Analysis of Population Aging and the Development of Silver Economy

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Abstract. As China accelerates into a deeply aging society, the silver hair economy, as an important development direction for coping with the aging trend has gradually become the focus of attention for academics and policymakers. This paper systematically combs through the progress of related research at home and abroad and analyses the existing results and shortcomings. This paper adopts the method of systematic literature review and finds that the socio-economic impacts of population aging are mainly reflected in the reduction of labour supply, the shift of consumption structure and increase of pressure on social security, etc., in which the degree of difference exists between different regions. The research hotspots of silver hair economy focus on senior insurance and senior health industry, and there is a lack of exploration of localised models in China. This paper gives theoretical support for the economic transformation in the aging society and promotes the industrial layout of the silver hair economy to achieve sustainable socio-economic development.

1 Introduction

According to international standard, when the aging rate exceeds 14%, it means that a country enters the "aging society". Relevant reports show that China has entered the stage of moderate aging, the trend of population aging is accelerating, and the potential market of silver-haired economy is broad, which has a certain effect on the overall quality of China's economic development.

The process of population aging means that the number of elderly groups is rising, and their consumption demands are more diverse and considerable, which has opened up a broad market for the progress of silver economy. From the perspective of consumption, the elderly group is promoting the accelerated growth of related industries, which is expected to become a new driving force for economic growth. Relevant documents clearly put forward that it is necessary to strengthen the social wealth reserve to deal with the aging population, realize economic development that is compatible with the aging population, and build a high-quality service and product supply system for the elderly. It can be seen that the aging population has become one of the basic national conditions in China, and the silver-haired economy will release strong development vitality.

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The silver economy, as an important economic form to cope with the demographic transition, has become a focus of attention for academics and policy makers. The core research content includes three levels. First, it systematically compiles studies and analyses the interaction between aging and economic development from the dimensions of labour supply, consumption structure, and social security. Secondly, it summarises the conceptual connotation, industrial boundary and development mode of silver hair economy, geriatric healthcare, senior finance and other segments. Finally, this paper analyses the development opportunities and market mechanism obstacles and based on the summary of existing research.

2 The socio-economic impact of population aging in the new era

2.1 Labour supply

Labour supply serves as the core driving force for socioeconomic development, functioning through multi-dimensional effects of scale expansion, structural optimisation, and quality improvement. These effects underpin the logic of economic growth, industrial upgrading, and sustainable social development, making its dynamic balancing mechanism a key focus in economic research and policy formulation. Population aging exerts profound influence on socioeconomic progress by reshaping labour supply [1].

Relevant studies indicate that China will witness a rapid decline in the working-age population after 2030, with the labour force under 44 years old shrinking notably. The most significant impact will stem from the decline in the 25-44 age group, a demographic that constitutes the most active segment of the labour market. Concurrently, the labour participation rate will further decrease as the workforce ages, altering the fundamental characteristics of labour supply.

In terms of impact pathways, population aging exhibits both negative and positive effects: while it significantly lowers per capita wages and reduces the working-age population ratio-thereby dragging down economic growth-the outflow of labour in central and western regions exacerbates aging, further eroding the local "demographic dividend". Positively, higher labour productivity and rising employment rates among the working-age population help sustain economic growth. However, the overall negative impact prevails, with aging exerting a net inhibitory effect on economic development.

From a spatial equilibrium perspective, studies reveal significant spatial heterogeneity and spillover effects in aging's impact. For instance, aging can negatively affect neighbouring regions' economic growth through channels like cross-regional labour mobility and regional industrial collaboration chains, intensifying labour supply pressures and constraining growth in adjacent areas [2].

2.2 Consumption structure and consumption dynamics

As the population ages, the structure and dynamics of consumption change. The increase of elderly people causes the development of related industries, such as those with convenience and well-being, will have a stronger impetus for development; at the same time, the work experience accumulated by age will also lead to an increase in the level of seniority of the industrial structure. With regard to the Japanese society, which is of strong reference significance to China, some scholars conduct conclusions are drawn: population aging is conducive to the enhancement of the advanced level of industrial structure but is not conducive to the strengthening of the degree of rationalisation of the industrial structure; and the effect of the quantity of the workforce, the quality of the workforce, the effect of

technological innovation [3]. Under the important role of these five mechanisms, aging has a positive impact on labour productivity, promotes the consumption of urban households. With regard to the impact of aging on urban and rural consumption structure in China, some scholars find that the consumption structure of urban and rural residents will change due to the price changes of consumer goods, for example, when the price of food increases, urban residents will increase the proportion of food consumption expenditure and reduce the proportion of clothing consumption expenditure, while rural residents will increase the clothing consumption expenditure [4].

2.3 Social security

The topic has also had a great impact on social security, with an increase in the proportion of pensioners and an inevitable decline in the proportion of pension contributors, i.e., the existing labour force, and thus an increase in the pressure to pay pensions. At the same time, not only is the pressure on the pension system increasing, but the demand for health care is also expanding in line with the current state of an ageing society, with health care costs increasing in line with the demand for health care, and health care fund expenditures continuing to be pushed up, resulting in health care resources not being able to meet the market demand in a timely manner. Unsustainable finances and insufficient service provision undoubtedly inhibit further socio-economic development.

Vietnamese scholars have conducted a scientific investigation into the impact of population ageing on social security in light of the actual situation in Vietnam and find that firstly, the health of the elderly population is in a worrying state, with about 65% of the elderly interviewed in a sub-healthy or frail state. Secondly, social security coverage is seriously inadequate, as evidenced by the fact that most older persons are not covered by the insurance and the proportion of beneficiaries of pensions and social benefits is extremely low [5]. Some Chinese scholars studied the social security challenges under the aging [6]. Due to the one-child policy in 1980, China's aging is more severe, and the social security system with unified account is facing the problems of high payment rate, high replacement rate and account debt, and its sustainability is worrying. They built a computable equilibrium model of overlapping generations, and simulated five reforms, such as adjusting the replacement rate, increasing the contribution rate, delaying retirement, and turning to full funding system. It is found that the reform of repaying hidden debts with government assets and delaying retirement is the most efficient, and the efficiency of raising the contribution rate is the lowest while maintaining the replacement rate [6].

3 3.Analysis of the development status

3.1 Conceptual elaboration

The silver economy is a major economic field emerging in the context of profound changes in the global demographic structure and refers to the industrial clusters formed around the needs, consumption, services, products, and related economic activities of the elderly population (usually defined as people over the age of 65). It is both a solution to the challenges of an ageing society and an important engine for future economic growth. Its core industries include senior care services, geriatric healthcare, geriatric products, as well as geriatric finance and geriatric culture and education. The silver-hair economy shows great development potential and broad prospects. Scientific understanding and vigorous development of the silver economy are of great significance to the promotion of sustainable economic and social development. While the trend of aging is accelerating, the development

of science and technology also promotes the improvement of the quality of life and the diversification of the consumption pattern of the elderly, which provides a good market impetus and market prospect for further development of the silver economy.

Some scholars integrated and analysed the literature on "silver hair economy" and found that the current research focuses on the following three points [7]. First, based on China's aging and the basic market situation, discussing the necessity of developing the "silver hair economy", second, taking into account the current development of the field in the world or China's major cities, discussing the necessary paths, and third, researching its specific topics [7]. According to the 2015 EU Silver Economy Report the number of people will account for 42.9% of the total population, and it is expected that this group will account for 44.3% of the EU's private consumption in 2025 [8]. The report points out that the structural characteristics of the silver economy include a strong demand for healthcare, which accounts for more than half of all healthcare spending in the EU, and core consumption areas focusing on housing and utilities, food and drink, and transport. At the same time, the EU's "silver economy" is facing the key challenges of health deficits, social segregation and workforce disruption, but also important opportunities such as mHealth, age-friendly tourism and smart homes. The EU report puts forward the following core policies to address the problems identified, digitalisation of healthcare, promotion of wearable devices for the prevention of chronic diseases, and promotion of a flexible retirement system that allows pensions to coexist with wages. This will also shed light on China's silver economy development model. The key to the development of the industry lies in the realisation of technological inclusion, lowering the threshold for the use of smart devices, policy innovation, flexible retirement systems, bridging the barriers between the healthcare, transport and housing sectors, and finding a model of the "suitable ecosystem for the elderly" that suits China's national conditions.

Polish researchers pointed out in 2020 that the development of silver-haired economy faces a sharp ethical dilemma [9]. The core contradiction lies in the conflict between individual care to improve the well-being of the elderly and social efficiency to alleviate the burden of aging, and the opposition between them highlights the urgency of ethical consideration. Problems such as loneliness aggravated by technology, social gaps caused by uneven distribution of resources, and vulnerability of the elderly to financial fraud need to be solved urgently. Although the research lacks empirical data, and its conclusions may deviate from the reality, it enlightens China that policies need to embed ethical principles such as anti-discrimination and inclusive design, balance commercial profit-seeking and social justice, and build a "people-oriented" framework.

3.2 Current progress of elderly services

China's elderly service system mainly covers home care, community care and institutional care. In the trinity of elderly care models, they complement each other to meet the different needs of elderly people of different age levels in terms of health status and financial capacity. Deep aging and the special family structure formed under the one-child policy have led to a sharp increase in the pressure of individual and social support, and the traditional old-age care can hardly cope with the heavy burden, and the old-age care service system will usher in further upgrading in accordance with the basic status quo. At the same time, the elderly service industry has a huge potential market, and healthy elderly people can also realise their own value through moderate participation in community activities.

There are still shortcomings in the old-age service. Some scholars introduced random disturbance coefficients to construct a tripartite evolutionary game model to analyse how to carry out better social supervision under the background of the Internet [10]. While the Internet provides new regulatory channels, it also brings new challenges and uncertainties such as information amplification and public opinion pressure. The results of the study found

that Internet exposure can force senior care institutions and the government to regulate their behaviour and better achieve institutional self-regulation and active supervision, but older people are mainly concerned about the direct service experience rather than Internet public opinion. The higher the social reputation, the more the organisations tend to regulate themselves, and the more the government tends to actively supervise to maintain credibility. At the same time, financial incentives can dramatically increase residents' enthusiasm for monitoring, and institutions are slow to respond to older people's complaints, requiring external intervention by strong government supervision. Therefore, to build a collaborative governance ecology led by the government, self-regulation of institutions, participation of residents, and network assistance, it is necessary to do the network platform standardised supervision, elderly care institutions to strengthen the endogenous self-regulation drive, embrace digital transformation, and eliminate opportunism, the active participation of elderly residents in supervision, and the government's initiative to effectively carry out its responsibilities to form a synergistic effect, ".Scholars have employed Chongqing as a case to investigate the misalignment between resource allocation and service requirements in local aged care systems [11]. Through a questionnaire survey and semi-structured interviews, it was concluded that there is currently a user profile in China's community elderly care that is biased towards urban and highly educated older people, and therefore there is a potential inequity in the distribution of resources, while the problems include a limited range of services, a shortage of beds and so on. Although the sample size is limited, it still reflects the room for progress of community elderly care in China.

3.3 The current situation of the development of pension finances

The "three pillars" of pension finance commonly used in the international arena consist of public pensions, occupational pensions and personal pensions, which are mandated by the government, jointly contributed by enterprises and individuals, and voluntarily participated by individuals in the implementation of personal contributions. This can achieve social co-payment and equity, as well as meet the personalised and diversified needs of individuals for old-age reserves. The development of pension finance can alleviate the pressure of public pension payments, meet the diversified and high-quality pension needs of residents, and at the same time promote the formation of social long-term capital and support the development of the real economy.

The global pension financial system faces multiple challenges of population aging, financial sustainability and individual decision-making efficiency, and developed and developing countries present different reform paths. Research in Canada shows that although delaying pension claims can enhance benefits (claiming at age 70 can increase by 42 per cent), the economic incentives are limited - for every 10 per cent increase in pension benefits, the probability of delay increases by only 1.11 per cent, and increasing the penalty for early claiming may, on the contrary, result in a loss of wealth [12]. In contrast, educational interventions and framework adjustments are more effective. Developing countries such as Russia face more complex structural tensions, with research illustrating that its pay-as-you-go system already has an intergenerational imbalance (i.e., 120 workers need to support 100 retirees) [13].The 2019 reforms, while raising the retirement age and introducing a personal pension coefficient, partially erode public trust by freezing the accumulation system and limit the effectiveness of reforms due to the risks associated with health and employment for older age groups. These cases suggest that developed countries need to optimise behavioural interventions to avoid the negative effects of economic incentives, while developing countries need systemic reforms to enhance institutional credibility and complement employment support policies. Future reforms need to balance fiscal sustainability and individual welfare to avoid one-size-fits-all policies that harm vulnerable groups.

Some scholars find that the probability of holding risky assets is significantly higher for participating households in urban areas than for non-participating households by 2.3 per cent, and the proportion of risky asset allocation is increased by 0.8 per cent, and the effect is stronger for households with higher risk preferences; however, there is no significant difference between participating and non-participating households in rural areas in terms of risky asset allocation [14]. This suggests that pensions affect asset allocation through both expected income effect and substitution effect, in which the high substitution rate of urban pension dominates the positive effect, while rural pension insurance (New Rural Insurance) fails to effectively alleviate the uncertainty expectation due to the low level of protection and the restriction of urban-rural dual structure. Therefore, policy reforms need to break the urban-rural dichotomy in pension insurance, improve the level of rural pension protection, and enhance financial literacy to optimise household risk management capabilities.

4 Conclusion

This study indicates that population ageing has complex socio-economic impacts through multiple pathways, including reduced labour supply, transformation of consumption demand and increased pressure on social security. Although aging may have a partially positive effect on the economy by improving labour productivity and optimizing industrial structure, its overall effect is still mainly inhibitory, especially in the central and western regions, which face more severe challenges due to the outflow of labour. Against this background, the silver hair economy, as an important economic form to cope with aging, shows great potential for development.

The progress of the silver economy covers a wide range of fields such as senior care services, geriatric healthcare, and senior finance, but its current development still faces many bottlenecks. There are problems such as misalignment between resource allocation and service requirements, which need to be solved through government-led multi-party collaborative governance; while in senior care finance, the level of protection in rural areas is insufficient, and it fails to effectively stimulate the allocation of risky assets of the family. International experience shows that delaying retirement, optimising pension incentives and strengthening financial education are effective ways to enhance the efficiency of pension finance. In addition, relevant department needs to pay attention to ethical dilemmas and avoid technological substitution that exacerbates the social segregation of older groups or the unfair distribution of resources. Future policies should focus on building an inclusive senior care service system, promoting technological inclusion and institutional innovation, and balancing commercial interests and social equity.

In summary, the silver hair economy is both a key hand in addressing the challenges of aging and a new engine for promoting high-quality economic development. IIit is necessary to make efforts in three aspects: firstly, improve the pension service system, strengthen government supervision and market self-regulation; secondly, deepen the pension financial reform, break the urban-rural barriers, and improve the level of protection; and thirdly, embed the ethical principles to ensure that the elderly groups are the mainstay of the economic development. Only through multi-dimensional policy synergy can fully release the potential of the silver-hair economy.

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