Population Aging and its Impact on China's High-Quality Economic Development

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Abstract. China is undergoing one of the most rapid demographic transitions in modern history, with profound implications for its economic future. By 2035, more than 30% of the population will be aged 60 or older, a shift driven by a record-low fertility rate of 1.16 and rising life expectancy, which reached 78.2 years in 2022. This paper examines two major economic consequences of population aging: labor market contraction and consumption restructuring. Empirical data show that between 2011 and 2022, China's working-age population (15–59 years) declined by 50 million, leading to severe labor shortages in key industries. Manufacturing firms in Guangdong and Zhejiang, for instance, report workforce deficits exceeding 20%, accelerating investments in automation technologies. At the same time, household spending on elderly healthcare has surged to 15.2% of total budgets, while the smart eldercare market—including health monitors and assistive robotics—generated ¥50 billion in revenue in 2023, marking a 120% year-on-year increase. Regional disparities further complicate this transition, with rural elderly facing significantly lower access to healthcare and leisure services compared to their urban counterparts. To address these challenges, this study proposes policy measures such as expanding automation, reforming retirement systems, strengthening rural pensions, and strategically investing in the "silver economy." If implemented effectively, these strategies could help China transform demographic challenges into opportunities for sustainable, high-quality growth.

Keywords: Population Aging, Labor Market Dynamics, Consumption Restructuring, Silver Economy, Sustainable Development.

1 Introduction

Experts note that China's demographic shift is unprecedented in both pace and magnitude. According to the National Bureau of Statistics [1], 19.8% of the population was aged 60 or older in 2022, a figure expected to surpass 30% by 2035. What makes this transition remarkable is its speed: China will transition from an aging to a super-aged society (where 20% of the population is 65+) in just 21 years—a process that took industrialized nations like Japan and Germany nearly a century [2]. The sheer scale of aging is equally staggering. With 280 million seniors, China's elderly population is

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larger than the total populations of most countries, presenting unique governance challenges. Compounding these issues is the spatial inequality of aging. Rural areas, which have seen mass outmigration of younger workers, now face aging rates of 23.8%, compared to 17.5% in cities [2]. This urban-rural divide exacerbates disparities in healthcare access, pension coverage, and economic opportunity.

The rapid aging of China's population threatens to erode the "demographic dividend" that fueled its economic rise. For decades, a young, expanding workforce drove industrialization and export-led growth. However, as the working-age population shrinks, China must confront two critical questions: First, how will labor shortages and skill gaps affect productivity and global competitiveness? Second, how will shifting consumption patterns among the elderly reshape industries and create new economic opportunities? This paper addresses these questions by analyzing labor market contraction (Section 2.1) and consumption restructuring (Section 2.2), followed by a discussion of indirect fiscal and social security impacts (Section 3). The conclusion (Section 4) synthesizes policy recommendations to turn demographic challenges into drivers of innovation.

2 Direct Economic Impacts of Population Aging

2.1 Labor Market Contraction and Productivity Challenges

Workforce Shortages and Automation. The most immediate effect of aging is a shrinking labor pool. Between 2011 and 2022, China's working-age population (15–59 years) declined by 50 million, and projections suggest a further loss of 100 million by 2050 [3]. Labor-intensive sectors, such as manufacturing and electronics, have been hit hardest. In Guangdong and Zhejiang—China's industrial powerhouses—over 40% of manufacturing firms report labor shortages exceeding 20% of their workforce needs [4]. These shortages have triggered a surge in automation. Industrial robot installations grew by 20% annually from 2020 to 2023, with Shenzhen's electronics factories now using robots for 35% of assembly tasks [5]. Rising labor costs have accompanied this shift: average manufacturing wages increased by 9.6% per year between 2015 and 2022, squeezing profit margins for small and medium enterprises [1].

Skill Mismatches and Retraining Efforts. Aging also alters the composition of the workforce. Workers aged 50+ now account for 24% of the labor force but just 8% of employment in high-tech sectors [2]. This mismatch contributes to productivity declines of 11.7%-17.9% [29] in tech-driven industries, attributed to slower adoption of new tools and higher rates of health-related absenteeism. In response, companies like Tencent are investing heavily in reskilling. Their "Silver Hair Technology Plan," launched in 2023 with a ¥1.2 billion budget, trains older employees in cloud computing and AI [27]. Government initiatives complement these efforts, with a national goal to train 10 million older workers annually in digital skills by 2025 [28].

2.2 Consumption Restructuring and the Silver Economy

Healthcare and Eldercare Demand. As the population ages, household spending patterns shift dramatically. Healthcare expenditures for seniors rose from 8.4% of household budgets in 2015 to 15.2% in 2022, driven by chronic disease management and elder care services [1]. The eldercare industry, valued at ¥8.5 trillion in 2023, is expanding at 25% annually, with nursing home capacity struggling to keep pace [29]. Rural areas face acute shortages: while urban seniors allocate 35% of discretionary income to leisure, rural elderly spend 60% on basic healthcare [1]. To bridge this gap, the Chinese government, under the 14th Five-Year Plan, expanded rural elderly care facilities to address the acute healthcare shortages, where 60% of rural seniors' income is allocated to basic medical services, thereby enhancing access to healthcare and elderly care in targeted regions [31].

Technological Innovation and Market Growth. The "silver economy" is also driving innovation. Smart eldercare products, such as wearable health monitors and robotic exoskeletons, generated ¥50 billion in sales in 2023—a 120% increase from the previous year [26]. Companies like Haier have capitalized on this trend, with voice-controlled appliances capturing 17.6% of the senior market [6]. Meanwhile, traditional industries are adapting. While demand for fashion and consumer electronics among seniors fell by 30–40%, senior-focused tourism packages—bundling health checkups with cultural tours—have grown exponentially [24].

3 Indirect Economic Impacts of Population Aging

3.1 Strain on Social Security and Pension Systems

China's rapidly aging population is placing immense pressure on its social security systems. Public pension expenditures reached 4.2% of GDP in 2022, a figure projected to double by 2040 [30]. The sustainability of these systems is particularly precarious in rural areas, where over 60% of seniors rely on fragmented pension schemes that provide minimal monthly payouts—often as low as ¥200 (US$30) [2]. Unlike urban workers, who contribute to employer-sponsored pension plans, rural elderly face higher poverty rates due to limited coverage and reliance on familial support.

The urban-rural pension gap exacerbates inequality. For example, urban retirees in Shanghai receive an average of ¥4,500 monthly, while rural retirees in Guizhou get just ¥180 [4]. This disparity forces many rural elderly to continue working past retirement age, often in informal sectors with no social protections. To address this, the government has experimented with regional pension pooling and subsidized voluntary contributions, but systemic reforms are needed to ensure long-term viability.

3.2 Fiscal Pressures on Local Governments

Aging-related healthcare costs are straining public finances. National healthcare spending, which stood at 7.1% of GDP in 2022, is projected to reach 12% by 2030 [25]. Aging provinces like Liaoning—where 24% of the population is already over 60—face

fiscal deficits exceeding 8% of GDP, forcing cuts to infrastructure and education budgets [4].

Local governments have turned to "silver bonds" to fund eldercare facilities, but debt sustainability remains a concern. For instance, Sichuan Province issued ¥5 billion in bonds in 2023 to build nursing homes, yet demand still outstrips supply by 30% [29]. Without reforms, these fiscal pressures could undermine China's ability to invest in future growth drivers like green technology and advanced manufacturing.

3.3 Intergenerational Equity and Family Burden

The traditional "family as caregiver" model is collapsing under demographic strain. With the one-child policy (1980–2015) leaving many seniors with only one adult child, the caregiver dependency ratio has soared. In 2023, there were just 2.5 working-age adults for every retiree, down from 5.1 in 2000 [3]. This has led to a rise in "sandwich generation" households, where middle-aged adults simultaneously support aging parents and children.

Currently, the economic losses caused by the demand for elderly care have shown a significant trend. Specifically, job caregivers, due to their caregiving responsibilities, spend an average of 7.8 [7] working hours annually, resulting in a direct loss of productivity; At the household level, urban households in Japan allocate an average of approximately 10,280 yen monthly for private elderly care services, accounting for up to 23.4% of their disposable income, exacerbating the economic pressure compounded by caregivers' loss of 7.8 working hours annually due to caregiving responsibilities [32]. Although policy makers have started to promote employers to provide elderly care leave and implement community-based care support and tax incentives, the process of building systematic solutions still faces many challenges, and the path to comprehensively resolving economic burdens is not yet clear.

4 Policy Recommendations and Sustainable Development Pathways

China's aging population demands comprehensive and systematic policy responses. In terms of labor market reforms, the government should implement a gradual retirement age extension policy, drawing lessons from Shanghai's pilot program that progressively raises the retirement age for skilled professionals to 65 [8] while establishing flexible work arrangements that allow older workers to choose employment modes according to their physical conditions. Taking Guangdong's manufacturing sector as an example, while the robot density reached 322 units per 10,000 workers in 2023, this still lags behind South Korea (932 units) and Singapore (605 units) [9]. Recommend increasing automation subsidies from the current 15% to 25% [10], with particular focus on supporting intelligent transformation of small and medium enterprises.

The pension system reform must break through the urban-rural dual structure. Establishing a nationally unified basic pension account with minimum disbursement standards (recommended at 800 yuan/month for rural areas and 1,500 [11] yuan/month

for urban areas) could be funded through increased state-owned enterprise profit transfers (raising the current 16% to 20% [12]) and special pension bond issuance. Zhejiang Province's trial of the "third pillar" commercial pension insurance model achieved a 38% [13] participation rate in 2023, suggesting this tax-deferred scheme could be expanded nationwide.

For healthcare system innovation, Zhang proposes establishing a tiered diagnosis and treatment system where 80% [14] of elderly chronic diseases are managed at community level. Beijing's "Internet + Elderly Care" pilot reduced hospital visits by 35% [15] through telemedicine, demonstrating the potential for digital health solutions. The government should increase investment in smart elderly care technologies, such as the health monitoring bracelets developed by Xiaomi that have shown 91.7% [16] accuracy in fall detection.

To promote the development of the silver economy, it is recommended to establish a certification standard system for elderly friendly products covering 15 categories [17] such as household appliances and walking aids. By 2030, 50 [18] national level elderly care industrial parks will be built simultaneously, and targeted tax incentives will be implemented for enterprises serving the elderly population (such as the 15% [19] corporate income tax reduction policy for elderly care enterprises in Chengdu High tech Zone). At the regional coordination level, the implementation of the "East West Matching Assistance" plan for elderly care resources requires developed coastal provinces to provide special support for the development of aging areas at a ratio of 1% [20] of fiscal revenue, while promoting the construction of rural elderly care service facilities. It is planned to add 10000 [21] rural elderly activity centers by 2025, forming a multi-dimensional and cross regional coordinated development pattern of the elderly care industry.

These measures should be supported by establishing a National Aging Industry Development Fund with initial capital of 100 billion yuan [22], adopting Singapore's successful public-private partnership model in elderly care infrastructure [23]. Liu et al. assert that the ultimate goal is to transform demographic challenges into drivers for industrial upgrading and quality economic growth, while ensuring equitable access to aging services across all regions. Continuous monitoring through a newly established National Aging Development Index will track progress across 25 key indicators including workforce participation rates, pension adequacy, and elderly life satisfaction.

5 Conclusion

China's aging crisis is inevitable, but its economic consequences are not predetermined. With appropriate policy support, the silver economy has the potential to generate substantial economic value in the coming years. Scholars generally agree that the solution lies in achieving several critical transitions: shifting from labor-intensive to capital-intensive growth models through automation; transforming youth-focused consumption patterns into age-inclusive markets to unlock seniors' spending power; and transitioning from family-based to society-wide elderly care systems to ensure equitable support mechanisms. Through bold reforms, China could potentially transform

demographic challenges into drivers of innovation, paving the way for high-quality development in the decades ahead.

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