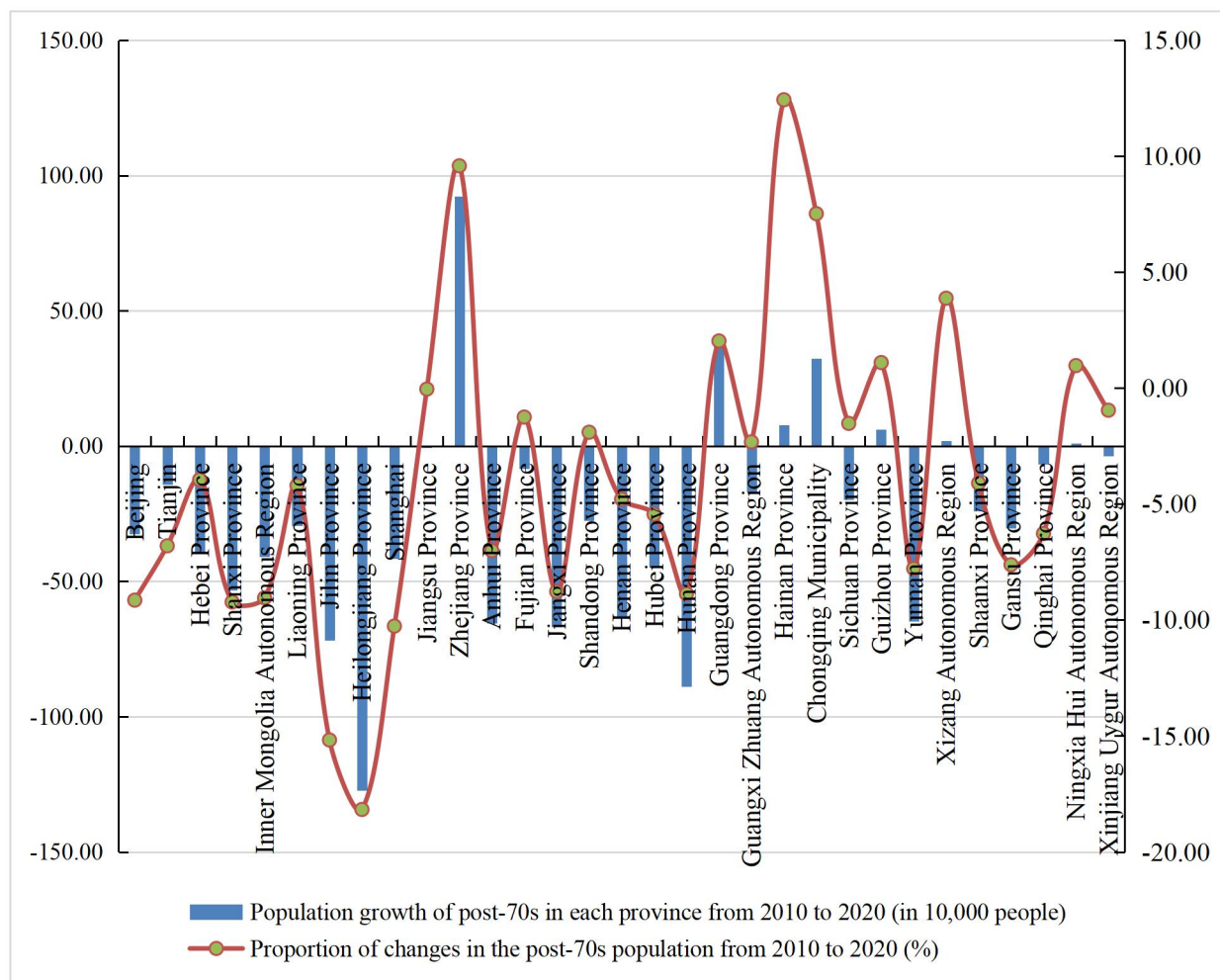

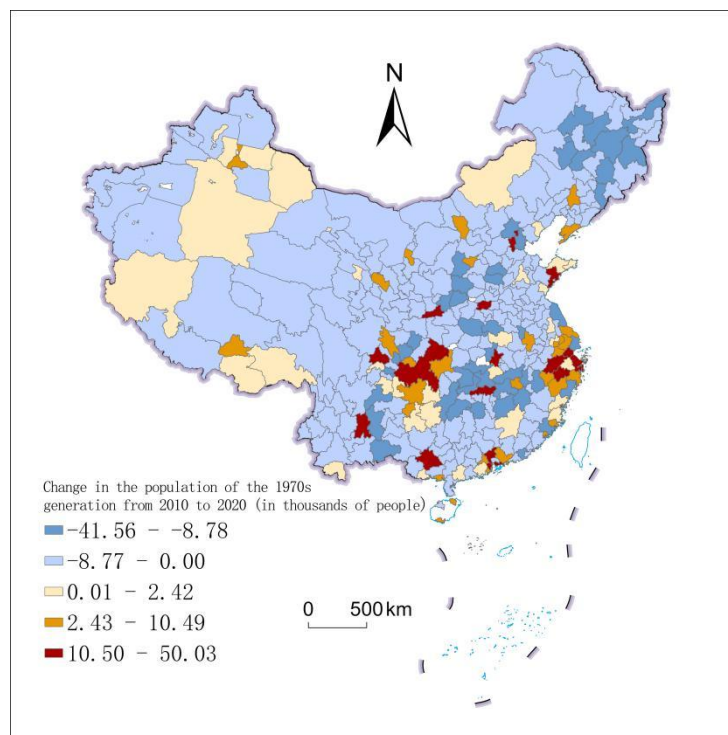**Figure 8. Changes in the Post-70s Population in Each Province from 2010 to 2020**

Figure 9. Changes in the post-70s population from 2010 to 2020

Note: This map is based on the standard map with the review number GS(2023)2767 downloaded from the Ministry of Natural Resources' Standard Map Service website, and the boundaries of the base map have not been modified.The data for Taiwan region, China is not included in the map.

4.6. Post-60s: the Return to Their Hometowns in Sichuan and Chongqing for Retirement is Significant, and Economic Factors also have a Considerable Impact on the Post-60s Generation

The post-60s are the first generation of migrant workers, but they are less likely to leave their hometowns than the post-70s, 80s and 90s. More of their peers chose to stay in their hometowns, work and settle down in the province, and have a significantly stronger sense of nostalgia and affection for their native land. A study of the changes in the post-60s population found a significant decline in most provinces, mainly due to the passing of some of the post-60s. 1) In Sichuan Province, Chongqing Municipality and other places, the number of people born in the 1960s has increased instead of decreased, reflecting the important desire of the migrant population to return to their hometowns. This also reflects the appeal of the superior living conditions of the "Land of Abundance" to people working outside their hometowns. Returning to their hometowns for retirement has become an important choice for the first generation of migrant workers. 2) Among the coastal provinces, Zhejiang saw an increase instead of a decrease, while Guangdong, Hainan, Jiangsu, Beijing, Shandong and Anhui saw a relatively small decline, reflecting the attractiveness of the good economic momentum. 3) Inland regions such as Ningxia Hui Autonomous Region, Xinjiang Uygur Autonomous Region and Guangxi Zhuang Autonomous Region also saw less decline in the post-60s generation, due to cultural factors in ethnic minority areas. 4) The most significant decline in the post-60s generation was still in the three northeastern provinces, Inner Mongolia Autonomous Region, Shanxi Province, and less developed provinces such as Qinghai and Gansu.
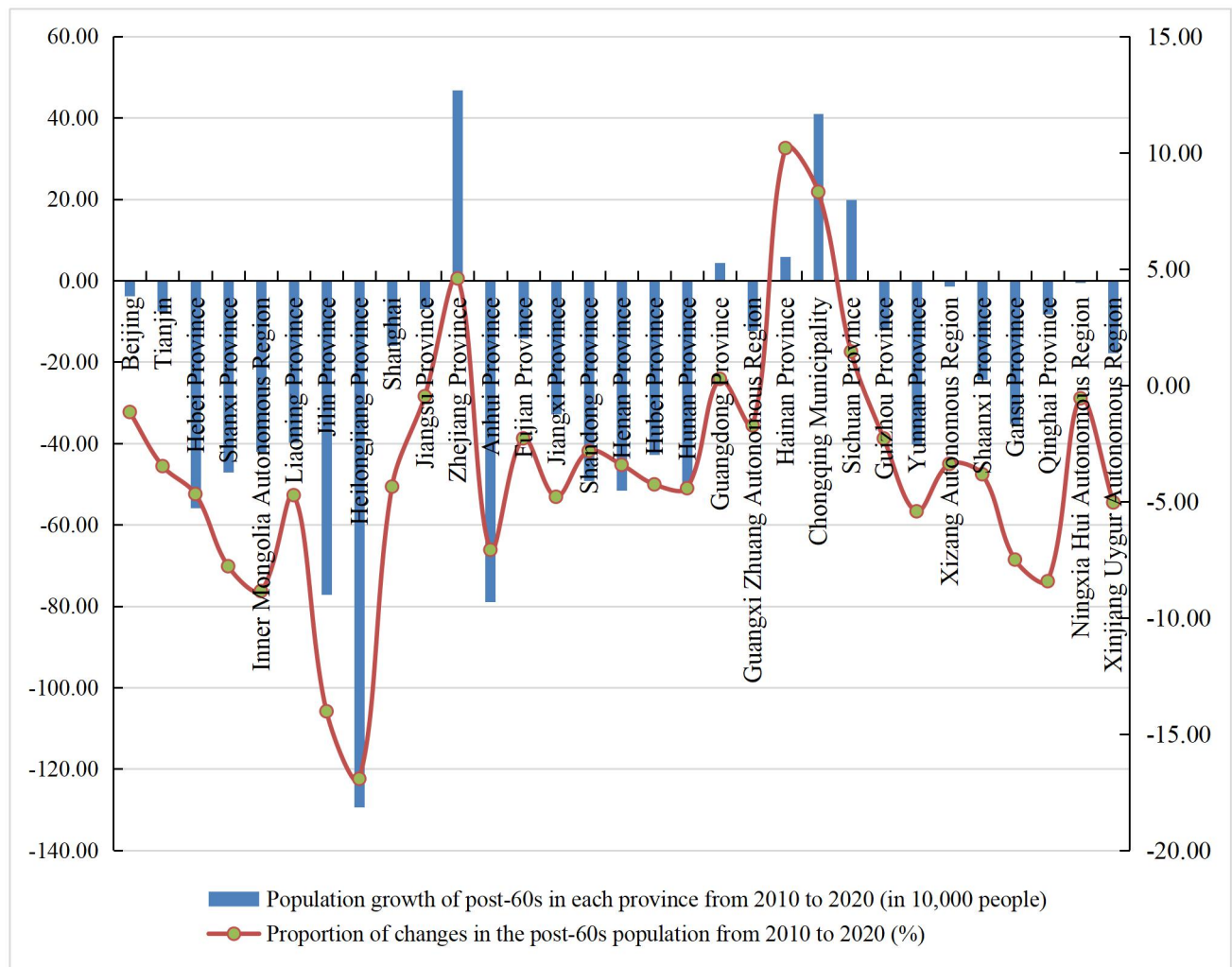
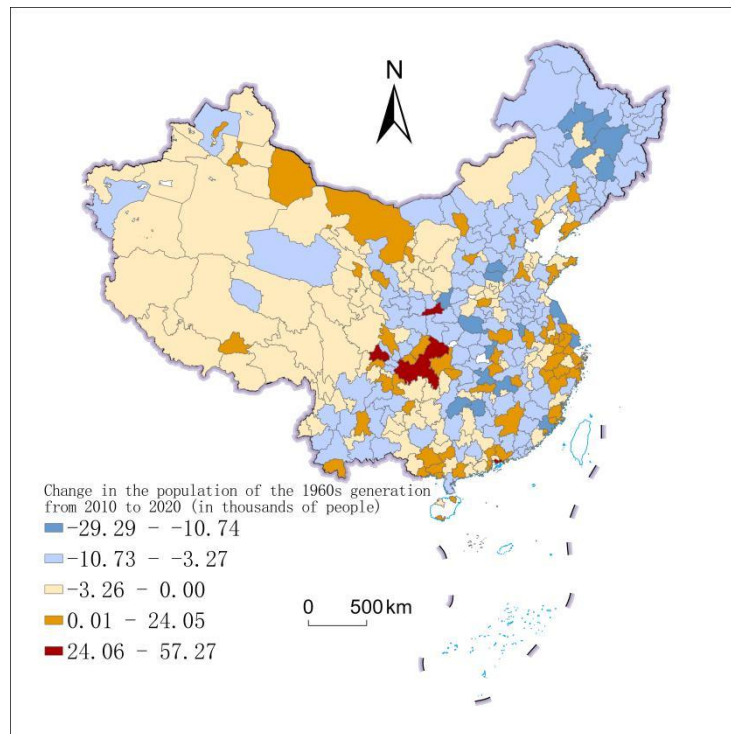**Figure 10. Changes in the post-60s population in each province from 2010 to 2020**

Figure 11. Changes in the post-60s population from 2010 to 2020

4.7. Post-50s: Economic Factors, Living Conditions and Life Expectancy Determine the Pattern of Post-50s

The overall mobility of the post-50s is relatively weak, with a low proportion of local mobile population, and more post-50s died between 2010 and 2020. Examining the changes in the post-50s population in various provinces, the results show: 1) In all provinces except Beijing, there is a rapid decline in the post-50s population. 2) The provinces with low rates of population decline are either economically developed provinces such as Zhejiang, Jiangsu, Guangdong, Hainan and Fujian, or habitable regions such as Chongqing, Sichuan and Anhui, as well as once economically prosperous places like Tianjin. 3) The post-50s population has also decreased significantly in the three northeastern provinces, Inner Mongolia Autonomous Region and Gansu Province, where the economy is in decline and the climate is poor, with a large number of elderly people moving out for retirement. 4) In many mountainous provinces in the central and western regions where living conditions are harsh and life expectancy is short, the post-50s population has naturally decreased even more.
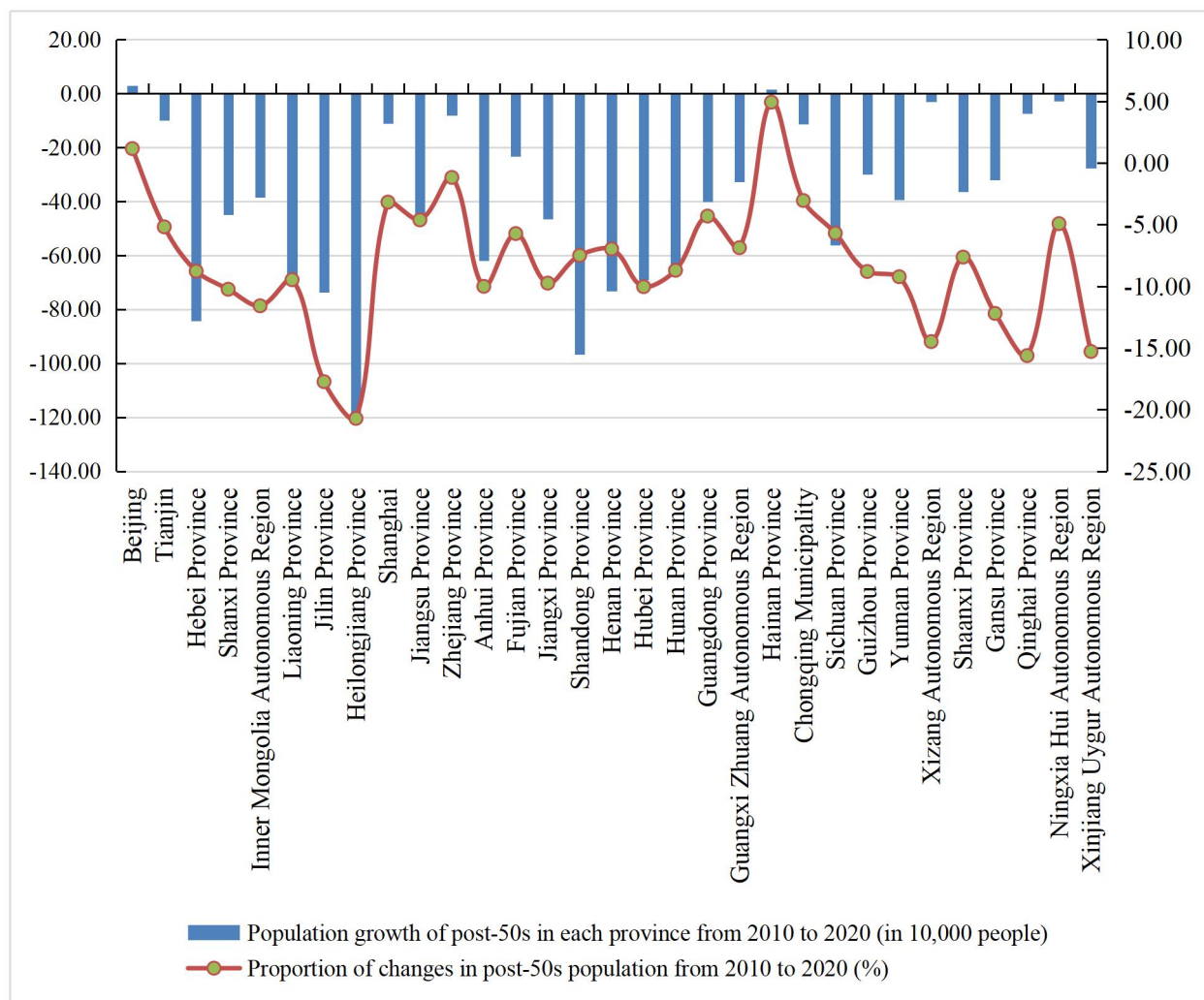

Figure 12. Changes in the post-50s population in various provinces from 2010 to 2020
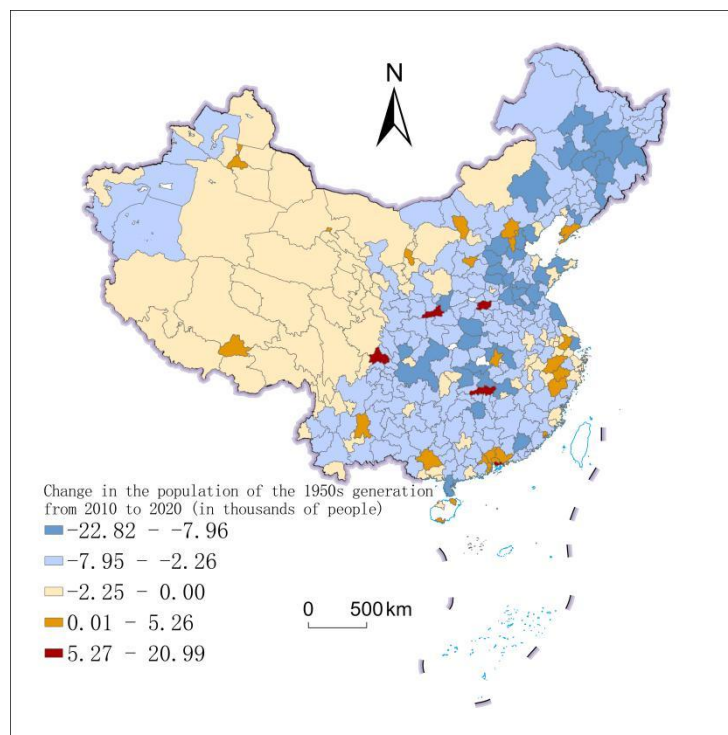
Figure 13. Changes in population after 50 from 2010 to 2020

Note: This map is based on the standard map with the review number GS(2023)2767 downloaded from the Ministry of Natural Resources' Standard Map Service website, and the boundaries of the base map have not been modified.The data for Taiwan region, China is not included in the map.

4.8. 50 Before: Life Expectancy Varied Among Provinces, and the Number of Elderly People Decreased More in Less Developed Areas

The pre-50 age group includes people of all ages born before 1949, who have all retired since 2020. Population changes are largely dependent on life expectancy in each province. The first 50 years saw a greater decline in population in economically underdeveloped and poor living conditions, where life expectancy was relatively short and the proportion of the elderly population decreased was relatively high.
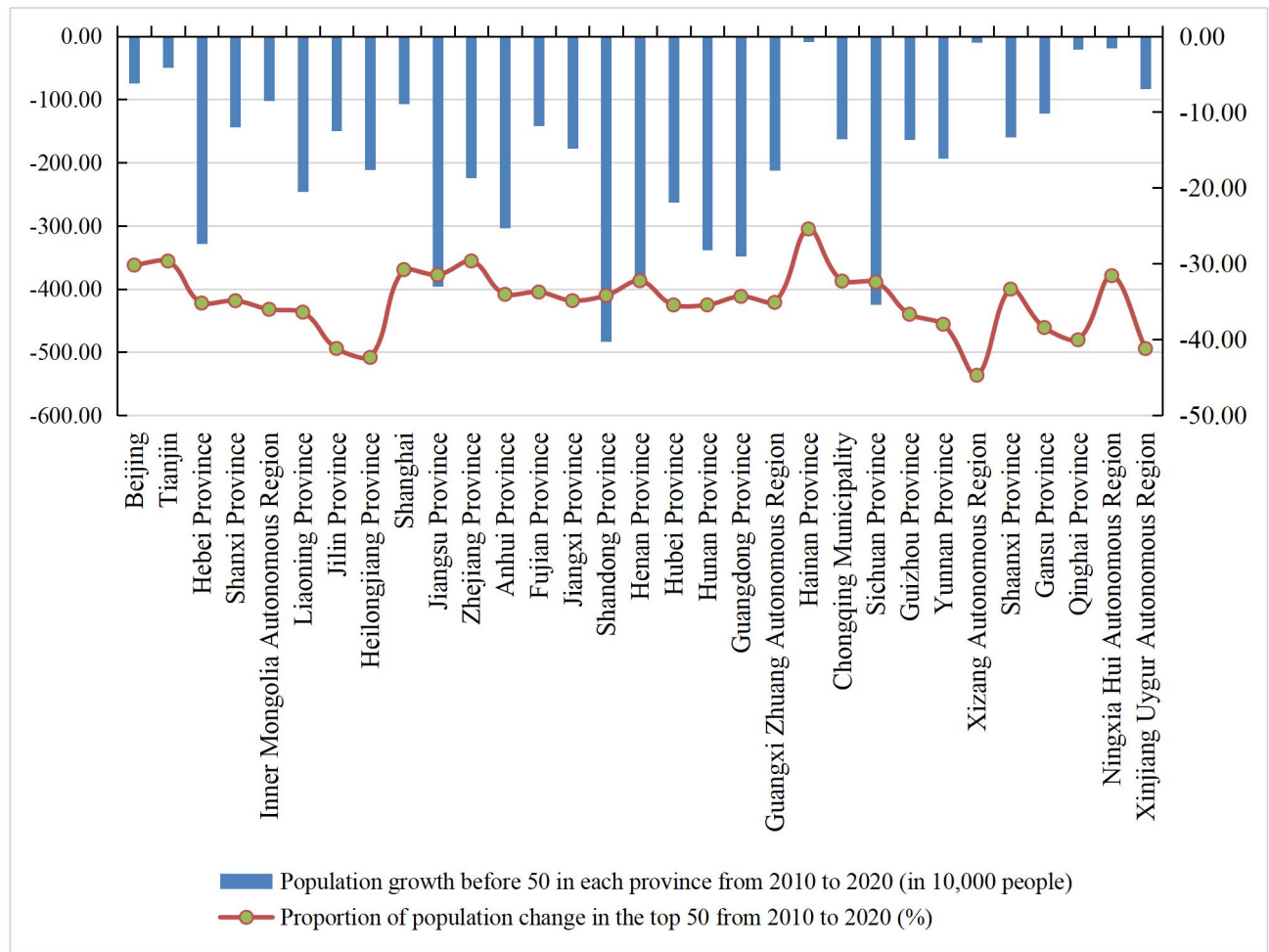
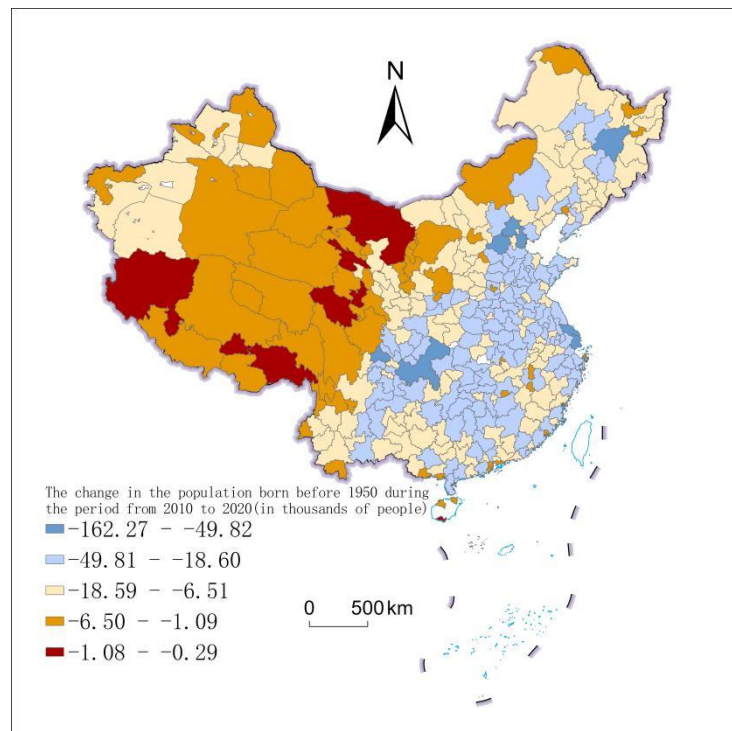**Figure 14. Changes in the population of the top 50 in each province during the period from 2010 to 2020**

Figure 15. Changes in population before 50 from 2010 to 2020

Note: This map is based on the standard map with the review number GS(2023)2767 downloaded from the Ministry of Natural Resources' Standard Map Service website, and the boundaries of the base map have not been modified.The data for Taiwan region, China is not included in the map.

5. Points The Trend Pattern Of Population Movement

According to the survey, the main groups of population mobility in China in the foreseeable future include the following groups. Under the influence of population age changes and economic conditions, these groups have their own characteristic patterns of mobility. These are sorted out one by one through the investigation.

5.1. Young People with High Knowledge: Not Knowing "Where to Settle Down", Possibly "Sinking Ineffective"

Highly educated people are the key group that determines industrial upgrading, including high-end services, technological innovation and other fields. The goal of industrial upgrading can only be achieved when talents are combined with the corresponding cities. The previous generation of highly educated people basically benefited from the reform, entering the industry early, buying houses early, and having a high social status, and there was basically no major migration. The new generation of educated young people face more difficulties in life. Whether they are post-80s, post-90s, or future graduates of post-00s, they all face high housing prices and high competition to varying degrees. These people are prone to mobility due to the external environment. Study the mechanism and pattern of future mobility of this group:

First, first-tier cities will also attract top talent, and only first-tier cities will be able to bring top talent into play for the next 10 years. Top talents will still flow to megacities such as Beijing, Shanghai, Shenzhen and Guangzhou. At present, only first-tier cities in China have the ability to organize production and the transformation of scientific and technological achievements. Second-tier cities do not have mature business and research environments, and real innovation activities will be difficult to occur in the vast majority of second-tier cities.

Secondly, due to the cost of living, there will be a large number of highly educated people moving to second-tier cities. This phenomenon has been happening since 2016. Cities such as Suzhou, Nanjing, Hangzhou, Dongguan, Yiwu and Wenzhou, which are located along the coast, have strong economic vitality. Although they are smaller in scale than first-tier cities, they can also play the role of talents if they match their specialties. In contrast, although the provincial capitals in China are large in size, the actual economic environment is not yet in place, and highly educated people return to work in public service, education and medical care rather than in departments related to economic development. It is almost impossible for the talent advantage to turn into an innovation advantage in the short term.

Thirdly, young intellectuals' demands for quality of life are gradually increasing, and the demand for talent is increasingly disconnected from the actual conditions of first-tier cities. Especially for the post-95s generation, they do not accept a crowded and poorly equipped living environment. They need not only work but also life, and in contrast, "life is more important". This creates a serious contradiction: highly educated people "don't know where to settle down", first-

tier cities face high housing prices, and second-tier cities don't have enough room for development.

5.2. Young Ordinary College Students: Concentrate in Second-Tier Cities, or take up Positions Within the System at all Levels of Counties and Cities

This group is mainly composed of graduates from regular universities and is a fundamental but not leading force in the social economy. The group is large in size, has a white-collar lifestyle, lacks the knowledge of top white-collar workers and the technical barriers of senior blue-collar workers, and is among the most likely to lose their jobs when the economy fluctuates. From the perspective of demographic changes, about 40 percent of the younger generation belongs to this group, which is also the main group of so-called "difficult employment for college students". Study the mechanism and pattern of their future mobility:

First of all, this group of people will hardly go to cities below the second tier at the moment, and if they do, they will take up positions such as public servants, teachers and doctors. There aren't many cities suitable for this group to live in, either big cities or public institutions. Because there are few "white-collar" jobs in third-tier and lower-tier cities, the group can only move and concentrate in cities above the provincial capital. This group is also a major force in the civil service and public institution examinations. Many of them see getting a job as an important life goal and do not have high aspirations in their professional fields.

Second, these people in first-tier cities are moving out in large numbers, even those who have settled down have the intention to move out. First-tier cities are suitable for highly educated people to strive for. For ordinary college graduates, there is no particular difference between the platforms in first-tier and second-tier cities, and it is not mandatory to stay in first-tier cities. At the same time, the high housing prices and high cost of living in first-tier cities are forcing these people to settle in cities with better living conditions and more "value for money".

Thirdly, if a "new track" emerges, this group of people will be an important force in following the "new track" and will choose their future workplace along with it. Like the previous "new track" in China, the main players in the Internet and real estate sectors are the same group of people, except that the post-70s and post-80s have been replaced by the post-90s and post-00s today. If the new track is in second-tier and lower-tier cities, the population will move along with the industry. If the new track is in first-tier cities, it is not ruled out that there will be corresponding conversion bases on the periphery of first-tier cities in the future to accommodate the large number of employed groups.

5.3. Professional and Technical Population: Flowing Into Cities with Advantages in Industrial Clusters, Requiring Full Family Living Support

Professional and technical workers are the main group of manufacturing workers in the era of innovation and are an important foundation for China as a manufacturing power. In the previous stage, industrial workers in China were mainly unskilled ordinary workers. As China's economy enters an innovative development stage, industry will shift from the "ordinary worker era" to the "skilled worker era". Many skilled workers have graduated from vocational schools, undergone professional training and technical positions, and have a relatively high industry threshold;

Thirdly, the income of skilled workers is not low. In many industries, the monthly salary of senior blue-collar workers can exceed 20,000 yuan, which is much higher than that of ordinary white-collar workers. Study the mechanism and pattern of their future mobility:

First of all, this type of people will only flow to work in cities with corresponding technical positions, including big cities and corresponding professional cities. Specifically, second-tier metropolises are larger in size, offer more opportunities for skilled workers to find jobs, and the housing prices in inland second-tier cities are not fully beyond their affordability. In addition to second-tier cities, they tend to choose industrial cities where specialized industrial enterprises are concentrated. For example, many skilled workers in the automotive field tend to flow into cities where the automotive industry is well-developed.

Second, skilled workers need to reach a certain threshold scale of enterprises in the same industry when choosing the inflow city. The reason is that skilled workers often live with their families, and the cost of moving is relatively high. When choosing a city to settle, these people should take into full consideration the potential opportunities of future "technological development" and "job-hopping", and the city should have a large enough market for similar jobs. In this way, there will be technological progress at work, and it will be easier to have new options when the company changes. This puts inland counties and cities with poor industrial foundations at a significant disadvantage in future talent competition, while industrial cities in the Yangtze River Delta and Pearl River Delta will face sustained industrial agglomeration advantages.

Thirdly, skilled workers need a "family-wide" living environment, and thus traditional industrial parks need to transform. Skilled workers have very high requirements for their living environment. Because of their families, they often need a mature urban environment for the entire family. The income of highly skilled workers is relatively high in general industrial cities. They need a quality environment in their lives and cannot be viewed from the perspective of traditional "migrant workers". Most industrial parks, however, remain stuck in the old mindset and fail to recruit workers, always thinking that "young people are not willing to endure hardships", without recognizing the changes in living needs in the era of skilled workers.

5.4. Urban Basic Blue-Collar Workers: More Flow to Local Big Cities to "See The World" in Other Places when They are Young

Workers in basic social work, but the internal structure is changing rapidly. This group includes construction workers, sanitation workers, restaurant waiters, hourly workers, etc. They are characterized by low incomes, no obvious technical barriers, and a large population. Due to the continuous upgrading of the social education structure, the proportion of these people is generally lower with the younger generation. Young people, due to the "white-collar" nature of their living habits, are mostly reluctant to take up such basic jobs. This leads to a higher proportion of such jobs among middle-aged and elderly people. Examine the mechanism of future mobility:

First, the movement of this group of people is mainly driven by economic factors, and they are relatively more willing to move closer to home. Because the technical content of the job is average, there is not much difference in working in different cities, so they prefer to be closer. But

if there are good opportunities in the distance, they are also willing to work there. For example, cotton picking in Xinjiang has brought in a large number of such people from Sichuan.

Second, because there are more job opportunities in big cities, they are more willing to work in big cities in their hometowns. These people, due to their lower educational attainment, have a lower chance of getting into civil service or public institutions and are engaged in market-oriented jobs. Big cities tend to offer more job opportunities, such as running errands, cleaning, moving, and being a security guard, and the prices of old second-hand houses in inland cities are not unacceptable. By contrast, cities like Beijing and Shanghai will only be options for them to "see the world" before the age of 30, and they will hardly settle down.

5.5. Older Generation of Migrant Workers: Gradually Return to Their Hometowns to Retire and May Continue Working Before Retirement

These are the first generation of migrant workers, with a lower level of education. Most of them have been engaged in manual labor for a long time and have relatively weak labor skills. From the perspective of The Times, with the upgrading of industries and the advancement of technology, there are fewer and fewer suitable positions left for them, leaving only cleaning and security positions. From their personal perspective, they are approaching retirement age and their children have grown up, so there is little point in continuing to strive. Since there is no pension in this group, only some people have prepared for their old age in advance, while others can only continue to work. Study the mechanism of their future mobility:

First, a considerable number of people choose to retire in their hometowns. Some retire in rural areas of their hometowns, while others retire in county towns. The statistics show that many people in the central and western regions have chosen to return to their hometowns, and there is a statistical trend of "population return". A significant portion of the returning population are these older "first-generation migrant workers". A decline in physical strength and a lack of technical skills are important reasons for returning home. Some people built houses in villages (towns) in advance, or bought commercial housing in county towns in their early years, leaving a way out for life. It should be noted that the return of these people does not provide the impetus for economic growth in their hometowns, and it should not be misjudged that "population return" is a sign of "economic rise". The return of the elderly will further increase the demand for elderly care at the grassroots level.

Second, some people continue to work in coastal cities, moving due to the uncertainty of their jobs. These older workers, due to the changing environmental requirements of the industries they work in and their own physical conditions not being able to handle physical work, are largely facing the problem of re-choosing employment. Due to their age and difficulty in learning new skills, they face great uncertainty in their future job options and are likely to drift along with job opportunities. There are two options for future mobility. One is to live in a big city with more job options, but the quality of life will be lower in old age. The other is to choose a light physical job in a familiar city (hometown county) in exchange for a relatively better life.

5.6. Rural Left-Behind Population: More Elderly People are Moving to Cities for Retirement, While Fewer School-Aged Children are Moving to Cities

The reason why it is called rural "left-behind population" is that the rural labor force has largely moved to cities, and "young people have mostly gone out". Even in provinces like Henan and Shandong where township enterprises are well developed, it is mainly the elderly who work in factories. So the people who will move from rural areas to cities in the future will mainly be the "left-behind population", and the left-behind population will basically consist of two groups: the elderly and children. Study the mechanism and pattern of their future mobility:

One is children going to the city to study, but this motivation is bound to weaken gradually. "Education urbanization" is the demographic mechanism behind the rapid advancement of county-level local urbanization in the previous stage. The reason is that the integration of educational resources in the previous stage removed all rural primary schools, making school-age children have to go to cities for education. But this effect is bound to be short-term. Due to the significant decline in the number of rural children in stock and the sharp decrease in the number of children in the new generation, the scale of children entering cities will gradually decline in the future.

Second, the trend of elderly people moving to cities for retirement will gradually intensify, and the pressure of elderly care in county towns will increase significantly. The previous generation of retired farmers are mostly those born in the 1950s. Most of them have not lived outside the countryside for a long time and have a strong dependence on the countryside where they have lived all their lives. Nowadays, retired farmers are gradually turning to the 60s generation, many of whom have worked outside and have seen the world as the "first generation of migrant workers" since the reform and opening up. Rural retirement is just one of their options. Many of them have houses in county towns and towns, so the number of those who move to the city for retirement at a certain age is bound to increase.

Thirdly, there is still a certain non-agricultural amphibious population in rural areas, and their future mobility is uncertain. These people are mostly born in the 1970s, but their jobs are largely unrelated to agriculture, such as logistics, agricultural technology promotion, small businesses, vegetable transportation, etc. Some of these people live in rural areas and some in urban areas, so they belong to the "amphibious group". In the future, as the rural population continues to age and the agricultural structure undergoes deeper changes, these people may play a more significant role in rural areas.

5.7. General Residents in the Central and Western Regions: all want to Move to the Provincial Capital. It All Depends on The Economic Situation

This group mainly consists of families with a certain economic foundation, and the family income is not closely related to the location. There is a considerable number of such families in the Midwest, and their purpose of mobility is clear: to move to larger cities and receive better living conditions, education and medical care. These families tend to move in a gradient based on their economic conditions. Those with better conditions first move to well-educated prefecture-level cities, and those with better conditions move to provincial capitals. The further inland the

province, the stronger the "provincial capital sentiment" of the residents, and most families would like to move to the provincial capital if their economic conditions permit.

5.8. "New Farmers" Going to the Countryside: Demand for Agricultural Jobs Will Increase Significantly, but the Source is Questionable

New farmers: The concept of new farmers (i.e. new-type farmers) was first proposed at the Fifth Plenary Session of the 16th Central Committee of the Communist Party of China in 2005 and is defined as a group "with cultural literacy, technical mastery and business capabilities". In 2006, the "Several Opinions of the Central Committee of the Communist Party of China and The State Council on Promoting the Construction of a New Socialist Countryside" (i.e. Central Document No. 1) set the strategic goal of "cultivating new-type farmers with cultural, technical and business capabilities". The concept of new farmers goes beyond the traditional household registration category, including returning migrant workers to start businesses, urban residents engaged in agriculture in rural areas, and agricultural technology management and service personnel, etc. (Li and Yang,2025). New farmers are the "successors" of older rural farmers and will be the main group for future "rural revitalization". As the rural population is already aging across the board, the trend of new people taking over is already very obvious. In the next 10 years, a large number of agricultural workers will be needed, and they will be new farmers who master new technologies. In the "rural revitalization" strategy, traditional farmers are old and have a low level of education, making it difficult to rely on them to fulfill the multiple tasks of rural development. The future of rural areas will surely depend on "new farmers".

The source of the new farmers: The post-70s generation can make the transition, and the younger generation is the hope for the future. There are two potential sources of new farmers: one is the post-70s people currently in villages and towns, some of whom can be trained to join the agricultural system, but these people will surely retire in the future, which is not a long-term solution. The real solution is to train the younger generation and develop agriculture as a "new track" with high added value and high income. From Japan's experience, it can be seen that agricultural technicians earn significantly more than industrial technicians, and agriculture is not unattractive as long as it is modernized.

6. Future Judgments: Long-term Judgments on Changes in China's Population Pattern

At the national level: The trend of population moving from relatively underdeveloped areas to developed areas and from rural areas and small and medium-sized cities to leading cities remains obvious. But in the process, there is differentiation among different groups of people, and there is also the movement of people returning home. The "homecoming wave" in most areas is the result of the retirement of the first generation of migrant workers and does not mean that inland cities have become more attractive. Instead, in the era of innovation, cities rich in innovation resources have a greater advantage and are more attractive. As the country's urbanization enters the "zero-sum race for population" stage, most cities inevitably face population contraction, and a large number of urban construction and infrastructure facilities also face contraction.

First-tier cities: The population will continue to grow in the future, but it will mainly attract high-end talents. The appeal of these cities to top talents, senior white-collar workers and innovative talents is irreplaceable by other cities and will be the leaders of innovation in the future. These cities have a strong appeal to people from all walks of life, but due to high housing prices, a large number of young people find it difficult to settle here. So the long-term vitality of first-tier cities may be affected, but the gap between them and other megacities is huge and they will play the role of an "ecological niche" for attracting top talent for a considerable period of time. The main problem is how to accommodate the influx of intellectuals under the policy of high housing prices and population restrictions.

Second-tier cities: The population will continue to expand, the population structure is relatively complex, and there is a significant trend of talent return. These cities will remain attractive in the long term, and there will be considerable room for growth. The reason is that the cost of living in these cities is not high, and they attract a diverse population including people who are improving their living conditions within the province, general skilled workers, and returning educated people. The insufficient carrying capacity of cities can be supported by the form of metropolitan areas, but the trend of concentration is still obvious. As the advantages of provincial capitals continue to accumulate, the "provincial capital dominance" will only further polarize, and there will be no trend of "balanced distribution". It is worth noting that the "stock of talent" in these provincial capitals is several orders of magnitude lower than that in first-tier cities, and there will be no overtaking of talent reserves in the foreseeable future.

Cities within the first-tier regions: may maintain strong economic vitality and certain attractiveness. Including all kinds of cities outside the coastal first line, which have different administrative levels but all have strong economic vitality and have a place in the international market economy environment, and the level cannot be simply judged by size. Cities like Yiwu and Wenzhou, which are not first-tier cities, have already gained international influence. The characteristics of these cities in attracting population inflow: generally, there is less inflow of science and technology innovators in universities, but the accumulation of talents in applied research fields is not weak, and many cities have independent innovation capabilities; There will be cultural and dialect barriers for outsiders to enter the city, so the scale of the city will not grow very large, but there will be no shortage of senior professionals in the field.

General cities: The main task is to compete for "skilled workers", and there will be a high degree of differentiation among cities. These cities do not have the appeal of provincial capitals, do not avoid the living migration of people to provincial capitals, and do not avoid young people chasing the future in megacities. Their main economic base is industry. A strong industry can bring the population to over a million, while a weak industry can easily reach the ceiling. Its future development direction is to attract a group of specialized skilled workers and promote the upgrading of manufacturing. The difference from manufacturing in the past is that skilled workers are selective about cities. They prefer to work in places with a high degree of enterprise cluster (which is convenient for changing jobs), well-developed living facilities (which can support families), and close to home (which is convenient for taking care of the elderly). Cities that can

meet the needs of skilled workers can achieve industrial upgrading; otherwise, they may fall behind in this round of development.

General county: The elderly return to their hometowns mostly to the county level, which will take on the important responsibility of providing for the elderly. Most of the people flowing out of the county are young and middle-aged laborers, while those flowing down or in are mostly elderly people. The population structure of the county is rapidly sliding towards an "inverted pyramid" pattern. If we look back 10 years, the ratio of the working-age population to the elderly population in many counties may drop from 4:1 to 2:1 or even lower. Overall, the population is gradually decreasing, the proportion of the elderly population is gradually increasing, and the younger people are leaving more. In the future, the county-level labor force will continue to shrink, especially the shortage of young and high-quality labor force, which makes it difficult for most counties to achieve industrial upgrading and they are likely to shift to the functions of county towns mainly for elderly care.

Townships: Due to the scarcity of women of childbearing age in rural areas, there will be a significant reduction in rural students in the future, and the demand for education in a large number of townships will decrease. According to statistics, due to factors such as the increasing outflow of rural population and the influence of fertility concepts, the number of rural women of childbearing age is bound to continue to decline, and the number of primary school students in county-level units has decreased by 35% compared to 20 years ago. The status of women in rural areas has been rising, and women naturally support having fewer but better births. Fathers in rural areas have less control over their children than those in urban areas, and they have less control over their offspring. "Cities are crowded, towns are weak, and rural areas are empty" is the current situation of compulsory education schools across the country. With the decline in the number of new students, a large number of rural schools will disappear completely. In the future, there will likely only be one central primary school in the location of the town government, and all junior high school students will have to attend school in the county.

In general rural areas, as the elderly gradually retire, agricultural safety forces "new farmers to go to the countryside". With the overall decline in China's population and the aging of farmers, the population decline in agriculture will accelerate further. According to field research, China's rural areas are already highly aging, with nearly half of the population being over 60 years old. By extrapolation based on the current population structure, the population engaged in traditional agriculture will significantly decline by 2035, and in many places there is even a possibility that the population engaged in agriculture will "drop to zero". Under this "once-in-a-millennium change", the risks in agriculture will increase significantly, and a new group of people will need to go to the countryside to engage in future agriculture. Considering that the post-80s and post-90s generations from rural areas have matured in society, and they wouldn't have been able to farm in the first place. In the future, it might be the newly trained professional farmers of the post-2000s and post-2010s who have mastered new technologies and are highly modernized.

Combining the data from the sixth national census in 2010 and the seventh national census in 2020 to analyze the evolution of population patterns by age groups and the flow patterns of classified populations, the following conclusions are drawn: Based on the data from the sixth and

seventh national censuses, it was found that the provinces with a relatively high proportion of post-10 distribution include less developed provinces such as Guangxi Zhuang Autonomous Region, Guizhou Province and Henan Province, as well as Shandong Province, which has a strong fertility concept in the eastern provinces. The post-2000s population has increased in Guangdong Province, Zhejiang Province, Fujian Province and Jiangsu Province. The post-90s generation is highly concentrated in developed regions. Beijing and Shanghai saw a doubling of growth, while the eastern developed provinces such as Jiangsu, Zhejiang and Guangdong, as well as resource-based provinces like Xinjiang Uygur Autonomous Region and Tibet Autonomous Region, saw significant growth. The post-80s and post-70s generations have moved to coastal areas as well as Chongqing-Guizhou, Xinjiang Uygur Autonomous Region, Ningxia Hui Autonomous Region and Tibet Autonomous Region. They have left Beijing and Shanghai, where the cost of living is high, and have significantly left Henan Province, Hunan Province, the three northeastern provinces and Inner Mongolia Autonomous Region. The number of people born in the 1960s has increased in Sichuan Province, Chongqing Municipality and Zhejiang Province, decreased in Ningxia Hui Autonomous Region, Xinjiang Uygur Autonomous Region and Guangxi Zhuang Autonomous Region, and decreased significantly in less developed provinces such as the three northeastern provinces, Inner Mongolia Autonomous Region and Shanxi Province. The number of people born in the 1950s in the three northeastern provinces, Inner Mongolia Autonomous Region and Gansu Province also decreased significantly. Summarizing the movement patterns of different groups of people, young and highly educated people mainly flow to first - and second-tier cities; Young ordinary college students are concentrated in second-tier cities or positions within the system in counties and cities at all levels; Professional and technical workers flow into cities with industrial cluster advantages; Urban blue-collar workers are more likely to flow to local big cities; Older migrant workers are gradually returning to their hometowns to retire; Rural left-behind people move to cities; The general living population in the central and western regions moves to provincial capital cities; "New farmers" go to the countryside. Make judgments on future population trends by combining the movement patterns of different age groups and groups of people. At the national level: The trend of population moving from relatively underdeveloped areas to developed areas and from rural areas and small and medium-sized cities to major cities remains obvious. First-tier cities: The population will continue to grow in the future, but it will mainly attract high-end talents and other groups will move out. Second-tier cities: The population will continue to expand, the population structure will be relatively complex, and there will be a significant return of talent. Cities within first-tier regions: may maintain strong economic vitality and a certain level of demographic attractiveness. General cities: Competing for "skilled workers" is the main task, and there will be a high degree of differentiation among cities. General county town: Many elderly people return to their hometowns, and county towns will take on the important responsibility of providing for the elderly. Townships: Due to the scarcity of women of childbearing age in rural areas, there will be a significant reduction in rural students in the future, and the demand for education in a large number of townships will decrease. General rural: The elderly are gradually retiring, and agricultural security is forcing "new farmers to go to the countryside".

7. Discussion

Combining the data from the sixth national census in 2010 and the seventh national census in 2020, analyze the evolution of population patterns by age group - post-00s, post-90s, post-80s, post-70s, post-60s, post-50s, and pre-50s - and categorized groups: young high-knowledge population, young ordinary college students, professional and technical population, urban basic blue-collar workers, older generation migrant workers, rural left-behind population, average in central and western regions The living population, the flow pattern of "new farmers", and make a qualitative judgment on the future flow trend of the population.

7.1. Human Resources: We Should Attach Importance to Top Talents and Strengthen the Training of Talents in New Industries

Given the trend that young highly educated individuals mainly flow to first-tier cities, talent is the key to technological innovation.Talent is the key to independent innovation, and top talent is irreplaceable. Support industry enterprises in developing and training high-tech and skilled talents, actively coordinate various resources, increase financial and personnel input, and focus on the industry's shortage of highly skilled talents for joint training. We will promote the development of talents in emerging industries and promote the integration of industry and education in a coordinated manner. We should do a good job in vocational education for rural areas and cultivate a new type of rural workforce. Improve relevant policies and subsidies for talent introduction, focus on key issues such as children's education, medical care, old-age care and household registration that are of concern to high-quality talents in the inflow areas, improve the ecological environment quality of cities, build beautiful and livable cities, and solve the long-term residence concerns of talents.

7.2. In the Field of People's Livelihood: Attach Importance to Elderly Care at the Grassroots Level and "Fertility-Friendly" in Large and Medium-Sized Cities

In response to the increasing aging population, some elderly people have returned to their hometowns for retirement, and the grassroots elderly care service system has been improved to effectively guarantee people's livelihood. At present, China has achieved a moderately prosperous society in all respects, but it has also entered an aging society. The number of elderly people is increasing day by day, especially in rural areas, where the proportion of people aged 65 and above exceeds 25 percent, and the proportion of people aged 50 and above exceeds half, putting great pressure on grassroots elderly care. With the shrinking of family size, the importance of grassroots care has become increasingly prominent and has become a new focus of basic livelihood. However, there is still much room for improvement in the quality of elderly care services at the grassroots level, especially due to factors such as the influence of traditional elderly care concepts, the singularity of elderly care models, and the lack of elderly care institutions. Understand the needs of the elderly and increase humanized services, establish innovative elderly care models and intelligent elderly care facilities, increase investment in grassroots elderly care construction, enhance the elderly care experience, improve the elderly care level, so that the elderly can truly enjoy their old age, have access to medical care and be well cared for.

In response to the current low fertility rate, the increasing aging and negative population growth have made us pay more attention to building a fertility-friendly environment in large and medium-sized cities and establishing fertility-friendly communities. Actively support the overall coordination and effectiveness of fertility policies, especially strengthening the guarantee of women's career development, shaping a new family culture of appropriate age for marriage and childbearing, intergenerational harmony, gender equality and shared responsibility between husband and wife, establishing and improving welfare policies to enhance the resilience of family development, and taking multiple measures to reduce the costs of childbirth, child-rearing and education; At the same time, we will vigorously develop a universal public service system for infant and toddler care, improve maternity and parental leave systems, promote inclusive and equitable development of education, comprehensively improve children's growth communities and municipal physical Spaces, take more measures to benefit people's livelihood and warm people's hearts, enhance social equity and sense of gain, effectively address public concerns about not wanting to have children and not daring to have children, and enable more families to enjoy the benefits of the fertility policy. This will help China achieve a moderate fertility rate and promote long-term balanced population growth.

7.3. Develop a "Tailored to Local Conditions" Development Strategy Based on the Characteristics of Each City

Different age groups and types of floating population choose different directions of movement. Post-2000s and post-90s prefer big cities, while post-80s and others are not limited to big cities due to issues such as the cost of living in big cities. With industrial transfer and policy support, the number of people moving to small and medium-sized cities is also increasing, and cities of different sizes have different levels of development. Therefore, policies should be tailored to different levels of cities, and local conditions should be taken into account to help the floating population stay in the cities and improve the convenience of their lives in the inflow areas.

Different age groups and types of migrants have different preferences for inflow cities. For megacities and large cities, where capital, technology, talent and information are concentrated, infrastructure is relatively complete and the population is dense, it is necessary to give full play to the dispersion function and the radiation and driving effect, and disperse the migrants through the establishment of satellite cities and industrial transfer. At the same time, large cities have better infrastructure and public services and relatively higher housing prices. Measures such as easing restrictions on household registration, providing preferential housing policies, increasing the proportion of affordable housing and public rental housing can be taken to reduce the housing burden of the floating population. We will continue to promote educational equity and increase the proportion of medical insurance contributions for the floating population to solve their concerns about education and medical care. We will continue to beautify and improve the living environment and enhance the livability of cities. For small and medium-sized cities, it is necessary to gradually improve their economic, educational, medical and cultural levels, improve the quality of the environment and the level of infrastructure construction, increase the wage level of the floating population, and promote the long-term residence of the floating population in the inflow area. We should do a good job in cultivating local professional and technical talents,

improve the talent introduction policy to ensure that talents are retained, promote the optimization and upgrading of the industrial structure, attract more enterprises to settle in, improve the employment level and structure of the migrant population, provide more job positions and meet the employment needs of more labor force. Some small and medium-sized inland cities also show greater appeal to the floating population. We should promote the transfer of industries to regions with convenient transportation, good resource endowment and strong environmental carrying capacity, make use of local resource advantages to build characteristic and advantageous industries, improve the efficiency of government services, attract enterprises to settle through measures such as tax incentives and creating a fair competitive market environment, and improve business environment services. Build a modern transportation system, pay attention to the demands of the floating population, retain the local population, improve social security and public services, and do a good job in the subsidy policies and supporting services for talent introduction to accumulate demographic dividends for local development.

In 2023, the proportion of people aged 60 and above in China reached 21% (297 million), with a rapid aging process. Developed countries such as Sweden and France have gradually increased their fertility rates through welfare policies (childcare subsidies, extended maternity leave). China only fully liberalized the two-child policy in 2016 and the three-child policy in 2021. It completed the industrialization process that took developed countries a hundred years in just 30 years, leading to a concentrated outbreak of conflicts between fertility concepts and economic pressures (housing and education costs). The average age of first childbirth for urban women has increased from 23 in 1990 to 28 in 2022. The rural fertility rate (about 1.5) is still higher than that of urban areas (1.0), but the influx of rural migrant workers into cities has accelerated the convergence of fertility intentions, which is different from the pattern of continuously expanding fertility rate differences between urban and rural areas in developing countries like India. In contrast to Nordic countries where public childcare coverage reaches 60%, Chinese families bear 90% of the childcare costs, which suppresses fertility intentions. In 2023, the enrollment rate of children aged 0-3 in childcare centers in China was only 5.5%. China's sex ratio at birth has long exceeded 115 (the normal range is 103-107), and it was still 111.3 in 2020, resulting in a cumulative 30 million "leftover men", which is particularly prominent in the East Asian cultural circle (such as South Korea and Vietnam). Intergenerational mutual assistance under Confucian culture (such as "grandparent childcare") has partially alleviated the pressure of low fertility rates, but it has also led to the younger generation's reliance on parental resources (home purchase, childcare), forming a contradictory cycle of "needing to be supported by parents" and "pressuring to have children", which is different from the low fertility model in Western individualistic cultures. It is necessary to address the combined effects of policy legacies (gender imbalance, fragile family structure) and market pressures (high childcare costs). Population transformation needs to be advanced in tandem with economic development and social security. A composite model of "policy incentives + public services+cultural reshaping" should be explored to avoid falling into the "low fertility trap" like Japan and South Korea.

At present, the analysis of the internal mechanism of the population pattern is still at a relatively superficial level. In the future, we should start from the perspective of life, strengthen

field research, truly understand the problems faced by people of different age groups, and put forward more practical and effective policy suggestions. In addition, the future trend of the population presented in this paper is limited to qualitative research and does not combine quantitative models for more rigorous prediction. Further research on population prediction should be strengthened, and variables should be scientifically and reasonably set up so as to provide more feasible suggestions for urban development and infrastructure investment.

In the past, academic research focused more on analyzing a certain group of people and less on analyzing the evolution of population patterns by age groups.The main issue of this study is to analyze the evolution of population patterns across different age groups and different types of people.Analyze the evolution of the population pattern from a more detailed perspective.

8. Conclusions

Combining the data from the sixth national census in 2010 and the seventh national census in 2020 to analyze the evolution of population patterns by age groups and the flow patterns of classified populations, the following conclusions are drawn: The 20th National Congress of the Communist Party of China emphasizes promoting coordinated regional development and advancing a new type of urbanization centered on people. To better understand the evolution of the population pattern and the mechanisms behind it, GIS statistical analysis and mathematical statistical analysis were used. Combined with the data from the sixth national census in 2010 and the seventh national census in 2020, it was found that the overall trend of population growth was mainly concentrated in the eastern developed provinces such as Beijing and Shanghai, Jiangsu Province, Zhejiang Province and Guangdong Province. There was also a significant increase in resource-based provinces such as Xinjiang Uygur Autonomous Region and Tibet Autonomous Region, while the population in less developed provinces such as Henan Province, Gansu Province, the three northeastern provinces and Inner Mongolia Autonomous Region decreased significantly. The notable changes in the population pattern of the post-80s and post-70s generations are that some of them are moving out of Beijing and Shanghai, where the cost of living is high, and the post-60s generation is moving in to Sichuan and Chongqing. By group, young people with high knowledge mainly move to first-tier cities, but also to second-tier cities due to factors such as high housing prices and high living costs; Young ordinary college students are mainly concentrated in second-tier cities or positions within the system at all levels of counties and cities; Urban basic blue-collar workers are more likely to move to the local big cities; Older migrant workers are gradually returning to their hometowns to retire; The general living population in the central and western regions: all want to move to provincial capitals; The number of "new farmers" moving to the countryside is increasing. In light of the flow patterns of different age groups and groups, this article puts forward policy suggestions from aspects such as strengthening the training of professional and technical talents, attaching importance to grassroots elderly care and making large and medium-sized cities "fertility-friendly", and formulating development strategies based on local conditions to promote sustainable development of people and society.

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