

Yining Li
Qiuyun Zhao
Zhiqiang Cheng *Editors*

China's Road and Aging Population



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Preface

China's Road and the Employment Strategy of Population Aging



Yining Li

1 The Population Aging of China Has Become a Practical Problem That Merits Attention

In the 1980s and 1990s, when the reform and opening-up policy just came into effect, almost all economists, sociologists, and demographers held the view that with the abundant labor resources in rural areas, China would not be short of the labor force in the process of industrialization, as long as the peasant workers who egress from the countryside were fully mobilized. According to the standard formulated at the Vienna World Congress on the aging Problem in 1982, the percentage of old people aged 60 and above making up more than 10% of the total population marks the entry of the aging process. The aging population of China occupied 5% of the total population in 1982, which meant it was still an adult society.

However, the growth of the percentage of the aging population of China is alarming. This is probably, on the one hand, because of the omission in the demographic statistics in 1982; on the other hand, with the improvement of health care conditions in rural areas after the reform and opening up, the number of the aging population increased very fast; consequently, the percentage of the aging population continues to rise. According to the statistics, the percentage of the aging population amounted to 10% in 1999, marking the arrival of the aging society.

Furthermore, as the percentage of the aging population continues to increase, the increase in the number of older people aged 65 and above is growing faster after 1999. According to the statistics, by the end of 2015, the number of elderly people aged 60 and above was 222 million, which accounted for 16.1% of the total population, among which the number of elderly people aged 65 and above was 144 million, which accounted for 10.5% of the total population. This growth rate was very small across the whole world.

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Why is the growth rate of the aging population in China higher than that of most countries in the world? Almost all economists, sociologists, and demographers have pointed out that, the implemented population policy and its natural result, the “4-2-1” family mode, must be reformed. This family mode is one of the causes of aging. If the population policy is not adjusted appropriately, we can hardly meet the huge requirements of the labor supply or improve the living standard of the people. This is bound to be a huge obstacle to the realization of a moderately prosperous society and the building of a prosperous and strong China. The aging population has increasingly become an urgent problem for Chinese social and economic development and social stability.

2 Characteristics of Population Aging in China

One fact must be taken into account when we think of the countermeasures for the aging population of China, and that is, the characteristics of it reflect the status quo of China. These characteristics can be roughly concluded by the following five aspects.

First, rural areas have a higher proportion of an aging population than urban areas. According to the survey, this phenomenon was directly related to young and middle-aged migrant workers in rural areas from the 1980s to the first decade of the twenty-first century. These migrant workers would bring their spouses and children into cities when their working and living conditions improved. Thus, the number of young and middle-aged laborers and children in rural areas decreased. The old people were left behind, with some “left-behind women” and “left-behind children”. Consequently, the percentage of old people out of the total “left-behind” people has increased significantly (Jiang Chunli 2016).

Second, on the basis of region, the degree of aging population in the eastern regions is higher than that in the western regions. According to the survey, there are two main reasons. The first is health care services. The health care services in the eastern regions is, whether it is urban or rural areas, better than that in the western regions as a whole, which means that the old people in the eastern regions can have early treatment if they are sick and maintain health if they are not; hence, the long life population is larger. The second reason is that migrant workers are from the western regions. Although there are some young and middle-aged workers from the eastern regions migrating to work in the western regions, the number is much less than the number of young and middle-aged workers migrating from west to east. The natural result of this tendency is that the number of young and middle-aged workers in the eastern regions is larger than that in the western regions. In addition, when the working and living conditions of these young and middle-aged workers migrating from the west to the east improve, they tend to bring their family, including the old people, their spouses and children, together into the eastern cities; hence, their houses in the west become empty. In our investigations of Jiangsu, Zhejiang, Guangdong, Gansu, and Shaanxi Provinces, there are many migrant worker families migrating from west to east, but families seldom migrate from east to west.

Third, from the perspective of gender, the female aging population is larger than the male aging population. This is probably a universal situation. One reason is that male laborers, who shoulder much of the manual labor, are more easily injured or have accidents and tend to lead an irregular life. If they make wrong friends, they would even fall into bad habits such as excessive drinking, gamble, prostitution, and drug taking, which might render them weak and sick when they are old or even die early, leaving their spouses alone. In such cases, it is understandable that the female aging population is larger than the male aging population. What are the Chinese characteristics of the female aging population? According to investigations in some cities and towns in Shanxi Province, there were few opportunities for women to have education for a long time (including the Period of the Republic of China and the early period of the People's Republic of China); therefore, many women are illiterate, and they seldom participate in the activities conducted by the women organizations. This is very different from the old women in the southern Yangtze River regions.

Fourth, in terms of the health conditions of old people, the urban area is better than the rural area, and the plain area is better than the mountainous area, especially better than the remote mountainous area. Specifically, if we measure the health conditions of old people by city size, megapolis is the best, followed by medium-sized cities and small towns, and rural areas are the worst. Likewise, the health conditions of old people in rural areas depend on the levels of affluence in that area. This is understandable because this distinction is not only related to family income, the convenience of transportation of the family residence, and the convenience of hospitals but also related to the facilities and skills of medical workers in hospitals or clinics. Although the income of rural and urban residents is increasing and the medical conditions at the grassroots level are improving, the elimination of this distinction is a gradual and long process.

Fifth, as the total number of “empty-nest” families is increasing, the number of “empty-nest” families in rural areas is also increasing, although with less momentum than the increasing speed of “empty-nest” families in cities. Two reasons account for this phenomenon.

Reason One: The emergence of the “empty-nest” family is probably due to the large number of migrant workers, especially those migrant workers sent by enterprises who undertake construction projects in foreign countries; among them, many are unskilled workers, skilled workers, and technical and administrative staff. Very few of them bring their families along. If the send-away worker is the only child of the family, then there would form an “empty nest” family, namely, a family with the so-called “left-behind elderly”, “left-behind women” and the “left-behind children”. However, this situation is only temporary; once the contract expires or the projects finish on time, the workers come back home, and the “empty nest” family becomes normal again. If the enterprises sign a new contract and send more work force to foreign countries, a new circle of the “empty nest” family will appear again. Among the expatriate workers, skilled workers and technical and administrative staff are mainly recruited in urban areas; they usually take positions that require skills and expertise because unskilled workers can be recruited in foreign lands. The foreign side sometimes requests recruiting their local workers. Thus, enterprises sometimes

try their best to recruit local workers when the contract for outsourcing work is accepted and signed.

Reason Two: The emergence of the “empty-nest” family is also related to undergraduates and graduates who study abroad. Many of them would stay abroad when finishing their studies, whether it is to continue their studies or take positions in companies or universities. Thus, the older generation of the family becomes the only residents in the “empty-nest” family. Maybe after a short time, after retirement, they will emigrate abroad too. If they do not transfer possession of their houses in their homeland and come back home after spending a short time abroad, then they would form an “empty-nest” family again. Most of this kind of “empty nest” family are city residents. There are also students from rural areas who emigrate to live abroad, but the number is much less than those from cities.

In summary, the number of “empty nest” families with urban residency is doubtlessly much larger than that with rural residency.

3 A New Trend: The Improvement of Population Quality in the Process of Population Aging

How to deal with the advent of population aging is an issue of common interest in the fields of economics, sociology and demography. Before discussing the specific strategies, a new trend that emerged in the process of population aging merits our attention, that is, the improvement of population quality.

In the past ten years, the process of population aging and the general improvement of population quality have been parallel new trends since 2000. On the one hand, the number of elderly people continues to increase; on the other hand, there has been a fever for vocational and technical education, technical and management training classes, computers and surfing the Internet from cities to rural areas, from coastal to inland provinces. Many laborers and entrepreneurs are striving to learn more knowledge and advance their cultural and technical level. A revolution is taking place in the area of human resources in China; not only young people but also middle-aged people and even the elderly are involved in this revolution. This is a quiet revolution, and people who advance their cultural and technological knowledge are millions of different age groups, which is unexpected by many academics, but everyone is excited, feeling that the human capital revolution has come.

In rural areas, the revolution should be attributed to land right confirmation and land transfer. Because of the reform of the land confirmation right, the courtyard farm appeared, and the farmers felt satisfied and fulfilled, full of energy and motivated to turn the farmland into a high-yield and high-income farm; or step on the road of scale operation, of industrialization of agriculture and animal husbandry, through land transfer. Age is no longer a restriction for farmers to learn new knowledge and technology; some of them are old in age but have a high spirit of learning. They go to training classes, send their children to learn the techniques of farming, learn how to

surf online, how to improve varieties, how to be environmentally friendly, and how to sell homemade products. Age is no longer a restriction, but vigorous has become a new fashion.

Because of land transfer, some farmers leave the countryside to operate business in cities. The farms are either merged into a new type of cooperative organization, distributing dividends based on shares, or leased to other family farms to obtain rent. These farmers who are engaged in commercial and service industries have embarked on the road of self-management and increased their income. The land would not be deserted, farmers from other provinces would subcontracted the land and became tenant farmers.

A new name of “city returnees” has emerged in some cities and rural areas, which refers to the group of people migrating to work outside for several years and then returning to hometown. These people have been outside for years; they have learned technology, made friends and are sophisticated enough to understand the market rules and business practices; they have also accumulated some funds. However, years of migration and separation have produced “left-behind elderly”, “left-behind women” and “left-behind children”. Will this abnormal phenomenon continue? The wave of “returning to the hometown to start a business” hence came into being. These migrant workers are called “city returnees”. We conducted investigations on the entrepreneurs of the “city returnees” in Hanzhong, Ankang, and Bijie in Guizhou Province and made some new findings.

First, each region has its own characteristics. For example, in Hanzhong Xixiang County of Shaanxi Province, the local “city returnees” are busy with their tea gardens that produce tea with rich selenium, by which the pollution problem of local farmland is resolved. Xixiang is located on the south bank of the Han River, where the planting areas are formed. Since the South-to-North Water Diversion Project, Danjiangkou Reservoir has been built in the lower reaches of the Han River as the beginning of the South-to-North Water Diversion Project. To ensure clean water sources, chemical fertilizers and pesticides are prohibited in all rice fields along the Han River. Instead, tea trees that require not of chemical fertilizers or pesticides but farmyard manure are planted, and the produced tea is well-sold. In this way, the “city returnees” not only helped to solve the big problem of maintaining the water quality of the Han River, but also reunited with their families, thus creating the opportunity of both making a living and getting rich.

The famous scenic spot in Bijie, Guizhou Province, “Baili Rhododendron”, is a tourist attraction with beautiful scenery. Here, the business of “city returnees” is becoming increasingly prosperous, with “Farmhouse Accommodation” and “Farm Restaurants” everywhere. In addition, there are also groups of migrated workers setting up microenterprises after returning to their hometowns. We went to a microenterprise entrepreneurship park in Qixingguan District of Bijie, which is full of microenterprises established by migrant workers, including garment shops, fashion production factories and bakery. The owners were very excited and told us, “no one cared about us in the past. After the establishment of the microenterprise entrepreneurship park, the management committee is the organization that helps

us, they help us to develop and organize learning activities. This park is like a home for us."

Some auto repair shops and motorcycle repair shops operated by the "city returnees" have been built on both sides of the roads in Bijie. Since cars and motorcycles are constantly increasing, the car repair business is booming, and it is common for mechanic masters to lead apprentices. This is also a new phenomenon, from which we can see changes and development of cities and towns in outlying provinces in recent years.

There are articles and opinions in foreign countries holding that the "reform dividend" and the human capital of China have been exhausted, or declaring that China is a so-called "getting old before getting rich" country. In fact, these are superficial talks made without understanding the reality of China. China is a developing country, and the reform and opening-up policy has implemented nearly forty years since the 3rd Plenary Session of the 11th CPC Central Committee (1978), without which, China would not enjoy the current situation of a good economy and a stable society.

China has always insisted on the reform and opening up. The "reform dividends" of China are not exhausted and are constantly springing up with the deepening of reforms.

Population aging and the decrease in the number of "migrant workers" in China do not mean the exhaustion of human capital dividends. Practices has clearly told people that elderly human resource dividends still exist and that human capital is undergoing a huge revolution in cities and rural areas, coastal areas and inland provinces, which will eventually complete the transformation of human capital, and the new human capital will surely bring new human capital dividends.

The comment of "getting old before getting rich" also originated from knowing too little about the national conditions of China. "Not getting rich" is a fact, and there is no need to defend against it, because China has a large population. Despite the increased force for poverty alleviation, the growth of GDP per capita is difficult to raise because of the weak foundation and the expanding poverty-stricken areas. With the hard work of the past 40 years, China has finally developed into a country with middle- and upper-middle income. This is already a very incredible achievement, and the whole nation has the determination to work harder and strive to become stronger, and achieve the goal of making China become a high-income country in the near future.

"Getting old first" is variable. If the aging population is only regarded as a heavy burden and the effectiveness of the human capital revolution is overlooked, pessimism will easily prevail, and people will only feel the pressure brought about by population aging. In fact, from the conditions mentioned above, the elderly are still active and helpful in the establishment of family farms, microenterprises, family business workshops, etc., they are often a component of productivity that cannot be ignored. For example, after the establishment of a family farm, the elderly over 60 years old could play the role of technical guide in farming, breeding and gardening, helping the younger generation become wealthy. In workshops for repairing cars and motorcycles, we often see retired elderly still helping with the work. Therefore, the comments such as "getting old before getting rich" are not in line with the status quo of China.

4 Redisussion on Population Aging, Technological Innovation, and Industrial Upgrading

As mentioned above, elderly parents usually contribute to the family farm (or cooperative farm) to perform their duties if health conditions are allowed; even if the elderly no longer hold specific positions in the family-run businesses, they still offer advice and suggestions and help younger generations run the family business well, as long as they feel healthy.

Next, the issue of the role of specialized technical personnel in the aging population will be explained.

Economic transformation is the focus of the economy of China in the new stage, and the most important reform measure in economic transformation is to accelerate the establishment of industrial entities with clear property rights and protected property rights. Reform is unstoppable, and technological innovation and industrial upgrading are driving forces for growth and necessary measures to open up new markets. Specifically, technological innovation and industry upgrading can alleviate the problems caused by the aging, alleviate the shortage of labor supply, and especially alleviate the shortage of research talent in technical sciences. Judging from international experiences, outstanding achievements in technological innovation and industrial upgrading can effectively help the economy continue to grow, the market continue to expand, and China stand at the forefront of the world as a powerful country, despite the pressure of the aging population at this stage.

It can be concluded that the key is not the increase in the supply of labor but increase in the talent in the scope of scientific and technological research and increase in the skilled workers. This is the effect that has been played in terms of talent supply in developed countries around the world. In other words, the key is not the supply of general labor but the supply of scientific and technical personnel and skilled technical personnel.

The supply of scientific and technical personnel depends on the quality and quantity of higher education and the development of scientific research institutions. To this end, we must vigorously cultivate scientific and technical personnel and make good use of them. The admitting, gathering and employing of talent are inseparable. Therefore, it is necessary to increase research and development funding and to implement a talent incentive system, a means to mobilize the enthusiasm of scientific and technological researchers, which has been proven effective by the experiences of some foreign developed countries.

On the national scale, the rule of retirement at the age of 60 is in urgent need of adjustment. For experts and scholars who are in better physical condition, the retirement age can be extended appropriately with consultation of their opinions. It is a blessing and beneficial to the nation if experts and scholars can work until the age of 70; the retirement age for the leaders of scientific research institutions can be extended to at least 65 years old; he or she will not be the leaders after 65, but can still serve as consultants and still be able to guide graduate students. In this way, the strength of the scientific research team will be improved.

Extensive recruitment of experts and scholars from all over the world is an urgent policy for China to open up new disciplines and new fields. Introducing outstanding talent, including PhD graduates, teachers, experts and scholars who work in foreign research institutions or universities, is important for the domestic development and acceleration of new disciplines and fields. There are many good experiences, which should be carefully summarized.

Skilled craftsmen and technicians should also be included in the scope of specialized talent. The shortage of workers and technicians in China makes it necessary to discover talent in practice and let them continue to improve. Compliments should be paid to those “great country craftsmen” who have devoted themselves to industries and have worked hard and made achievements for decades. The retirement age of skilled craftsmen and technicians should also be extended appropriately. If they are willing to work until the age of 70 in enterprises that are in great need of them, the rules for the extension of scientific and technological researchers with expertise can be referred to. This is a good thing that will help alleviate the shortage of skilled workers and technicians.

A question arises here: Would the extension of the retirement age of experts and craftsmen hinder the employment of young people? If it would, how can we solve it?

This issue can be viewed from three different perspectives.

First, young people are unable to replace the positions of experts and academics who have strong academic skills and considerable experiences in scientific research and development, whose efforts will contribute to the advancement of research institutions, and produce more positions for young people.

Second, experts and scholars who are willing to retire when they reach retirement age may choose to put their professional into entrepreneurship; they could build independent enterprises and become entrepreneurs of newly established technology companies; as well as those skilled craftsmen and technicians who have reached retirement age and are willing to start their own businesses and as business owners in an industry that they are familiar with. In this way, more opportunities are created for young people to be employed.

Third, employment opportunities for young people will be increased with the development of scientific research institutions and the increase in independent scientific research enterprises. According to employment theory, employment depends on economic expansion; the more active the economy is, the more employment opportunities, which is the law of employment. Therefore, for the employment prospects of China, the extension of retirement age will not reduce the employment opportunities of young people; in contrast, it will create more employment opportunities for society. Perhaps in the near future, China will see new employment climax one after another.

It is foreseeable that the aging population will bring new employment opportunities.

5 Issues Concerning the Development of Social Enterprises

Further analysis on the prospect of employment can be made based on the foreign experiences of social enterprises.

Social enterprises first appeared in the UK around the 1840s, and it has gone through approximately 70 years since the industrial revolution. As the first country embarking on the road of industrialization, the benefits of industrialization to the UK are obvious, and the problems it brings about are ever more prominent. Social enterprises have emerged under such circumstances.

What kind of enterprise is called a social enterprise? Generally, it is defined as follows: It is a socially owned enterprise, serving the interests of society and adopting corporate management; social enterprise is allowed to have small profits but there is no shareholders and no tax burden; it hires people to do some management work, with a relatively moderate salary.

Social enterprise are not profit organizations but public welfare enterprises. Their profits all go to the enterprises and then invest in social welfare undertakings. The enterprises may grow larger, but the beneficiaries are the whole society.

The form of social enterprise began to be imitated and was followed by other Western European countries and the United States after the mid-twentieth century. Social enterprises are mainly distributed in industries such as pension, medical care, health care and nursing. From the perspective of organizational formation, social enterprises in European countries and the United States after the mid-century have the following three differences from those in the past in the UK.

First, in America and European countries, the newly established social enterprise can raise funds from society when reaching a certain scale, in spite of its aim of public welfare undertakings with social-investment or government-investment. In this way, the scale and economic strength of the enterprise will be enhanced, so that more public welfare investments can be made.

Second, an increasing number of social enterprises tend to give up the subsidies from the government after reaching a certain scale, and rely on their own accumulation and self-development. In doing so, they may attract more funds from private sectors, which is more beneficial to the development.

Third, from the practice of the economic development of Western countries, there are three ways for social enterprises to raise funds: social donations, including initial construction funds; government subsidies, which for social enterprises is a combination of pros and cons, pros refer to subsidies from the government, cons include more inspections by the government and less autonomy and fewer social donations; the last way is to make social enterprises become a listed company and receive the attention of society through the capital market in the name of public welfare. Demutualization has become a self-seeking development of social enterprises. This is also the biggest difference between current social enterprises and past social enterprises.

The experiences of social enterprises in European countries and America can be used as references for China. Since the goal of social enterprises is not to make profit but to public welfare, they can receive funds donated by society and rely on

government subsidies; it can also be restructured into a shareholding system and listed based on certain performance and scale. These are all feasible options.

At present, fund raising can refer to foreign practices in the elderly care, medical and nursing industries. This will help reduce the pressure of the aging population. More significantly, the development of social enterprises is, after all, a new way to increase employment and is helpful in coping with employment pressure in urban and rural areas, as the development of the pension, medical and nursing industries will require different workers and broaden employment. Moreover, with the refinement of service work and the expansion of the scale of social enterprises, more staff will be needed. The employment potential in the medical, health care, and nursing industries means that the service scale of these industries will expand as the services expand.

In China, social enterprises shoulder the responsibility of inheriting the excellence of Chinese culture in the process of investing in public welfare undertakings, such as respecting and honoring the elderly, and helping and supporting elderly. Both the community and the family can play a better role in helping the sound development of service undertakings such as elderly care, medical treatment, health care, and nursing. If the service work of social enterprises can further integrate with the cultural industry to the achievement of “care for the elderly” (referring to the good care of the elderly), “support for the elderly” (referring to accomplishing worthy work of the elderly), and “recreation for the elderly” (referring to the possibility of family reunion and cultural enjoyment for the elderly), then family harmony, community harmony, urban and rural harmony, and ultimately social harmony and social employment, can be realized.

In short, population aging itself is indeed a practical issue in social and economic life of China at this stage. We must, on the one hand, see the pressure or disadvantages it will bring on the economy; but on the other hand, it also should be understood that we should find effective countermeasures to it, changing the negative to the positive, and grasping the opportunities provided by it.

This article starts with the opportunities population aging has brought about; the parallelism of population aging and the human capital revolution is one of the opportunities currently facing China, and the urgency of improving the knowledge and technology of workers has been recognized by the whole society.

This article also discusses the problems caused by the insufficient supply of senior talent (including experts, scholars, craftsmen and technicians engaged in scientific and technological innovation and entrepreneurship research). It is recommended that the retirement age should be extended, as to the promotion of talent supply and the relieve of the pressure of aging. Meanwhile, it is also recommended that senior talent who are willing to retire to start their own businesses and operate independently to promote economic development should be encouraged and supported.

The employment of young people in China is also an unavoidable issue in the process of population aging. Starting from modern employment theory, this article adheres to the law of “increasing employment by employment” to alleviate social employment pressure. In this way, employment problems will be gradually solved through economic development, thus proving that population aging does not necessarily lead to uncontrollable unemployment. Human effort is the decisive factor.

The last part of this article expounds the importance of strengthening national cultural and moral qualities in the process of population aging. The largest dividend in a society is the social harmony dividend, that is, the dividend from social harmony. We must attach importance to the role of the cultural industry and pay attention to the improvement of the moral quality of the whole population. When an increasing number of people in the society understand the far-reaching significance of respecting and honoring elderly, helping and supporting elderly, when “care for the elderly”, “support for the elderly” and “recreation for the elderly” are realized, the national moral quality will be transformed into a harmonious social atmosphere, and the aging will no longer be social pressure but will be transformed into a new fruit of social construction, economic construction, and cultural construction.

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Theoretical Volume

The Evolution and Strategies of Population Aging in China: Forty-Years' Experience of the Reform and Opening up



Zhiqiang Cheng

1 Introduction

The stable demographic structure that has been maintained for many years in industrialized countries has been broken since the beginning of the twentieth century. Afterwards, the developing countries underwent similar changes. Caused by the decline in the population growth rate and the increase in life expectancy, population aging has become a worldwide phenomenon. China has completed the transformation of population reproduction and population structure and entered the rank of countries with low fertility level in only forty years of reform and opening up, while the developed countries took one century and ever longer to undergo the same process.

Population aging refers to the aging state of the social demographic structure with the increasing proportion of the elderly in the total population. According to the classification criteria in *The Aging of Populations and its Economic and Social Implications* established by the United Nations, when the population aged 60 and above accounts for 10% or the population aged 65 and above accounts for 7% of the total population in a country or region, the country or region has entered the stage of population aging. The third census of China in 1982 showed that the proportion of the population aged 0–14 was 34%, the population aged 15–64 was 61%, and the elderly aged 65 and above was 5%; the fourth census in 1990 showed that the proportion of the population aged 0–14 was 28%, the population aged 15–64 was 67%, and the elderly aged 65 and above was 5.6%; the fifth census in 2000 showed that the proportion of the population aged 0–14 was 22.89%, the population aged 15–64 was 70.15%, and the elderly aged 65 and above was 6.96%; the sixth population census in 2010 showed that the proportion of the population aged 0–14 was 16.60%, the population aged 15–64 was 74.53%, and the elderly aged 65 and above was 8.87%. It is easily seen from the results of these censuses that after the reform and opening up,

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Table 1 Age distribution of the six censuses

Year	0–14 years old (%)	15–64 years old (%)	60 years old and above (%)	65 years old and above (%)
1953	36.28	59.31	7.15	4.41
1964	40.69	49.17	6.08	3.56
1982	33.59	61	7.63	4.91
1990	27.69	67	8.58	5.57
2000	22.89	70.15	10.47	6.96
2010	16.60	74.53	13.4	8.87

Source National Bureau of Statistics of the People's Republic of China (PRC), *China Census Data*

the population structure of China has changed greatly, and the speed of population aging continues to accelerate and deepen (Table 1).

Since the reform and opening up, China has achieved tremendous success in economic development, and both economic growth and economic aggregates have created miracles in the history of the world. The structure of the population and social economy have also undergone fundamental changes, exerting significant and far-reaching impacts on this critical moment of transforming social structures and deepening reforms, presenting challenges to economic growth, labor supply, social medical security systems and inter-generational relations, as well as providing opportunities for the reform of social medical security system, the development of aging industries and the change of the domestic consumption structure. On the occasion of the 40th anniversary of reform and opening up and comprehensively deepening reform, this paper aims to accomplish a systematic analysis of population aging, including the status quo, characteristics and trends, reasons for its rapid development, and a comprehensive investigation into the effects of population aging on the economy and society and its mechanisms; then it proposes corresponding strategies to deal with the aging society that has already arrived and keeps deepening, which will be of great significance to the sustainable development of the population, society, economy, resources and environment of China.

2 The Status Quo, Characteristics and Trends of Population Aging in China

2.1 Evolution Phases

During the forty years of reform and opening up, China experienced population growth peaks in the early and late 1980s. The birth rate and natural growth rate have continued to decline since then, and the population structure has changed from the adult stage to the aged stage. Figure 1 below shows this process. The population

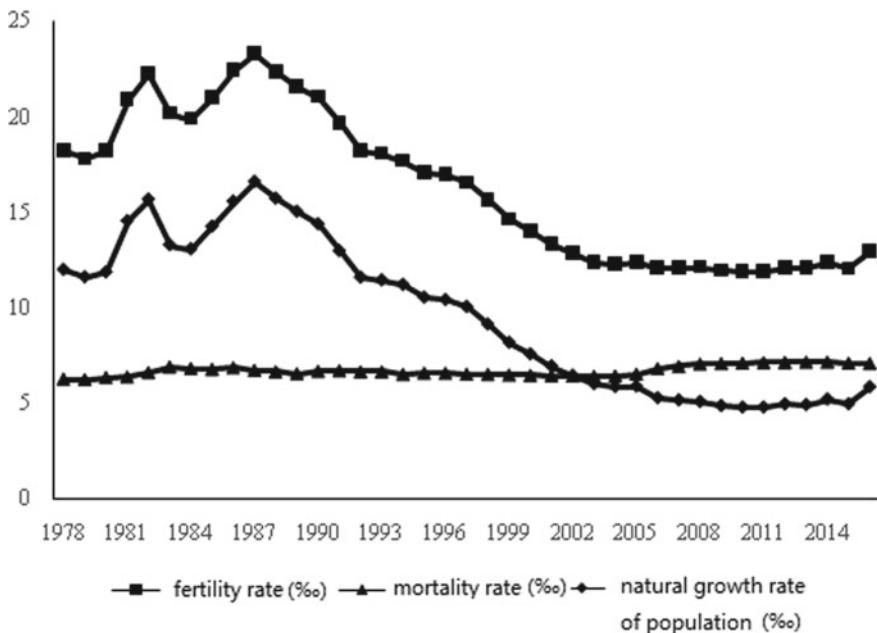


Fig. 1 Birth rate, mortality rate and natural growth rate. *Source* National Bureau of Statistics of the PRC, *China Statistical Yearbook*

birth rate and natural growth rate continued to decline after two birth peaks in the 1980s due to population inertia; meanwhile, the mortality rate remained at a low level; consequently, the population structure has transformed dramatically.

Figure 2 shows the changes in the population dependency ratio. The number of elderly people above 65 years old and the dependency ratio of the elderly has been rising since the 1990s, while the dependency ratio of children has been declining.

(1) Adult phase (1970s–1980s)

To control population growth, China implemented the family planning policy in the early 1970s; since then, the fertility rate has undergone rapid changes. The total fertility rate was 5.44 in 1971 and dropped to 2.84 in 1977. From then on, the total fertility rate remained below 3 and kept falling downward. The decline in fertility rate means fewer children, whereas the population born before the 1970s, when the fertility rate was high, has become the main body of the working population; therefore, the population age structure has transformed into an adult phase. The third census in 1982 showed that, compared with 1964, the proportion of the population aged 0–14 fell by 7%, the population aged 15–64 increased by 11%, and the proportion aged above 65 years old increased by 1.3%. The fourth census in 1990 showed that, compared with 1982, the proportion of the population aged 0–14 fell by 5.9%, the population aged 15–64 increased by 6%, and the elderly aged above 65 increased to 5.6%. The gradual decrease in the proportion of children and the

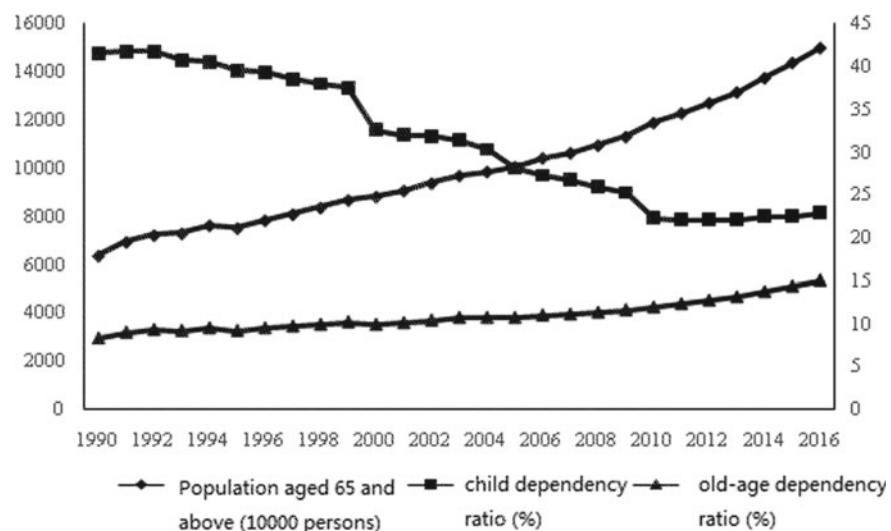


Fig. 2 Change in the population dependency ratio. *Source* National Bureau of Statistics of the PRC, *China Statistical Yearbook*

gradual increase in the working-age population indicate the contracting bottom of the population pyramid and the entry of an adult phase.

(B) The phase of aging formation (1990s)

The total fertility rate of China has further declined since the 1990s, from 2.31 in 1990 to 1.99 in 1995 to approximately 1.8 in the mid-to-late 1990s, which was lower than 2.1, the fertility replacement level. The proportion of the children's population decreased, while the proportion of the working-age population and elderly population increased. The fifth census in 2000 showed that the proportion of children aged 0–14 decreased to 22.89%, the proportion of the working-age population aged 15–64 increased to 70.1%, the proportion of the population aged 60 and above exceeded 10%, the internationally accepted aging standard, and the proportion of elderly aged 65 and above was 6.96%, close to the internationally accepted aging standard 7%, and increased 1.4% compared with the fourth census in 1990. It is apparent that population aging has accelerated since the 1990s, and China has gradually entered an aging society.

(C) The phase of aging acceleration (early twenty-first century)

The total fertility rate has been declining since 2000, from 1.22 in 2000 to 1.34 in the 1% sampling survey in 2005, much lower than the replacement level of 2.1. The sixth census in 2010 showed that the proportion of children aged 0–14 was 16.6%, the proportion of the working-age population aged 15–64 was 74.53%, the proportion of the population aged 60 and above was 13.4%, the proportion of the population aged 65 and above was 8.87%, and the proportion of the population aged 65 and above

was increased 3% and 1.7%, respectively, compared with 2000. From then on, the growth speed of population aging and its proportion are faster than those in the first 30 years of reform and opening up. Population aging is accelerating.

(D) The phase of aging rapidly (since 2010)

The total fertility rate was 1.18 in 2010, of which urban areas were 0.88 and rural areas were 1.44. According to the statistical results of the *World Population Dashboard*, the global average fertility rate was 2.5 in 2010, 1.7 in developed countries, 2.7 in less developed countries, and 4.5 in the least developed countries. The total fertility rate of China was lower than half of the world average level and lower than the average level of developed countries. The 1% census in 2015 showed that the total fertility rate fell to 1.047, much lower than the government's encouragement level of 1.8, despite the introduction of the two-child policy for couples in which one partner is an only child in 2014. Lu Jiehua and Guo Ran (2016) divide the population aging of China into four phases: the fast development phase (2010–2022), rapid development phase (2023–2035), slow development phase (2036–2053) and peak platform phase (2054–2071). They believe that in the rapid development phase, the elderly will experience the first growth peak, with the population aging level rising to 18.5%, but it is still a mild aging phase; in the rapid development phase, the elderly will experience a second growth peak, with the aging level increasing to 29%, the elderly dependency ratio exceeding the child dependency ratio, which is a phase of moderate aging; in the slow development phase, the elderly will experience the third growth peak, and the aging level will rise to 35%, which is a severe aging phase, exceeding the average level of the developed countries; at the peak platform phase, the speed of aging will decrease and the level of aging will stabilize at approximately 34%, forming a stable state.

2.2 *The Status Quo of Population Aging*

The basic characteristics of population aging in China are the declining of fertility level and the increasing of life expectancy. By the end of 2017, the elderly over 60 years old was 241 million, accounting for 17.3% of the total population, and the population over 65 years old was 158 million, accounting for 11.4% of the total population. China has become the country with the largest elderly population in the world. Here is an analysis of China's aging population from two aspects: life expectancy and the total fertility rate at the population level.

(1) Life expectancy

According to the estimation by the Population Division of the United Nations, life expectancy in China rose from approximately 66 years of age in the 1970s to approximately 76 years of age in 2016. With the economic development and the progress and improvement of medical and health services since the reform and opening up,

Table 2 Life expectancy of the Chinese population

Year	Life Expectancy	Year	Life Expectancy
1950–1955	44.59	1985–1990	68.92
1955–1960	45.01	1990–1995	69.95
1960–1965	43.97	1995–20,001	70.86
1965–1970	59.42	2000–2005	73.41
1970–1975	64.58	2005–2010	74.44
1975–1980	66.29	2010–2015	75.68
1980–1985	67.71	2016	76.25

Source United Nations (Population Division, Department of Economics and Social Affairs), 2018, *World Population Prospects*, the 2017 Revision

life expectancy has continued to increase, adding to the proportion of the elderly population (Table 2).

(B) Total fertility rate

According to the estimation by the Population Division of the United Nations, the total fertility rate of China continued to decline from the 1970s to 2016, from 3.0 to 1.56 during the period of the reform and opening up until 2000, and has remained between 1.5 and 1.6 from 2000 to present, a relatively stable development. Due to the missing reports of the birth population in the statistics of China's census, the statistics from the Population Division of the United Nations are higher than the results of the sixth national census, but on the whole, China's total fertility rate is lower than the normal replacement rate and at a low level worldwide (Table 3).

Table 3 The total fertility rate of China

Year	Life Expectancy	Year	Life Expectancy
1950–1955	6.11	1985–1990	2.87
1955–1960	5.48	1990–1995	2.05
1960–1965	6.11	1995–2000	1.56
1965–1970	5.94	2000–2005	1.55
1970–1975	4.77	2005–2010	1.63
1975–1980	3.01	2010–2015	1.60
1980–1985	2.69	2016	1.62

Source United Nations (Population Division, Department of Economics and Social Affairs), 2018, *World Population Prospects*, the 2017 Revision

2.3 Characteristics of Population Aging in China

(1) Large number and fast development

The first characteristic of population aging in China is large number and fast development. the elderly in China over 65 years old increased from 88.11 million to 158 million from 2000 to 2017, and the proportion increased from 6.96% to 11.4%. According to statistics, the speed of population aging in China is much faster than that of European countries, the United States and other countries. In China, the proportion of the elderly (over 65 years old) increased from 4.91% to 7.0% in only 18 years, while Sweden took 340 years for the proportion to increase from 5.2 to 8.4%, France took 115 years for the proportion to increase from 7 to 14%, and the United States took 66 years for the same increase. Table 4 shows that the proportion of China is rising from 7 to 14% at a rate similar to Japan, one of the most aging countries in the world.

(B) Advanced aging is prominent

In the 40 years of the reform and opening up, with the advancement of the population aging process, the degree of aging has also increased. The life expectancy was 67.77 in 1981 and 76.34 in 2015, with a nearly 10-year increase. According to the classification of the elderly population, 60–69 are young elderly people, 70–79 are middle-aged elderly people, and over 80 years old are advanced elderly people. According to the census, the number of advanced elderly aged over 80 was 5.05 million in 1982, accounting for 6.59% of the total aging population; 7.68 million in 1990, accounting for 7.92%; 11.99 million in 2000, accounting for 9.23%; and 20.99 million in 2010, accounting for 11.82%. When the baby boom population reaches 80 years old, the elderly will further increase, and China will face the trend of advanced aging of the

Table 4 Speed of population aging in several countries

Country	Time when the proportion of people aged 65 and above reached the standard		Time required (year)
	7%	14%	
Japan	1970	1996	26
United Kingdom	1930	1975	45
Sweden	1910	1975	66
Germany	1890	1975	85
France	1865	1980	115
China	2000	2025	25

Source Wu Cangping and others, *Social Gerontology*, Press of Renmin University of China (1999, p. 160)

aging population. Compared with the middle-to-low-aged population, the advanced elderly population has higher disease risks and higher social security and medical needs, which will bring severe challenges to China's pension security system and medical and health system.

(C) Getting old before getting rich

The aging population of China is the result of the implementation of the family planning policy in the 1970s with the aim of control population growth, and it has ushered in the aging in the context of an underdeveloped economy, making China a typical country of getting old before getting rich. In 2000, the per capita GDP of China was \$856, while in some European countries and America, such as France, Germany, the United States and Sweden, the per capita GDP was \$2849, \$3134, \$4096 and \$2516, respectively, in 1900. The degree of population aging in China far exceeds the level of social and economic development. It can be seen from Table 5 that when China entered the aging society, the per capita GDP was only \$1,749, while the population aging level in 2010 was equivalent to that of 1980 in Japan; China's per capita GDP level in 2010 was only half of Japan's level in 1980. If the aging phase is used as the comparison standard, China's economic development level is seriously lagging behind from the developed countries at the same aging phase.

(D) Remarkable difference between urban and rural areas

The economic development and medical and health conditions in urban areas are better than those in rural areas, and the life expectancy of the urban population is higher than that in rural areas. Generally, the degree of aging in cities should be higher than that of rural areas. However, the gap in economic development has not only caused the flow of the working-age population between urban and rural areas, but also resulted in the left-behind elderly in rural areas, rendering the decrease aging of the urban population and the increase aging in rural areas at the same time. From the comparison of the age structure of the urban and rural population in Table 6, it can be seen that the fertility rate of the urban population is lower than that of the

Table 5 Comparison of the proportion of the elderly and per capita GDP in different countries

Country	Proportion of the population aged 65 and over (%)			GDP per capita (2010 constant USD price)		
	1980	2000	2010	1980	2000	2010
Japan	8.91	17.2	23.0	9333	40,167	43,118
Germany	15.65	16.3	20.8	12,091	36,517	40,164
France	13.92	16.01	16.82	12,709	22,262	40,629
Italy	13.33	18.3	20.3	8431	34,832	33,761
United States	11.56	12.4	13.1	12,458	43,890	46,616
China	4.70	7.0	8.9	307	1740	4434

Source United Nations (Population Division, Department of Economics and Social Affairs), 2018, *World Population Prospects*, The 2017 Revision; World Bank Data

Table 6 Comparison of the age structure of urban and rural populations

Year	Proportion of population aged 0–14 (%)		Proportion of population aged 15–64 (%)		Proportion of population aged 65 and over (%)	
	Urban	Rural	Urban	Rural	Urban	Rural
2000	18.42	25.52	75.16	66.98	6.42	7.50
2005	16.60	21.95	74.91	68.50	8.49	9.55
2010	14.08	19.16	78.12	70.78	7.80	10.06

Source The Fifth and Sixth National Population Census; 2005 National Survey of 1% Population Sample

rural areas, while the proportion of the working-age population is higher than that of the rural areas. The aging rate in urban areas is lower than that of rural areas. The aging rate in rural areas was 7.5% in 2000, 1.08 percentage points higher than that of urban areas, and 10.06% in 2010, 2.26 percentage points higher than that of urban areas, showing an ever-widening trend of aging gap between urban and rural areas.

(E) Unbalanced regional development

According to the sixth census, the five provinces with the deepest population aging in China in 2010 were Chongqing, Sichuan, Jiangsu, Liaoning and Anhui, and the rankings of these five provinces in the fifth census were 7th, 10th, 3rd, 8th and 9th, respectively, in terms of aging degree. With the exception of Jiangsu, the other four are all labor-exporting provinces after the reform and opening up. Labor migration has accelerated the aging degree. However, because of the absorption of a large number of migrant labor-age populations, the speed and degree of population aging in economically developed cities such as Beijing and Shanghai have decreased compared with the fourth census. The population aging rankings of Beijing, Shanghai, and Zhejiang in 2000 were 4th, 1st and 2nd, respectively, and dropped to 12th, 6th and 9th in 2010, which can be attributed to the inputs of working-age people who eased the aging of the local population.

(F) Apparent gender difference

The average life expectancy of female in China is longer than that of male, so the aging degree of female is also more severe than that of male. It can be seen from the comparison of the proportions of the elderly of different genders in Table 7 that in the 40 years since the reform and opening up, there are more female elderly population over 65 years old and over 80 years old than the male elderly population. Among the elderly over 65 years old, the proportion of the male aging population continues to increase, and the gender ratio gap continues to decrease, dropping from 11.36% in 1982 to only 3 percentage points in 2010. Among the elderly over 80 years old, the proportion of the male elderly population continues to rise, with the gender ratio still quite different.

Table 7 Comparison of the proportions of the elderly of different sexes

Year	Proportion of population over 65 years old(%)		Proportion of population over 80 years old (%)	
	Male	Female	Male	Female
1982	44.38	55.62	34.97	65.03
1990	45.50	54.50	35.31	64.69
2000	47.25	52.75	37.92	62.08
2010	48.1	51.9	41.81	58.19

Source China's census data over time

Table 8 The trend of population aging in China in the twenty-first century

Time Period	Development stage	The highest point of the elderly population (million)	Population aged 80 and above (million)
2001–2020	Rapid aging	248	30.67
2021–2050	Accelerated aging	more than 400	94.48
2051–2100	Severe aging	437	75–120

Source Li Tongping, *Population Economics*, Tsinghua University Press (2008, p. 107)

2.4 The Trend of Population Aging in China

The forecast report of the China National Committee on Aging divided the population aging into three stages of rapid aging, accelerated aging, and severe aging in the 100 years from 2001 to 2100. Table 8 shows that the future situation of China will be very severe, with huge challenges to the pension insurance system and various social management systems.

3 The Causes and Effects of the Aging Population in China

3.1 The Causes

(1) Aging is the inevitable result of demographic transformation

It is an inevitable law that in the transformation of the population structure, affected by economic development, social culture, resources and the environment, the fertility rate and mortality rate will experience the trend of high to low level. With the improvement of living standards and medical technology, the mortality rate has decreased in the process of industrialization, and the population growth brought about by it will increase the pressure on survival and reduce fertility. Since the reform and opening up, the economic construction of China has made great progress, medical and health conditions have been greatly improved, and the death rate has continued to decline