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Population Aging and Insurance Demand: An Empirical Analysis of Chinese Cities

Xintong Wang

College of Economics and Management, China Agricultural University, Beijing, China
nicolewxt20050422@163.com

Abstract. As China enters an advanced stage of population aging, changes in demographic structure present new challenges and opportunities for the insurance industry. Building on a systematic review of literature concerning insurers' participation in the eldercare industry, this paper uses city-level panel data to empirically test the effect of the degree of aging on insurance expenditures. The results indicate that population aging significantly drives growth in insurance demand, with a particularly pronounced effect on personal insurance products, while property insurance is relatively less affected. This finding suggests that insurers need to place greater emphasis on the development and innovation of eldercare-related products when responding to population aging. At the same time, diversified investment and service models—such as eldercare real estate and community- and home-based care—offer new avenues for insurer development. This study not only enriches the empirical evidence in the field of eldercare finance but also provides a reference for insurers' strategic planning and policy formulation in the context of population aging.

Keywords: Population aging, Insurance expenditures, Eldercare finance, Eldercare industry

1. Introduction

As China's population continues to age, effectively addressing the eldercare pressures brought about by demographic change has become an urgent issue for social and economic development. As an important component of the financial system, the insurance industry has unique advantages in risk sharing, capital accumulation, and long-term investment, and is therefore widely expected to play a key role in the eldercare industry. However, in practice insurers' participation in eldercare finance remains constrained by several factors. On the one hand, the industry as a whole started relatively late, product offerings are narrow, and service capacity is not well matched to the diverse needs of the elderly population; on the other hand, the macroeconomic environment and prevailing household saving patterns also limit the pace of expansion of the pension/eldercare insurance market, posing challenges for insurers in innovation and strategic planning.

Against this backdrop, examining how population aging affects demand for insurance expenditures both deepens our understanding of the economic effects of aging and provides empirical evidence to support insurers' product innovation and market expansion strategies. Based on a systematic review of the relevant literature, this paper employs city-level panel data to empirically assess the specific impact of the degree of aging on insurance expenditures, and—taking

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into account the trend toward integration between the eldercare industry and insurance—offers policy and practical implications. The research not only enriches empirical studies in eldercare finance but also supplies practical guidance for commercial insurers to better meet eldercare service demand and to promote coordinated industry development.

2. Literature review

Insurers' participation in the eldercare industry is of great significance for China's response to population aging, but this process faces multiple challenges. These challenges concentrate on three main areas: (1) issues internal to insurance companies, (2) constraints from the external market environment, and (3) mismatches between insurance companies and the eldercare market.

Regarding issues internal to insurers, Fangyuan Zhou [1], after analyzing the pension security system, concluded that because Chinese insurance institutions currently have a low degree of professional specialization and relatively poor service quality, insurers cannot fully bring out their comparative advantages in participating in the pension system, which undermines insurers' proactive engagement. Yujia Zhang [2] pointed out that although insurance companies possess capabilities in financial product design and risk management techniques, they are still at an early stage in the eldercare finance field and lack a systematic development strategy; pension/eldercare insurance products are overly homogeneous, and some innovations have become detached from customer needs, failing to effectively address the difficulties faced by the elderly. In addition, as many large insurers rush into the eldercare finance market and expand market share through low-price competition and predatory pricing, this not only harms insurers' own interests but also erodes consumer trust, necessitating corrective measures. Haichao Li [3] emphasized that professional talent remains insufficient within insurers, and the trust mechanisms between policyholders and insurers need continuous improvement.

Constraints from the external market environment are another important research direction. Lingyan Suo [4] found that by the end of 2023 China had broadly entered a moderately aged society, but in practice consumers have limited savings and short-term liquidity needs; this places strong short-term growth pressure on insurers' eldercare-related businesses and creates obvious short-term survival stress. Similarly, Xiaohua Qiu et al. [5], through a comparative analysis of per-capita GDP when China entered population aging versus the United States, Japan, and South Korea, found that China's "getting old before getting rich" phenomenon is prominent, posing challenges to the high-quality development of pension insurance. Shan Jiang [6] noted that China has not yet formed a normative policy system for eldercare services, industry standards remain ununified, and further formulation and improvement are required.

On the matching between eldercare and insurance, Xia Lou et al. [7] pointed out that due to constraints such as industry development speed and market acceptance, insurers seldom launch genuinely new eldercare insurance products, preventing the formation of a virtuous interaction between industry development and product innovation. Junting Chen [8] analyzed that the current level of integration between insurance companies and the eldercare service industry is shallow, making direct linkage between insurers and consumers difficult and resulting in inadequate interaction. Zhentao Ma [9] further found that concrete manifestations of poor matching between product design and eldercare demand include inadequate floating-rate mechanisms in existing product pricing, a low proportion of equity investments in pension assets, and difficulty hedging against long-term inflation.

The integrated development of commercial insurance and the eldercare service industry is key to achieving sustainable development in the eldercare sector. Siwen Li [10] examined the logic linking

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commercial insurance and eldercare services and argued that commercial insurers have advantages in efficient capital operation, service diversity, and professional capability; examples of integration already exist and continue to innovate. Kai Gao [11], from the perspective of designing commercial business models for eldercare insurance, explored how business-model innovation—approaching the eldercare service industry from multiple angles—can further drive development and promote integration between commercial insurance and eldercare services, emphasizing that insurers should strengthen cooperation with eldercare service providers to jointly build the eldercare industry chain, achieve resource sharing and complementary strengths, improve service quality, and meet the diversified needs of the elderly. Su Huang [12] noted that China's commercial life insurers have entered the eldercare services field mainly by investing in or developing senior living communities or partnering with professional eldercare institutions to provide integrated services (residence, nursing, rehabilitation, recreation) that meet different levels of demand; however, this participation is still exploratory and faces problems such as non-uniform service standards and a shortage of professional personnel. Future work should further optimize service models and raise service quality to better adapt to the needs of an aging society.

Community- and home-based eldercare is an important component of China's eldercare service system. By participating in such models, commercial insurers can provide elderly clients with more diversified eldercare services. Rongshang Hu [13] pointed out that small and medium-sized insurers can establish strategic partnerships with enterprises specializing in home adaptation for aging, and—by aligning with the features of community-based eldercare—develop suitable products and services to provide clients with personalized home-care plans. The research group of Pacific Insurance Pension Investment Management Company [14] conducted an in-depth study on the intrinsic logic, business models, and profit models linking insurance products and home-based eldercare services, noting that most insurers have already entered this field and established eldercare industry investment funds. Weihou Zheng [15] analyzed the current landscape of insurers' deployment in the eldercare industry and proposed optimization measures, emphasizing that in home-based eldercare, insurers should capture its commercial value—particularly in the large potential of home nursing services—while also using the Internet and "smart eldercare" tools to better integrate resources and improve efficiency.

Eldercare real estate, as another key component of the eldercare industry, has broad development prospects, and the participation of insurance funds can provide stable financial support for related projects. Su Huang [16] analyzed the involvement of commercial life insurers in the eldercare industry and the practical challenges they face, such as large investment requirements and long capital recovery periods, and highlighted that China has not yet formed a clear, replicable model. Huang suggested that commercial life insurers should draw lessons from existing cases and continue to explore in specific projects. Jie Dong [17], analyzing the relationship between insurers and eldercare real estate, argued that insurers need to further enrich and improve their products and services when investing in eldercare properties, focusing on enhancing the operational and cost-control capabilities of senior living communities to ensure insurers' stability and sustainable development.

Nonetheless, insurers' investment in eldercare real estate and communities still faces many problems and challenges. Wen Zhong [18], using SWOT analysis, found that insurers face multiple weaknesses and threats in the investment process. Weaknesses include a lack of professional real estate investment experience and management expertise, insufficient professional operation of senior housing, and limited understanding of the eldercare real estate market. Moreover, China still lacks successful examples of profitable eldercare real estate projects, and the government has yet to

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introduce substantive policies encouraging insurers' investment in this field, leaving insurers to bear part of the risk. Xiang Shi [19] supplemented this by noting persistent rigid thinking among insurance institutions, a narrow client base, and the need for continued improvement in the external environment of eldercare real estate.

Despite these challenges, such investments hold real value and significance for meeting the needs of the eldercare industry. Jin Dai [20], from the perspective of "meta-models," conducted an in-depth analysis of the commercial model value of insurance eldercare communities. The development of eldercare real estate can meet the demand for high-end eldercare services among higher-income elderly groups, while also bringing strategic value to insurers through improved asset management efficiency and other benefits. Chenyang Li [21] focused on insurance capital investment in eldercare real estate, arguing that such initiatives can create bundled win–win effects and further tap market potential. Given the high compatibility between insurance investment and eldercare real estate—since the customer base of pension insurance products overlaps significantly with that of senior housing—such integration helps expand the pension insurance market and further promotes overall economic development and social stability.

In terms of investment models and pathways, Ziyao Li [22] studied routes for insurers' investment in eldercare real estate and proposed several models, including direct investment, indirect investment, and cooperative investment, while emphasizing the need to pay attention to risk control and asset allocation in the process. Yong Zhang [23] discussed strategies for insurance capital investment in eldercare real estate, suggesting that insurers should leverage their strengths and market characteristics, adopt approaches such as integrating "medical–nursing care" with insurance products, introduce other forms of investment, and develop eldercare wealth management products. Zixi Wang [24] examined development pathways and strategies for China's eldercare real estate, arguing that fully leveraging the high compatibility between eldercare real estate features and insurers' long-term investment preferences can foster innovation, thereby addressing the dual challenges of financing shortages in eldercare real estate and the lack of long-term investment opportunities in the insurance industry.

3. Empirical analysis

This study specifies the following regression model:

$$Y_i = \beta * X_i + \varepsilon_i \,,\ i = 1,2,3,\ldots,n$$

where Y_i is the dependent variable, X_i the explanatory variable, β the regression coefficient, and ε_i the random error term. The parameter β represents the average change in Y when X changes by one unit, holding other factors constant. Ordinary Least Squares (OLS) estimation is employed, ensuring unbiased and efficient estimators under the assumptions of the classical linear regression model.

Table 1. Regression analysis of aging on total insurance premiums

Total Premiums	Coefficient	Std. err.	t	P>|t|	[95% conf. interval]
Aging Level	484.4281	74.34846	6.52	0.000	338.6043 630.2518
_cons	1123.751	893.5817	1.26	0.209	-628.8805 2876.382

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Table 1 shows that the degree of urban aging has a significant positive effect on total insurance premiums. The coefficient of aging is 484.43 and is significant at the 1% level (p=0.000), indicating that for every one-unit increase in the degree of aging, total insurance premiums rise by an average of about 484.43 yuan. The constant term (_cons) is insignificant (p=0.209), suggesting that baseline premiums without the impact of aging are unstable.

Table 2. Regression analysis of aging on property insurance premiums

Property Insurance	Coefficient	Std. err.	t	P>|t|	[95% conf. interval]
Aging Level	95.83146	21.07181	4.55	0.000	54.50218 137.1607
_con	774.5877	253.1421	3.06	0.002	278.0866 1271.089

Table 2 shows that the degree of urban aging also has a significant positive effect on property insurance premiums. The coefficient of aging is 95.83 and is significant at the 1% level (p=0.000), meaning that for every one-unit increase in the degree of aging, property insurance premiums increase by about 95.83 yuan. The constant term is significant (p=0.002), indicating that even when the aging level is zero, there remains a baseline level of property insurance premiums.

The regression results clearly demonstrate that aging significantly drives insurance demand in contemporary Chinese society. As the degree of aging deepens, both society's and individuals' demand for insurance continue to rise. Comparing the two regressions, the marginal effect of aging on total insurance premiums is much larger than that on property insurance premiums. This implies that aging has a more direct impact on personal insurance products, such as life insurance and health insurance, rather than property insurance. These findings suggest that insurers are more likely to develop and launch products directly related to eldercare, or—as highlighted in the literature review—integrate insurance with eldercare real estate and other services. In essence, insurers should focus on meeting the multifaceted needs of the elderly population, thereby capturing emerging market opportunities.

4. Conclusion

Based on the literature review and empirical analysis, it can be concluded that population aging has become an important driving force behind the sustained growth of insurance expenditure in China. With the deepening of aging, the insurance industry is undergoing significant changes in both premium scale and business structure. On the one hand, the demand for risk protection among the elderly is steadily increasing, driving the continuous expansion of overall insurance demand. On the other hand, the demand structure is becoming more diversified, particularly in the field of personal insurance. Products such as life insurance, health insurance, and long-term care insurance are showing strong market potential.

In response to this trend, insurance companies have begun to adopt product innovation and market expansion strategies. For example, in the elderly care industry, they are pursuing diversified layouts that not only provide insurance products tailored to different income groups but also invest in senior housing and retirement communities. By extending the industrial chain and exploring the "insurance + elderly care services" model, companies are better positioned to meet the multifaceted needs of the elderly while also capturing new market opportunities. This model not only alleviates practical challenges faced by the elderly but also creates new sources of profit growth and enhances brand value for insurers.

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Looking ahead, insurance companies should further strengthen differentiated design in pension-related products to precisely address the multi-level and diverse needs of the elderly population. Products such as long-term care insurance and health management-oriented insurance, which align closely with the characteristics of an aging society, should be prioritized. At the same time, companies should increase investment in retirement housing and community development, promote emerging models such as smart elderly care and home-based elderly care, and leverage digital technologies such as big data and artificial intelligence to improve the efficiency and personalization of elderly care services.

Moreover, promoting the deep integration of insurance and elderly care services is an essential pathway for building a sustainable development ecosystem for the insurance industry. By collaborating with professional elderly care providers and medical rehabilitation institutions, insurers can develop integrated solutions that combine financial protection, medical services, and elderly care support. This not only meets the growing demand for high-quality elderly care but also facilitates the long-term and stable operation of insurance funds. In doing so, the insurance industry can contribute to the improvement of China's social security system while fostering synergistic development between the elderly care industry and the insurance sector.

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