POPULATION AGEING AND INCOME INEQUALITY IN CHINA

YAN XIAO

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POPULATION AGEING AND INCOME INEQUALITY IN CHINA

by

YAN XIAO

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LIST OF ABBREVIATIONS

ASES	Adult Self-Expression Scale
CASS	Commercial Aviation Safety Survey
CES	Consumer Expenditure Survey
CFPS	Chinese Family Panel Studies
CGSS	Chinese General Social Survey
CHARLS	China Health and Retirement Longitudinal Study
CHIP	China Household Income Project
CHNS	China Health and Nutrition survey
CNY	Chinese Yuan
CPS	Current Population Survey
EU-SILC	The European Union Statistics of Income and Living Conditions
FE	The Fixed Effect Model
GDP	The gross domestic product
GFD	Global Financial Database
HIES	South Korean household income and expenditure surveys
Max	The maximum value of samples
Mean	The average value of samples
Min	The minimum value of samples
N	The number of samples
NBS	National Bureau of Statistics of China
OECD	Organization for Economic Co-operation and Development
OLS	The Ordinary Least Squares Model
PIH	Permanent Income Hypothesis
P50	Median value of samples
RE	The Random Effect Model
RIF	Reduction in Force Model

SD	Standard error of samples
T-index	Theil index of different age groups
UN	United Nations
USA	The United States of America
UK	The United Kingdom of Great Britain and Northern Ireland
WDI	World Development Indicators
WIID	World Income Inequality Database

PENUAAN POPULASI DAN KETAKSAMAAN PENDAPATAN DI CHINA

ABSTRAK

Ketaksamaan pendapatan telah menjadi isu sosial yang mendesak secara global, dengan peningkatan dramatic ketaksamaan di China sejak tahun 1990-an menarik minat penting dari segi kajian ilmiah. Tahap ketaksamaan di negara tersebut melebihi amaran antarabangsa pada akhir tahun 1990-an. Pada masa yang sama, China mengalami proses penuaan yang sangat pesat, yang meramalkannya akan menjadi negara super-penuaan terbesar di dunia dalam masa yang terdekat. Perubahan demografi mempengaruhi disparitas pendapatan di kalangan kumpulan umur, memerlukan kajian terperinci mengenai ketaksamaan pendapatan di kalangan kumpulan ini serta kesan usia terhadap ketaksamaan ini di China. Tesis ini mempunyai tiga objektif utama: Pertama, ia bertujuan untuk mengukur ketaksamaan pendapatan dalam sebelas kumpulan umur di China menggunakan kaedah dekomposisi Theil dengan menggunakan dataset mikro Kajian Panel Keluarga China (CFPS). Kedua, ia mengkaji impak penuaan penduduk terhadap ketaksamaan pendapatan melalui model campuran Kuasa Sepuluh Kecil Biasa (OLS), efek tetap, dan efek rawak. Ketiga, ia membezakan antara populasi bandar dan luar bandar serta mengkaji kesan usia terhadap ketaksamaan pendapatan menggunakan model-model serupa. Analisis regresi digunakan untuk menilai pengaruh kumpulan umur yang berbeza, pencapaian pendidikan, dan perkembangan sektor kewangan terhadap ketaksamaan pendapatan. Penemuan utama adalah Ketaksamaan pendapatan tidak seragam di kalangan kumpulan umur, dengan kumpulan umur 55-59 mengalami dispariti yang paling ketara. Penuaan penduduk memperburuk ketaksamaan pendapatan di seluruh China dari tahun

2010 hingga 2018, dengan perubahan dalam faktor-faktor makro-persekitaran dan saiz isi rumah juga memberi kesan kepada ketaksamaan. Selain itu, impak penuaan penduduk lebih ketara di kawasan bandar, manakala pendidikan mempunyai kesan yang lebih besar terhadap konvergensi pendapatan di kawasan luar bandar. Kajian ini memperkaya perdebatan ilmiah dan menawarkan implikasi dasar yang berharga. Untuk menangani ketaksamaan pendapatan yang ketara dalam kumpulan umur 55-59 yang berkaitan dengan dasar persaraan China, adalah penting untuk memastikan keselamatan pendapatan yang mencukupi bagi pesara. Ini termasuk reformasi pension, program pendapatan tambahan, dan pelan persaraan yang fleksibel. Di kawasan luar bandar, meningkatkan pendidikan orang muda dan literasi kewangan bagi golongan dewasa tua, memanfaatkan teknologi digital untuk memperluas perkhidmatan kewangan, dan menubuhkan sistem sokongan kewangan berasaskan komuniti dapat mengurangkan kesan penuaan terhadap ketaksamaan pendapatan. Bagi kawasan bandar, melaksanakan latihan kemahiran digital dan program penyelidikan semula untuk golongan dewasa tua, menggalakkan pembelajaran sepanjang hayat, dan membangunkan tempat kerja yang mesra usia adalah penting. Penemuan ini memberikan para pembuat dasar dengan cadangan berdasarkan data untuk mengurangkan kesenjangan pendapatan dan menggalakkan inklusiviti ekonomi, yang penting untuk mencapai pembangunan ekonomi yang mampan di China. Walaupun penyelidikan ini memberi sumbangan yang penting, kelemahan yang berkaitan dengan ketepatan tempoh dan negara menunjukkan perlunya penafsiran dengan teliti dan kajian akan datang untuk menyempurnakan pandangan ini. Dengan menangani kelemahan ini, kajian akan datang dapat membina atas penyelidikan ini untuk lebih memahami dinamik kompleks ketaksamaan pendapatan dan penuaan di China.

POPULATION AGEING AND INCOME INEQUALITY IN CHINA

ABSTRACT

Income inequality has become a pressing social issue globally, with China's dramatic increase in inequality since the 1990s drawing significant scholarly interest. The country's inequality levels exceeded international warnings in the late 1990s. Concurrently, China has experienced an unprecedentedly rapid ageing process, projecting it to become the world's largest super-aged nation soon. Demographic shifts impact income disparities across age groups, necessitating an exploration of income inequality among these groups and the age effect on this inequality in China. This thesis has three primary objectives: First, it aims to assess the age effects on income inequality in China using the Theil decomposition method and micro dataset China Family Panel Studies (CFPS). Second, it examines the impact of population ageing on income inequality through mixed Ordinary Least Squares (OLS), fixed effect, and random effect models. Third, it distinguishes between urban and rural populations and compares the age effect of income inequality in the rural and urban areas. Regression analyses were employed to assess the influence of different age groups, educational attainment, and financial sector development on income inequality. The key findings are Income inequality is not uniform across age groups, with the 55-59 age group experiencing the most significant disparities. Population ageing exacerbates income inequality throughout China from 2010 to 2018, with changes in macro-environmental factors and household size also impacting inequality. Moreover, the impact of population ageing is more pronounced in urban areas, while education has a more significant effect on income convergence in rural areas. The study enriches scholarly debate and offers valuable policy implications. To address the pronounced income

disparities in the 55-59 age group linked to China's retirement policies, ensuring adequate income security for retirees is crucial. This includes pension reforms, supplementary income programs, and flexible retirement plans. In rural areas, enhancing young people's education and financial literacy for older adults, leveraging digital technology to expand financial services, and establishing community-based financial support systems can mitigate the impact of ageing on income inequality. For urban areas, implementing digital skills training and retraining programs for older adults, promoting lifelong learning, and developing age-friendly workplaces are essential. These findings provide policymakers with data-driven recommendations to reduce income disparities and promote economic inclusiveness, crucial for achieving sustained economic development in China. Despite the study's significant contributions, limitations related to the specificity of the period and country highlight the need for careful interpretation and future research to refine these insights. By addressing these limitations, future research can build on this study to further understand the complex dynamics of income inequality and ageing in China.

CHAPTER 1

INTRODUCTION

1.1 Background of Population Ageing

1.1.1 Global population ageing

With the improvement of economic standards and medical technology, ageing has become one of the inevitable trends facing the world's population. According to global situations, changes in the population age structure have impacts on all aspects of socio-economic situations by way of directly influencing the labour supply (Jarzebski et al., 2021, Bloom et al., 2015, Chen et al., 2018). This section will explore global trends in population ageing and income inequality.

Population ageing has become a significant concern among countries because of the accompanying economic and social costs (Chen et al., 2020; de Meijer et al., 2013). It is the process by which the proportion of the older population in a society increases, and when the ageing population grows to a certain percentage (10% of the total population over 60 years old and 7% is over 65 years old), the society itself can be called as an ageing population (Lee & Mason, 2011; Balcombe & Sinclair, 2001). Generally, a population is considered to be ageing when more than 10% of the total population is over 60 years old, or more than 7% is over 65 years old (United Nations, 2019).

Population ageing occurs due to two main factors: an increase in life expectancy, which leads to a larger proportion of older individuals, and a decline in fertility rates, which reduces the number of younger individuals in the population (UN, 2019; Leeson,

2018). In particular, the rise in population life expectancy is attributed to several factors, including the decrease in world mortality rate due to advancements in medical care, improved nutritional intake, better sanitation, and changes in social labour relations (Bloom et al., 2015; Cheng et al., 2020; Roffia et al., 2023) Cheng et al., 2020). As shown in Figure 1.1, the world mortality rate has declined from 10.71% in 1963 to 7.71% in 2023. This more than halving of the decline is associated with the rise in medical technology and the standard of living of the population in the more densely populated developing countries, particularly China and India, leading to an increase in global life expectancy and a rise in the number of older people (Chen et al., 2019; Pham & Vo, 2021; Kinsella & Suzman, 1992).

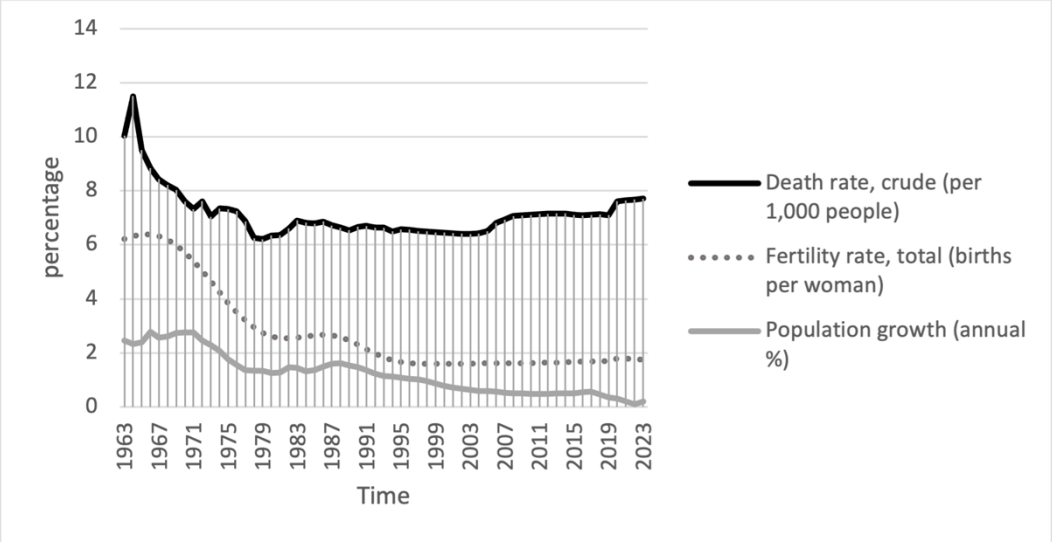

Figure 1.1 World death rate, fertility rate and population growth

Source: The World Bank (2024)

On the other hand, the population fertility rate has dropped from 4.98% in 1960 to 1.74% in 2023 (Figure 1.1) and is predicted from the World Bank (2024) to reach 2.17%

in 2050. The decline in fertility rate is more significant in developed countries where female labour force participation has risen significantly since 1960 (Nagarajan et al., 2021; Jarzebski et al., 2021b). For example, in the Nordic countries and Japan, the fertility rates have even reached negative levels in some places (Livi-Bacci, 2017; Chen et al., 2019). Since the rise in female labour force participation reduces the desire to have children, which in turn reduces the proportion of children in the age structure of the population (Wang et al., 2017; Nagarajan et al., 2021; Peng & Mai, 2008). At the same time, the global decline in fertility is also linked to the particular fertility policies of some countries, such as China's family planning policy, which clearly states that a couple can have only one child. Whether the decline in fertility is voluntary or due to objective constraints, its downward trend is evident in some countries and has contributed to the development of an ageing population (Huang et al., 2019; Repetto, 1978).

Against a double decline in population mortality and fertility, the global natural population growth rate has steadily declined from 2.8% in 1963 to 1.06% in 2019 (Figure 1.1). In addition to this, the population dependency ratio can provide a fair reflection of both the age structure of the population and its socioeconomic implications (Li et al., 2022; Li et al., 2021; Santacreu, 2016). According to United Nations (2019), the dependency ratio of the elderly population shows a consistent upward trend, rising from around 10% in the 1960s to 13.94% in 2019 and showing an accelerated upward trend after 2016 (shown in Figure 1.2). The working age population as a percentage of the total population shows an overall decreasing trend from 1966 to 2019, from 77.02%

to 54.48%, which leads to a shortage of labour force and further has a negative influence on socio-economic situations (Jarzebski et al., 2021a; Peng & Mai, 2008).

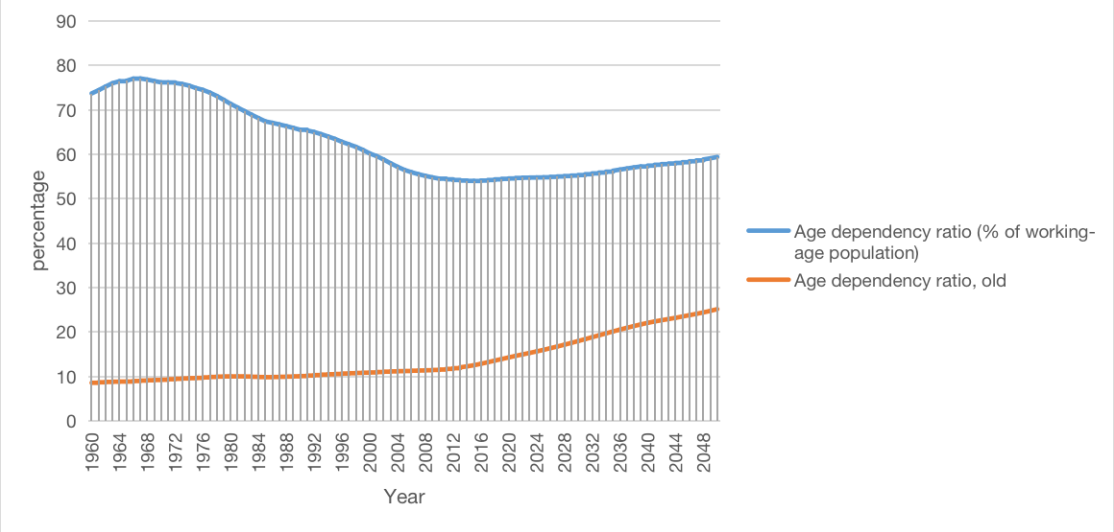

Figure 1.2 World age dependency ratio from 1960 to 2050

Source: The World Bank (2022)

Compared to developing countries, developed countries with higher levels of economic development and healthcare services tend to ageing earlier. This trend is highlighted in the research by Nagarajan et al. (2021) and Maity and Sinha (2021). The World Bank's 2020 report illustrates this with the example of Japan, which had the world's oldest population in 2019, with 27% of its people over 65 years old, leading globally. Following closely are Italy and Germany, with respective ageing populations of 23% and 21%. In contrast, developing countries like China are witnessing a more recent yet rapidly accelerating ageing trend, as observed in the studies by Li et al. (2021), Li et al. (2021b), and Chen et al. (2019). These differences between developed and developing nations offers a vital perspective on the global patterns of demographic shifts.

1.1.2 Population structure in China

From 1960 to 2020, the dynamics of China's increasing older population (aged 65 years old and above) share and its divergence from global trends in terms of older population is significantly as shown in Table 1.1. In 1960, the proportion of the older population in China was 3.97%, lower than the global average proportion of older population. However, over time, significant changes occurred. In 2000, China's proportion of older population surpassed the global average for the first time, indicating a notable shift. The difference between 1960 and 2000 in China amounted to 2.95%, marking a significant increase. Moreover, this trend continued to evolve, as by the year 2020, China's older population share exceeded the global proportion by 3.13%, solidifying the substantial difference.

Compared to China with restrictive fertility restrictions, countries without similar fertility restrictions have experienced different demographic trends. As an example, when examining OECD member countries, it is evident that the level of population ageing had already exceeded the global average by a considerable margin as early as 1960, reaching 8.37%. Although OECD countries have implemented policies to incentivize higher birth rates, these countries have also witnessed increasing older population share due to socioeconomic factors such as improvement of medical condition and decreasing fertility rate because of increased education and female participation in the labour market (Cheng et al., 2020; Leeson, 2018). Moreover, from 1960 to 2020, there was a consistent year-on-year increase in population ageing, indicative of a continuous trend. This culminated in a proportion of 17.39% by 2020. It

is noteworthy, however, that despite this rapid growth, the ageing process experienced by OECD member countries can still be considered relatively moderate in comparison to China's experience. At the beginning of 21st century, China became an ageing society, with the proportion of the elderly population (65 years old and above) exceeding 7% for the first time (Chen et al., 2018; Shirahase, 2015). Remarkably, China's natural population growth rate declined to 0.56% in less than four years, while the United States and the United Kingdom took approximately 200 and 140 years, respectively, to reach a comparable level (Livi-Bacci, 2017; Luo et al., 2018; Li & Zhang, 2015).

Over a span of half a century, China witnessed a remarkable transformation, with the proportion of older population surpassing three times its initial level. Thus, while acknowledging the accelerated pace of ageing, it becomes evident that the process of population ageing in China commenced relatively later and is already developing faster than that of OECD countries that have already been grappling with significant ageing challenges.

Demographic change in China is also unique to countries that also have fertility policies, because of its long duration and strong enforcement. Similar to China, India has also implemented mandatory population programs aimed at controlling population growth (Mehrotra & Parida, 2019; Srivastava et al., 2021). However, in contrast to China, India’s mandatory population programs have been in operation for an extended period and have thus had a limited impact on the overall population structure (Narayana, 2021; Rowlands & Regmi, 2022). As a result, India, the second most populous country in the world, exhibits a comparable proportion of older individuals relative to its total

population as China in 1960, with 3.29% and 3.97 % respectively. As of 2020, China's share of the ageing population is nearly double that of India, standing at 12.60% and 6.67% respectively. These statistics underscore the divergence in rates of population ageing between the two nations and their population structures.

Table 1.1 Population ages 65 and above (% of total population)

Country Name	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
China	3.97	3.71	4.39	5.30	6.92	8.62	12.60
India	3.29	3.62	3.98	4.08	4.49	5.07	6.67
OECD	8.37	9.34	10.58	11.36	12.74	14.42	17.39
World	5.02	5.31	5.87	6.11	6.89	7.65	9.43

Source: The World Bank (2023)

Compared to OECD countries and India, the demographic landscape in China is significantly shaped by its fertility policies, which have had a profound impact on population ageing. While deeper socioeconomic factors such as economic development, healthcare improvements, and social security systems also play crucial roles, the unique fertility policies in China have been the most distinguishing factor driving its demographic changes (He, 2023; Li et al., 2021b).

Data from the 7th National Census, conducted by the National Bureau of Statistics of China in 2020, shows that the population of children and adolescents aged 0-14 will be 253 million and the population of older people aged 60 and over will be 264 million in 2020. The number of older people exceeds the number of children and adolescents. The dependency ratio for children and young people is 0.283 (setting the working-age population aged 15-59 as the base 1), and the dependency ratio for the elderly population

is 0.295. This marks a shift in the burden of social old-age caring in China from the traditional one of raising young children to one of old-age provision, and the increasing pressure on old-age population care.

From 1960 to 2021, China experienced significant demographic changes that led to rapid and severe population ageing (Cheng et al., 2020; Chen et al., 2019). As shown in Figure 1.3, mortality rates have declined from 25.43% in 1960 to around 7.1% in 2019, while fertility rates have fallen from over 6.385% in 1965 to 1.69% in 2019. As a result, China's population growth rate also shows a marked decline, from 2.79% in 1965 to 0.31% in 2020. Life expectancy, another characteristic of an ageing population, also experienced a significant increase between 1960 and 2019. Compared to 1960, the average life expectancy in China increased by 75.91% in 2019 (shown in Figure 1.3). Female life expectancy increased at the same rate as male life expectancy, but female life expectancy on average was consistently higher than that of males. As shown in Figure 1.3, from 1960 to 2020, life expectancy for both men and women increased from 44 to 77 years, a 1.75-fold increase in 60 years. China's population is projected to decrease around the 2030s, implying a negative natural population growth rate (Huang et al., 2019; Nations, 2019). Based on existing theories on China's population structure and demography, China will enter a super-ageing society, with older people accounting for more than 21% of the population in 2033 (Luo et al., 2021; Chen et al., 2019; Huang et al., 2019).

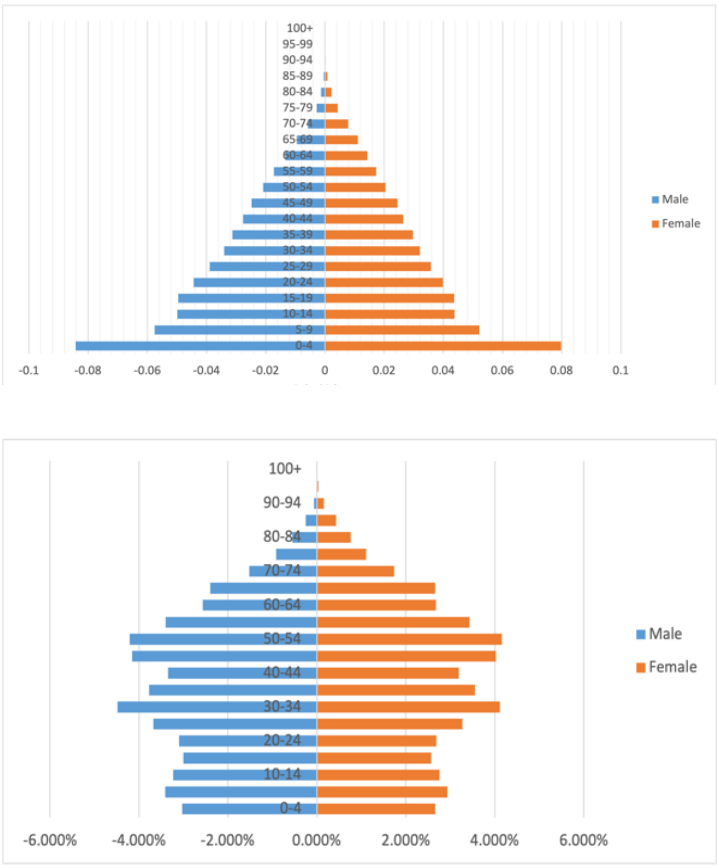

Figure 1.3 China's population structure in 1953 and 2020

Source: United Nations (2022)

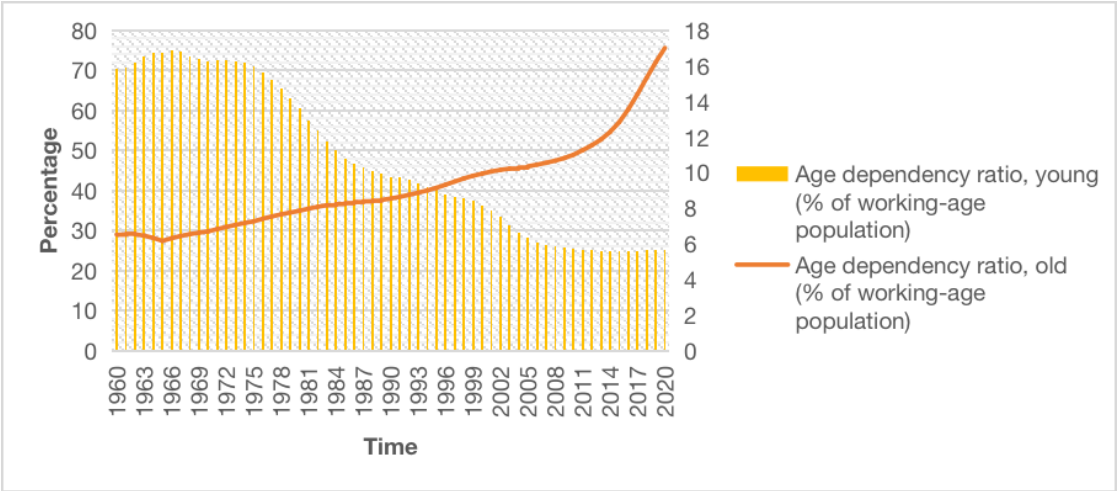

Figure 1.4 China Age Dependency Ratio for Old and Young Population

Source: The World Bank (2022)

Figure 1.4 illustrates China's demographic structure changes in 1953 and 2020. China's demographic structure takes a pyramid shape in 1953. The young population (under 15 years old) was overwhelmingly dominant, accounting for 36.28% of the total population. The more ageing population accounted for a smaller proportion, only 4.41% of the total population. With the full realisation of family planning and the quiet development of society, the third stage of the inverted triangle of the population age structure is reversed. The proportion of the young population fell significantly to 16.6% in 2015, and the proportion of older people (aged 60 and above) has risen sharply to 13.32%. As shown in Figure 1.4, the age dependency ratio of the elderly population has been on an upward trend since 1960, rising from 6.53% to 17.73% in 2021.

Moreover, the rate of increase has accelerated significantly since 2010, which is related to the changing age structure of the population and is predicted to continue to accelerate (Chai & Xu, 2016; Chen et al., 2019). The young population dependency ratio shows an overall decline, from 70.68% in 1960 to 24.92% in 2016. There is predicted to be a slow rebound after the start of China's two-child policy in 2016, reaching 25.14% by 2021, but not very significant compared to 1960 (Huang et al., 2019a).

At the same time, according to the National Bureau of Statistics in China, the unemployment rate for the age group between 16 to 24 is 21.3%, while for those aged 25 to 59, it is significantly lower at 4.1%. This disparity highlights a critical issue: population ageing is influencing employment patterns. As the population ages, the proportion of younger individuals entering the workforce is declining, leading to higher unemployment rates among this age group. The reduced number of young workers

exacerbates the challenge of integrating them into the labour market, contributing to skill mismatches and economic transitions (OFFICE, 2022; Taht et al., 2020). Meanwhile, the relatively stable employment situation for the 25-59 age group may not be sustainable in the long term as the overall working-age population shrinks.

Overall, the One-Child Policy has significantly influenced China's population age structure, setting it apart from other countries and presenting unique socioeconomic challenges. As previously discussed, China's population has entered its fourth stage of demographic transition, resulting in an increased proportion of the older population and their growing significance within the overall population. As this ageing trend continues to deepen, variation in the structure and composition of the working-age population have substantial implications for socio-economic life. By recognizing the unique nature of China's population ageing process and making comparisons with other nations, this section highlights the significance and distinctiveness of China as a valuable field of study.

1.2 Income inequality

1.2.1 Global income inequality

Income inequality in a society of economic growth has been a long-standing concern of economists (Cingano, 2014; Anderson, 2022; Caraballo et al., 2017). The concept of income inequality was first proposed by Ricardo (1817) in the theory of factor income distribution, which refers to the gap caused by the difference between high and low-income levels or the difference in the proportion of income occupied

(Caraballo et al., 2017; Kavya & Shijin, 2020; Jenkins, 2017).

Income inequality, a prevalent social issue in both developed and developing nations, has been extensively studied (Anderson, 2022; Darvas, 2019; Grigoryev & Pavlyushina, 2020). Firstly, for developed countries, the long-term trend of income inequality is often described as U-shaped, with a period of decline to lower levels of inequality followed by a rise (Piketty, 2018; Piketty & Saez, 2014). Recent developments in globalization and technology have led to a slowdown in the growth of global inequality, which correlates with the progress in emerging economies and a reduction in international inequality (Chusseau & Hellier, 2013; Ezcurra & Rodríguez-Pose, 2014; Anderson, 2022). Secondly, for developing countries, such as China and India, research primarily focuses on Kuznets' inverted U-shape hypothesis, suggesting that income disparities tend to decrease as economies grow (Darvas, 2019; Klasen, 2009; Silveira Neto & Azzoni, 2011; Caraballo et al., 2017). The foundation of these researches lies in Kuznets' 1955 theory, which posits that economic growth leads to reduced income inequality (Darvas, 2019; Luo et al., 2020). Subsequent studies have expanded this framework to include factors like education, financial development, industrialisation, urbanization, and population ageing (Younsi & Bechtini, 2020; Turnovsky & Erauskin, 2022; Dib et al., 2018; Ceddia, 2019; Siami-Namini & Hudson, 2019; Sulemana et al., 2019; Golley & Kong, 2018). Notably, population ageing, which became prominent towards the end of the 20th century, has not been as thoroughly explored as other factors in its influence on income distribution. This gap highlights a need for further research in understanding how ageing populations impact income

inequality.

In 2022, the World Bank analysed the Gini coefficient, a measure of income inequality, for 165 countries, revealing significant variation across different nations. South Africa recorded a Gini coefficient of 63 in 2014, the highest globally. In contrast, European countries, particularly in the Nordic and Eastern European regions, tend to have lower Gini coefficients. For example, countries like Norway, Ukraine, and the Slovak Republic have coefficients around 25, indicating lower levels of income inequality. In 2010, China's Gini coefficient stood at 43.7, surpassing the threshold of 40, which typically raises international concern about income inequality, as depicted in Figure 1.5.

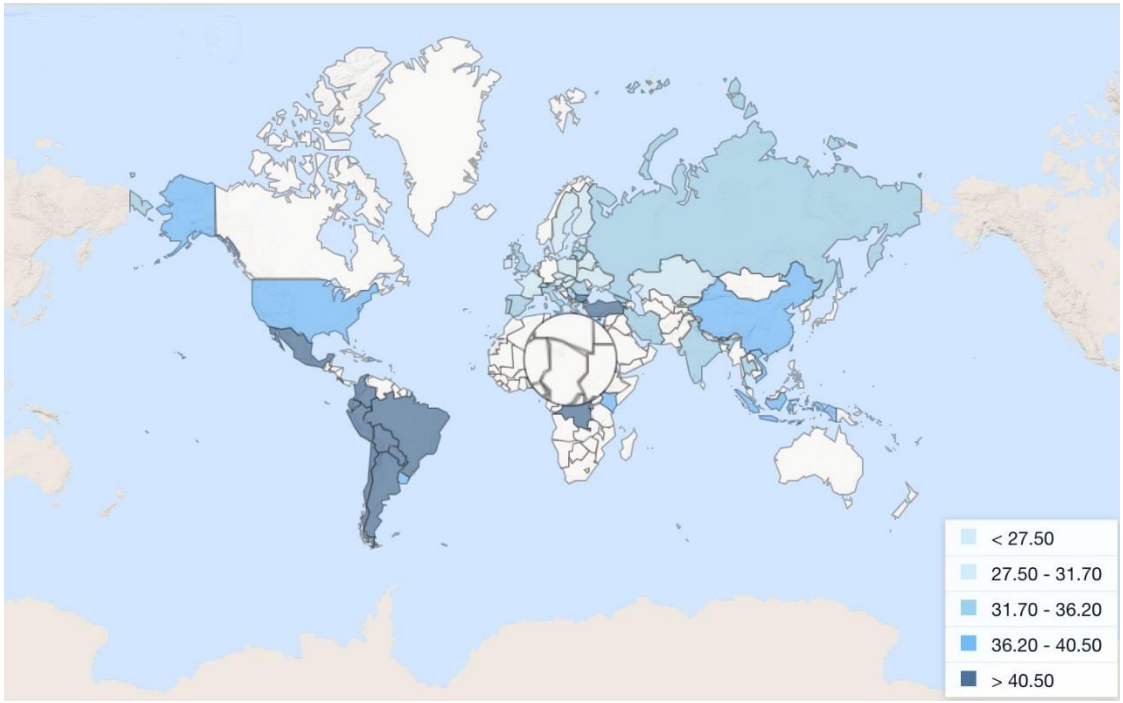

Figure 1.5 Gini coefficient for income inequality in 2020

Source: The World Bank (2024)

1.2.2 Income disparity in China

With the rapid growth of income in China, income inequality has also become one of the significant social issues. Figure 1.6 illustrates the trend of the Gini coefficient in China from 2004 to 2020. The Gini coefficient is a measure of income inequality, where 0 represents perfect equality and 1 represents perfect inequality. Between 2004 and 2010, the Gini coefficient in China remained relatively high, fluctuating around 0.48 to 0.49. This period was characterized by rapid economic growth and increasing income disparities, particularly between urban and rural areas (Chen & Ma, 2022). From 2010 onwards, the Gini coefficient shows a declining trend, reaching its lowest point around 0.465 in 2015. This decrease can be attributed to various government policies aimed at reducing income inequality, such as poverty alleviation programs in 2014 and reforms in the social security system in 2016 (Li et al., 2020; Liu & Guo, 2023). However, from 2015 to 2020, the Gini coefficient shows slight fluctuations but remains relatively stable around 0.465 to 0.47. This indicates that while progress has been made in reducing income inequality, challenges still remain, particularly in addressing the disparities between different regions and demographic groups.

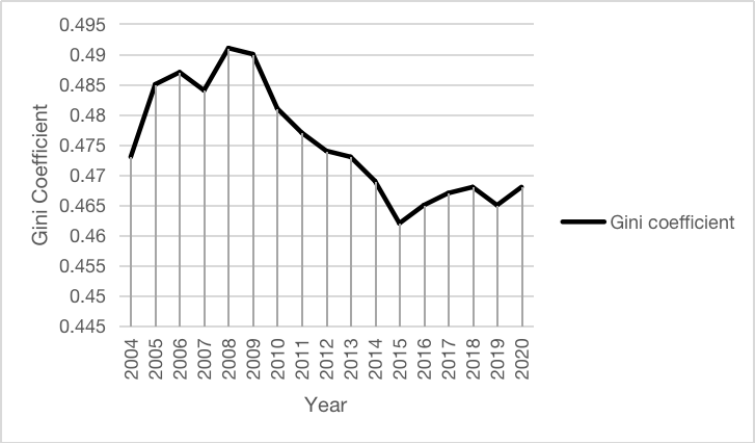

Figure 1.6 Gini coefficient in China from 2004 to 2020

Source: Wind information (2022)

It suggests that the government has put significant effort into reducing inequality (Luo et al., 2020; Li & Sicular, 2014). Firstly, the government has implemented progressive tax policies to redistribute income and narrow the wealth gap (Chen et al., 2022). As shown in Table 1.2, this includes higher tax rates for higher-income individuals and businesses. For instance, individuals with an annual income exceeding CNY 960 thousand are subject to a tax rate of 45% on their income, while those with an annual income below CNY 36 thousand are exempt from income taxation by the government. At the same time, the government has also implemented policy to regulate wealth accumulation, such as anti-monopoly regulations and measures to curb excessive income disparities within industries and sectors (Ju & Lin, 2020). The amended Anti-Monopoly Law of the People's Republic of China, which came into force on 1st August 2022, not only expands the overall scope of application of the Anti-Monopoly Law, but also significantly increases the penalties and liabilities for monopolistic acts.

Table 1.2 Personal income tax rates in China 2022

Annual taxable income (CNY)	**Tax rate (%)**	**Quick deduction (CNY)**
0 to 36,000	3	0
Over 36,000 to 144,000	10	2,520
Over 144,000 to 300,000	20	16,920
Over 300,000 to 420,000	25	31,920
Over 420,000 to 660,000	30	52,920
Over 660,000 to 960,000	35	85,920
Over 960,000	45	181,920

Source: National Bureau of Statistics of China (2022)

Secondly, the government in China has also increased the minimum wage to ensure that workers receive a fair income and improve their standard of living. China's minimum wage institution was formalized in 1994 under the Labour Law (Hau et al., 2020; Kong et al., 2021). The mean of minimum wage in China experiences rapid growth, which was CNY 5376.3 per year in 2006 and rose to CNY 16301.8 in 2016. This helps uplift those at the lower end of the income distribution (Kong et al., 2021).

In parallel, the Chinese government has placed significant emphasis on allocating resources towards education and skill development programs as a means to enhance human capital and augment employment prospects (Bai et al., 2020; Golley & Kong, 2018). By providing equitable access to high-quality education and vocational training, individuals can acquire the necessary skills required for high-paying employment opportunities. Notably, since 2012, government expenditure on education as a proportion of gross domestic product (GDP) has consistently exceeded 4%, with a continued increase in investment specifically directed towards higher education (Qazi

et al., 2018). This heightened investment has yielded tangible outcomes, as evidenced by the significant rise in the gross enrolment rate of higher education, reaching 51.6% in 2019 (Bai et al., 2020). This surge can be attributed to the perceived value of higher education in securing stable and rewarding positions within the labour market. By disseminating knowledge and fostering skill development, higher education contributes to the enhancement of the nation's workforce and progressively augments the accumulation of human capital (Golley & Kong, 2018; Qazi et al., 2018). This, in turn, catalyses technological innovation and further reduces personal income inequality.

Moreover, the government has promoted financial inclusion and access to credit for underserved populations, including small businesses and individuals with limited financial resources. This enables them to participate in economic activities and generate income (Wang et al., 2019). For example, promoting inclusive finance through digital financial services has made much progress in China and would further influences economic growth and income inequality situation (Ahmad et al., 2021; Hasan et al., 2022; Kavya & Shijin, 2020). Last but not the least, to address the urban-rural income gap, the government has implemented policies and programs to promote rural development, boost agricultural productivity, and improve rural infrastructure (Luo et al., 2020; Qi et al., 2019). These measures aim to increase income levels and living standards in rural areas and further reduce the income inequality between urban areas and rural areas.

However, there is no clear conclusion on income convergence in China (Zhu et al., 2020; Dong et al., 2018; Tian et al., 2016). As shown in Figure 1.7, the pre-tax income

shares of the top 10% and 1% have grown since 1978 and reached about 40% and 15% of the total income share in 2015. At the same time, the pre-tax income shares of the top 50% have been falling from one quarter to less than the top 1% in 2015. In this regard, one of the consensuses in China is that the increase in income inequality is one of the payments to the rapid development of a market economy (Younsi & Bechtini, 2020; Zhu et al., 2020; Zhuang & Li, 2016). Although the official data indicate a slight fall in national income inequality during the past ten years, the evolution of income inequality in recent years is worth investigating (Deng, 2021; Zhu et al., 2020).

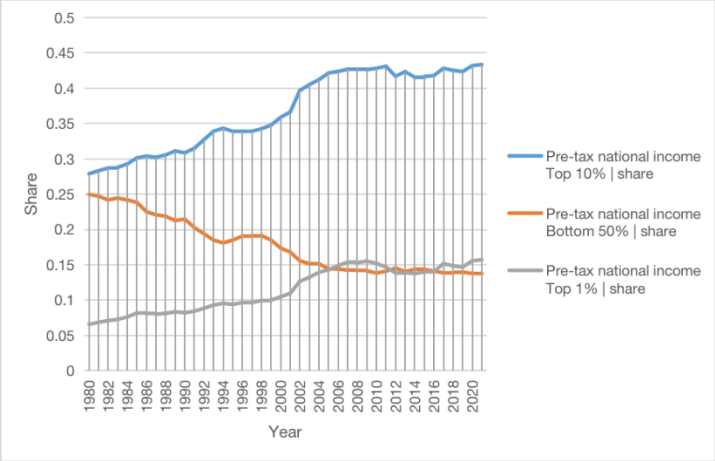

Figure 1.7 Top 10% and 1% pre-tax income shares in China, 1963-2023

Source: World Inequality Database (2024)

1.2.3 Income disparities between urban and rural residents in China

The urban-rural income disparity in China is also closely intertwined with the historical context surrounding the implementation of the household registration system (Wang & Benjamin, 2019; Chen et al., 2018; Zhang, 2021). The household registration system in China, known as the "Hukou" system, classifies individuals based on their

place of residence and family ties, creating significant disparities in access to public services, employment opportunities, and social security benefits between urban and rural residents (Guo et al., 2018; Meng, 2019). Established in the 1950s, this system has contributed to substantial income inequality by restricting rural-to-urban migration, limiting educational opportunities for rural residents, and providing better resources and welfare benefits to urban residents.

Prior to the advent of a market economy in 1978, the opportunity to bridge the urban-rural income gap was limited, as rural-to-urban migration was restricted (Guo et al., 2018; Meng, 2019; Boffy-Ramirez & Moon, 2018). These barriers limited access to education healthcare and other public services for rural populations, resulting in unequal opportunities for income generation in rural areas (Guo et al., 2018; Meng, 2019). However, since the 1990s, policies have been introduced to relax these restrictions, allowing for increased labour mobility between urban and rural areas, albeit without full access to urban public services (Wang & Benjamin, 2019; Qi et al., 2019; Chen et al., 2018). Nevertheless, the widening income disparity between urban and rural residents did not immediately reverse. Due to restrictions in the hukou system, these migrants often faced limited access to social benefits and urban public services, leading to lower income levels compared to urban residents (Chen et al., 2018; Guo et al., 2018). According to Figure 1.8, from 1990 to 2020, urban residents' disposable income increased from approximately 1,510 yuan to 45,033 yuan, demonstrating a substantial rise. During the same period, rural residents' disposable income increased from about 685 yuan to 17,131 yuan. The trends indicate that while both urban and rural incomes

have increased significantly, the income gap between urban and rural areas has widened over time. In 1990, the income ratio between urban and rural residents was about 2.2:1. By 2020, this ratio had increased to approximately 2.6:1. This widening gap highlights the persistent income inequality between urban and rural populations. The growing disparity between urban and rural incomes has significant implications for income inequality in China. Urban residents have benefited more from economic growth due to better access to education, healthcare, and employment opportunities. In contrast, rural residents have faced structural disadvantages, including limited access to these resources and services.

Additionally, there are several differences that are associated with income disparities between rural and urban areas. Firstly, the economic disparities, the urban-rural income disparities are exacerbated by regional economic imbalances, with wealth and economic development predominantly concentrated in urban centres (Caraballo et al., 2017; Kavya & Shijin, 2020; Younsi & Bechtini, 2020). The disparity in economic growth and investment between urban and rural areas significantly contributes to income inequality. This can be attributed, in part, to the skill and sectorial differences that exist between these regions (Luo, 2017; Molero-Simarro, 2017; Qiu & Zhao, 2019). Urban areas, characterized by a concentration of industries and a greater availability of higher-skilled employment opportunities, generally offer higher wages and income prospects (Chen et al., 2018; Qiu & Zhao, 2019). Conversely, rural areas are predominantly agrarian and rely on lower-skilled labour, leading to comparatively lower income levels for rural residents (Luo, 2017; Qi et al., 2019). The concentration of

industries in urban areas creates an environment that fosters innovation, technological advancements, and specialization, attracting higher-skilled workers and offering better-paying jobs. In contrast, the predominantly agricultural nature of rural areas limits the diversification of economic activities and hinders the development of higher-skilled employment opportunities, resulting in lower income potential for rural residents.

Figure 1.8 Per capita disposable income of urban and rural residents

Source: National Bureau of Statistics of China (2022)

The income gap between urban and rural areas is further magnified by the simultaneous dynamics of an ageing population in rural areas and the migration of the younger workforce to urban centres (Chen et al., 2020; Chen et al., 2018). These demographic trends contribute significantly to the widening income disparity between the two regions (the urban and rural areas). In rural areas, the ageing population is more prominent, and they often face limited access to higher-paying job opportunities and higher income prospects (Boffy-Ramirez & Moon, 2018; Chen & Ma, 2022). Challenges such as relatively limited educational attainments, lack of skill development

programs, and the prevalence of traditional agricultural practices restrict the income potential for older individuals in China (Luo et al., 2020; Zhu et al., 2021). Furthermore, the decline in agricultural activities and the lack of diversified industries in rural areas further curtail income opportunities for the ageing population (Chen & Ma, 2022; Wang et al., 2019). On the one hand, agriculture has historically been a primary source of income for rural residents in China, especially for the older population (Song et al., 2022). However, with the decline in agricultural activities due to various factors such as mechanization, urbanization, and changes in consumer preferences, the income-generating potential from traditional farming has diminished (Wang et al., 2020). This puts additional financial strain on the older population, as they may find it challenging to adapt to alternative income-generating activities. On the other hand, the lack of diversified industries in rural areas limits the availability of higher-paying job opportunities (Chen & Ma, 2022). The concentration of industries and economic activities in urban areas means that rural residents, older population especially, have limited access to higher-income jobs that require specialized skills and qualifications (Qiang & Lili, 2021). As a result, the ageing population in rural areas faces higher levels of income inequality and economic vulnerability. Conversely, younger individuals are possibly drawn to urban centres due to the allure of better employment prospects, improved educational facilities, and a more vibrant economic environment (Chen et al., 2020; Guo et al., 2018). The influx of young migrants concentrates talent and economic activities in urban regions, resulting in higher average incomes and more favourable employment opportunities for this demographic group (Chen et al., 2018; Zhan et al.,

2021).

As a consequence, the interplay between an ageing rural population and the migration of younger individuals to urban areas compounds the income gap between urban and rural regions (Luo, 2017; Wang & Benjamin, 2019). Indeed, measuring income inequality separately for urban and rural areas located age groups is necessary to comprehensively understand the complexities behind income disparities. As demonstrated by the unique factors affecting income inequality within urban and rural areas, such as skill and sectorial differences, demographic shifts, and economic disparities, analysing income inequality separately for age groups in various geographic regions allows for a more nuanced examination of the challenges and opportunities faced by different segments of the population.

Owing to factors like higher-skilled job opportunities, technological advancements, and better access to education and training, age groups in urban areas could experience distinct income disparities compared to their rural counterparts (Chen et al., 2018; Wang et al., 2017). On the other side, the ageing population in rural regions might face additional challenges due to declining agricultural activities and limited diversified industries, leading to reduced income opportunities.

By evaluating income inequality separately for age groups within urban and rural settings, policymakers and researchers can better identify the specific drivers of disparities and develop targeted strategies to address them. Besides, a comprehensive approach that considers income inequality across different age cohorts and geographical

locations enables a more effective and equitable response to the challenges posed by income disparities in today's diverse and evolving ageing process in China.

The substantial changes in the urban and rural population structures have had a profound impact on income inequality between urban and rural areas (Boffy-Ramirez & Moon, 2018; Zhu et al., 2020; Su et al., 2015). As China's urbanization level gradually increases, some studies suggest that the contribution of the urban-rural income gap, which was previously a major factor, to the overall income gap has been diminishing (Luo, 2017; Tian et al., 2016; Boffy-Ramirez & Moon, 2018). Furthermore, it has been argued that as a significant portion of the younger workforce migrates to urban areas, the growing ageing population in rural areas may further widen the gap between urban and rural regions (Dong et al., 2018; Sicular et al., 2008). Consequently, there is no consistent and definitive conclusion regarding the specific impact of population ageing on the income disparity between urban and rural residents.

1.3 Income inequality of population ageing on income inequality in general

According to the Word Bank (2023), the Gross Domestic Product (GDP) growth rate experienced a decline from 6.6% in 1964 to 3.3% in 2018. Income inequality becomes a significant socioeconomic issue that has garnered increasing attention with the rate of economic growth slowing in recent years (Luo et al., 2020; Tian et al., 2016; Zhuang & Li, 2016). Understanding the factors that contribute to income disparities is crucial for policymakers seeking to develop effective strategies to address this challenge and promote social justice. One critical dimension that shapes income inequality is the