Under what spatial conditions do Chinese urban elderly people wish to grow older?

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Contents

Abstract

Population ageing has become a severe problem faced by all countries in the world. According to the seventh population census, China's population aged 60 and above has reached 264 million, accounting for 18.7% of the total population. Since 2020, China has entered a deep stage of population aging. It is estimated that by 2050, the total number of elderly people in China will exceed 400 million. Population ageing will bring great challenges to China's healthcare, elderly care, social security, and other aspects. In response to population aging, the report of the 20th National Congress of the Communist Party of China clearly proposed to "implement a national strategy to actively respond to population ageing". In addition, active ageing, as a long-term national strategy of China, has been written into the outline of the "14th Five-Year Plan".

Ageing in place is currently the mainstream concept in gerontology literature to promote active ageing, which enables older adults to enjoy their later years in familiar family and community settings. It is believed to help older adults maintain independence, autonomy, and access to social support. However, not all external environments are suitable for ageing in place, and different older adults may be different in their most suitable ageing modes. Therefore, answering the question of what kind of older adults in what kind of environmental conditions are more inclined to ageing in place is of great significance for promoting active ageing at a deeper level. At present, there is a considerable amount of literature exploring the impact of different scales of environment on the health and quality of life of older adults from the perspectives of urban planning, sociology, gerontology, and geography of aging. There are also some studies exploring the optimization of space and planning strategies for elderly-friendly and livable environments. However, there is a lack of research on the influence of the environment on older adults' ageing intention.

Based on the perspective of active ageing and the theoretical framework of congruence between older adults and the environment, this study uses data from the 2018 Chinese Longitudinal Healthy Longevity Survey (CLASS) and the 2019 China Statistical Yearbook, along with research methods such as logistic regression models, ArcGIS spatial data visualization, and interaction effect models, to explore the

mechanisms that influence the ageing in place intention of older adults with different individual characteristics. The research considers both micro-level community environments and macro-level regional environments.

The findings are as follows: (1) Satisfaction with the physical environment of the community has a significant positive impact on older adults' intention of ageing in place. (2) While community social support does not have a direct significant influence on older adults' intention of ageing in place, it can indirectly affect this intention by moderating the influence of the physical environment satisfaction. (3) Regional environments also affect older adults' ageing in place intention. Specifically, warm and humid regions positively influence this intention, while provinces with a higher number of elderly care beds per capita negatively impact it. Additionally, intention of ageing in place is influenced by regional culture. The intention among the elderly in the Northeast Cultural Region and Central China Cultural Region is the highest, while that in the Northwest Cultural Region is the lowest. (4) The interaction between certain individual characteristics of older adults and the environment affects their intention of ageing in place. Older adults with varying health statuses and economic situations exhibit different levels of influence from the environment on their intention. Based on these findings, this study proposes policy recommendations focused on improving the physical and social environments of communities, optimizing the allocation of elderly care resources across different regions, and prioritizing the needs of vulnerable older adults.

Key words: Ageing in place; Active ageing; Community environment; Regional environment; Cultural environment

1 Introduction

1.1 Research Background

1.1.1 Active ageing and ageing in place

Currently, population ageing has become a severe issue faced by countries worldwide. It is projected that by 2050, 22% of the global population will be aged 60 or above (Bloom et al., 2008). China's ageing population is also showing a significant increase. According to the seventh national census data, the population aged 60 and above in China has reached 264 million, accounting for 18.7% of the total population. Since 2020, China has entered an accelerated phase of ageing. It is estimated that by 2050, the total elderly population in China will exceed 400 million, with the population of the oldest old (those aged 80 and above) reaching 95 million. The rapidly growing elderly population poses significant challenges to China in terms of healthcare, elderly care, social security, and other aspects.

To address the increasingly severe challenge of population ageing, the World Health Organization proposed the concept of "active ageing" in 2002, which is defined as the process of optimizing opportunities for health, participation, and security to enhance the quality of life as people age (WHO, 2002). At the same time, China has also paid full attention to the process of active ageing. In 2021, "active ageing" was included as a long-term national strategy in China's "14th Five-Year Plan" outline.

In response to and in promoting active ageing, both Chinese and international researchers have conducted studies exploring a series of ageing terms, concepts, and policies. Among them, "Ageing in place" stands out as a mainstream concept in current gerontology literature promoting active ageing. It is defined as "older adults maintaining a certain level of independent living in the community rather than residing in institutional care settings" (Davey et al., 2004, p.133). Additionally, "Ageing in place" is believed to help older adults maintain independence, autonomy, and access to social support (Li Xiaoyun, 2012; Keeling, 1999; Lawler, 2001). Allowing older adults to remain in their homes and communities for as long as possible can also help avoid expensive institutional care costs, thus gaining favor among policymakers, healthcare providers, and many older adults (WHO, 2007).

In China's exploration of the path towards active ageing, the "14th Five-Year Plan" and the Vision for 2035 Outline propose supporting families in assuming eldercare responsibilities, establishing closely coordinated community eldercare networks, and realizing an integrated eldercare service ecosystem that combines medical care, eldercare, and health preservation. In general, this eldercare system aims to enable older adults to enjoy their later years in familiar family and community environments, while also benefiting from the harmonious atmosphere of family, social support from the community, and professional medical services, thus maintaining a healthy and happy lifestyle. Therefore, China's current eldercare system, while meeting the diverse needs of the elderly, also emphasizes to a certain extent the advantages of ageing in place.

1.1.2 Elderly-friendly community

The World Health Organization initiated the "Age-Friendly Cities" project globally in 2005, introducing the innovative concept of an "age-friendly city" (WHO, 2007). As communities constitute the fundamental components of cities, they have emerged as pivotal entities in shaping strategies for active ageing, giving rise to the notion of age-friendly communities. Within the framework of active ageing, the significance of age-friendly community environments for the elderly has garnered considerable attention from governmental bodies and the academic sphere. Research indicates that the physical environment of communities profoundly influences the quality of life and health status of the elderly (Feng, 2018). Factors such as the accessibility of sidewalks and public transportation, proximity to medical facilities and shopping venues, as well as the overall safety and friendliness of the community, directly impact the daily experiences of the elderly. Enhancing these factors can bolster community comfort and the independence of the elderly, thereby ameliorating their quality of life. Given that the elderly often have more leisure time and typically engage with community environments more frequently than younger cohorts, the physical milieu of communities exerts a more pronounced and consequential effect on this demographic. Consequently, in the context of active ageing, governments and pertinent organizations ought to prioritize the planning and enhancement of community physical environments to cater to the needs of the elderly and augment their quality of life.

Simultaneously, the social environment of communities also holds significant sway over the happiness of the elderly. Research underscores a positive correlation

between the social environment of communities and the subjective well-being of the elderly. Engageing in cultural activities within the community, for instance, can furnish emotional support and social interaction for the elderly, thereby mitigating feelings of loneliness and depression (Jin et al., 2017). A congenial and supportive community environment not only facilitates the participation of the elderly in leisure activities and social interactions but also fosters their physical and mental well-being.

Consequently, alongside improvements in the physical environment, communities should actively foster a nurturing and cohesive social atmosphere, encourageing mutual assistance among residents, thus amplifying the happiness of the elderly. Age-friendly communities ought to function as welcoming harbour for the elderly, providing them emotional support and social care, enabling them to relish a fulfilling life within the community during their later years.

1.1.3 The spatial pattern of ageing population in China

China, with its expansive territory, exhibits diverse climatic characteristics, historical cultures, customs, and varying levels of economic development. The natural environment and cultural landscapes also manifest significant disparities across regions. In addition to these regional differences, the level and pace of ageing across different areas in China also display heterogeneous spatial distribution characteristics.

Regions with higher degrees of population ageing are predominantly concentrated in the Yangtze River Delta region, encompassing Shanghai, Jiangsu, and Zhejiang provinces, the Circum-Bohai Sea region, including Beijing, Tianjin, and Shandong province, as well as the northeastern region, comprising Liaoning, Jilin, and Heilongjiang provinces (Zhao et al., 2012). The level of population ageing demonstrates significant spatial clustering both nationally and locally (Liu et al., 2014).

Furthermore, substantial disparities exist in the allocation of elderly care service resources across different regions in China. The distribution of elderly care service resources in various provinces does not fully align with the distribution of the elderly population, leading to situations of both resource over-allocation and under-allocation, consequently resulting in spatial mismatches and imbalances in resource distribution (Zhang & Duan, 2023).

1.2 Research relevance

Active ageing underscores the importance of promoting the health, participation, and security of the elderly, with the overarching aim of enhancing their quality of life. Ageing in place represents both a theoretical concept and a practical endeavor within the framework of active ageing. It seeks to foster the health, social engagement, and security of the elderly by facilitating their ability to maintain a certain degree of independent living within their community, thereby improving their quality of life. In contemporary mainstream academic discourse, ageing in place is frequently hailed as the most suitable model of elderly care. Nevertheless, not all external environments are conducive to ageing in place, and disparate elderly individuals may harbor preferences for various elderly care models. Hence, comprehending which elderly individuals are predisposed to ageing in place under specific environmental conditions assumes paramount importance in advancing active ageing more effectively.

At the theoretical level, there exists a substantial body of literature that delves into the impact of community environments on the health and quality of life of the elderly. Perspectives from fields such as urban planning, sociology, and gerontology contribute to this discourse. Additionally, numerous studies have investigated regional disparities in ageing levels and the allocation of elderly care resources, primarily from the vantage point of gerogeography. Furthermore, several papers have explored spatial and planning strategies aimed at optimizing age-friendly living environments. However, despite these contributions, there remains a notable paucity of research specifically examining the influence of the environment on the intention of ageing in place.

The thesis delves into the mechanisms through which urban community environments at the micro level and regional environments at the macro level influence the intention of ageing in place of elderly individuals with different characteristics. Its objective is to address the theoretical question of which types of elderly individuals are more inclined to age in place under what environmental conditions, and under what circumstances they are more likely to consider relocation or moving into care institutions.

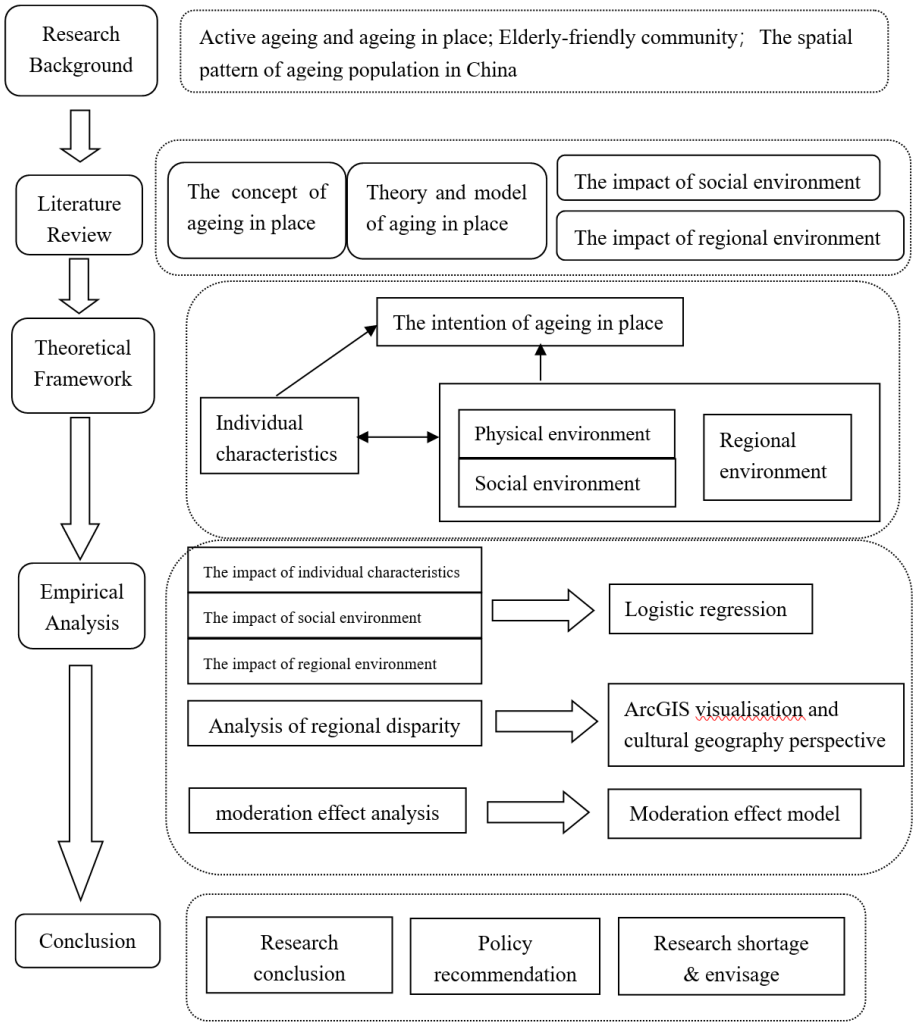
On the practical level, studying the relationship between community environments and the intention of ageing in place among the elderly is crucial for devising planning policies and implementing age-friendly community transformations

tailored to different types of communities and elderly populations. Investigating regional disparities in the overall intention of ageing in place among elderly populations and the influence of regional environments on this intention is significant for developing targeted elderly care policies and efficiently allocating elderly care resources nationwide. By delving into the interactions among community physical environments, social environments, individual characteristics, regional contexts, and the intention of ageing in place, we can better meet the needs of the elderly and assist them in achieving more suitable living conditions. Understanding the preferences and needs of the elderly can grant them greater autonomy and satisfaction while also fostering the creation of more inclusive and sustainable solutions for ageing in society.

1.3 Reading guide

The paper, based on the perspective of active ageing, utilizes data from the 2018 China Longitudinal Ageing Social Survey (CLASS) and the 2019 China Statistical Yearbook. It explores the mechanisms through which urban community environments at the micro level and regional environments at the macro level influence the intention of ageing in place among elderly individuals with different characteristics. The study derives corresponding research conclusions and proposes relevant policy recommendations. The specific content arrangement is as follows:

The introductory chapter of this paper consists of three main parts: research background, research relevance, and reading guide. Firstly, this section provides a summary introduction to the challenges of ageing faced by China, the national strategy of "active ageing," and the ageing-friendly community environment as well as the spatial pattern of ageing in China, emphasizing the importance of the chosen topic and the research foundation. Subsequently, the introduction delves into the



theoretical and

Figure 1-1 Writing framework

practical relevance of the research, providing a clear direction and framework for subsequent contents.

Chapter 2 serves as the literature review section, drawing from existing literature from both Chinese and international sources. Firstly, it compares and analyzes the terminology of ageing in place and existing elderly care models. Subsequently, the review section outlines theoretical research related to ageing in place. Building upon this foundation, it separately reviews the influence of community physical

environment, social environment, and regional environment on the intention of ageing in place among the elderly, aiming to better guide the development of research design.

Chapter 3 is the research design section. It begins by proposing the research framework and hypotheses. Following that, it introduces the basic information of data sources and key variables, including the intention of ageing in place among the elderly, individual characteristics, community physical environment, community social environment, and regional environmental characteristics, along with their descriptive statistics results. In the research methods part, the primary focus is on introducing the logistic regression model used in the study, the visualization of spatial data using ArcGIS, and the application of interaction effect models.

Chapter 4 is the empirical analysis of factors influencing the intention of ageing in place. This section begins by conducting statistical tests on the logistic regression model. Subsequently, based on the results of the regression model, empirical analyses are conducted on the influences of individual characteristics, community environment, and regional environment on the intention of ageing in place among the elderly.

Chapter 5 focuses on the empirical analysis of the impact of regional environment on the intention of ageing in place. This section utilizes ArcGIS for spatial data visualization of regional differences in the intention of ageing in place. Additionally, it conducts in-depth analysis and discussion of regional differences in the intention of ageing in place from the perspective of cultural geography.

Chapter 6 presents the empirical analysis of moderation effects among influencing factors. This section begins by conducting empirical analyses of the moderation effects between community physical environment and community social environment, as well as the moderation effects between community environment and certain individual characteristics. It then proceeds to analyze the moderation effects between certain regional environmental characteristics and individual characteristics, aiming to further explore the mutual moderation effects of community physical environment and community social environment on the intention of ageing in place. Moreover, it addresses the question of which types of elderly individuals are more influenced by community environment and regional environment regarding their intention of ageing in place.

Chapter 7 comprises the conclusion and discussion. Based on the aforementioned research, this section presents the research conclusions and offers corresponding policy recommendations regarding the influencing factors of the intention of ageing in

place among the elderly. Additionally, it identifies research limitations and suggests future prospects for related studies in this field. Figure 1-1 illustrates the writing framework of this paper.

2 Literature Review

The literature review section thoroughly explores the conceptual understanding of ageing in place, theoretical models, and the influence of community and regional environments on ageing in place.

Initially, this section clarifies and distinguishes the concept of ageing in place. The “place” not only denotes the elderly's continued residence in their original dwelling but also encompasses various facets of housing, neighborhoods, and community environments. "Ageing" represents the dynamic process of interaction between individuals and their surroundings. Furthermore, this section compares the terminology of ageing in place with other models of elderly care. Following the elucidation of the concept of ageing in place, the subsequent part of the review delineates relevant theories and models. Place attachment, continuity, and environmental control collectively shape the elderly's experience of ageing in place and act as driving forces, while unsuitable living conditions may exert pressure on the elderly. The ecological model of ageing and the person-environment congruence theory emphasize the importance of considering both individual characteristics and environmental factors comprehensively to achieve fit or congruence between individuals and their environment. Moreover, different spatial scales of ageing environments exert varying degrees of influence on the elderly. Lastly, this section primarily focuses on outlining the impact of community and regional environments on ageing in place. Community environments are classified into physical and social aspects, with existing research indicating that they can independently and collectively influence ageing in place, as well as the overall quality of life and mental and physical health of the elderly. The regional environment segment provides an overview of regional disparities in ageing populations and the current status of elderly population migration in China, along with its impact mechanisms.

2.1 The concept of ageing in place

Ageing in place is defined as "older adults maintaining a certain level of independent living in the community rather than residing in institutional care settings" (Davey et al., 2004, p.133). Due to its potential to delay individual ageing and save public finances, ageing in place has emerged as a consensus strategy among major developed countries and international organizations, occupying a dominant position in

the literature of environmental gerontology (Yao, 2015 and 2016). However, despite the significant attention paid by gerontologists to the concept of older adults "ageing in place," there remains a relatively limited comprehensive and detailed conceptualization of this theme. Definitions in the literature often appear overly simplistic, failing to fully encompass the diverse life experiences of older adults in the process of ageing in place (Zhang, 2020 and 2021; Bigonnesse & Chaudhury, 2019). Furthermore, in the context of China, terms related to elderly care such as family care, home care, and community care exhibit partial similarities and differences with ageing in place. Therefore, in the Chinese context, it is particularly important to analyze and compare the concept of ageing in place for subsequent research.

The concept of ageing in place can be approached from two angles: "ageing" and "in place." "In place" is a concept with an expanding scope (Wiles, 2005). It encompasses not only the actual place of residence but also various aspects ranging from individual dwellings to community environments (Peace et al., 2006; Zhang et al., 2018). For instance, some environmental gerontologists increasingly recognize that, beyond the household, neighborhoods and communities are crucial factors in determining whether people can remain ageing in place (Oswald et al., 2010). To promote ageing in place, policymakers need to consider not only housing choices for the elderly but also transportation, recreational facilities, and amenities to facilitate their engagement in physical activities, social participation, cultural involvement, and lifelong learning (Wahl & Weisman, 2003; Chen et al., 2022).

China's current elderly care system mainly comprises three modes: home-based care as the foundation, community-based care as the support, and institutional care as the supplement. "Home-based care" refers to the elderly receiving care services and assistance within their own household environment, primarily relying on support from family members. "Community-based care" involves professional service personnel providing services at the elderly's homes or in community day care centers, offering services such as daily living assistance, rehabilitation care, and psychological support, with the community as the support base. "Institutional care" entails the elderly being placed in specialized care institutions, where care personnel are employed to provide daily living assistance and nursing services (Liu and Li, 2022).

The concept of "ageing in place" integrates the core principles of "home-based care" and "community-based care," emphasizing the continuity of elderly care in terms of location and residence, allowing the elderly to age in the environment where

they have lived in the past. Simultaneously, this concept also diminishes the emphasis on the providers of services and support, no longer overly emphasizing the boundaries between family and community. Instead, it emphasizes the collective responsibility of various entities in the elderly's original living environment as they approach the end of life. Therefore, using the concept of "ageing in place" rather than further subdividing elderly care models into multiple categories helps to distinguish more clearly whether the elderly continue to live in their former environment. Such differentiation and analysis contribute to further research on how the environment influences the elderly's desire to age in place.

2.2 The theory of ageing in place

2.2.1 The momentum of ageing in place

In the process of ageing, older adults' attachment to specific places, continuity of behavioral patterns, and strategies for environmental adaptation collectively constitute the momentum that motivate them to age in place (Zhang, 2021). This section offers a literature review of these phenomena observed in the process of ageing in place, aiming to improve the understanding of the reasons that prompt older adults to age in place and laying the groundwork for understanding related theoretical models of ageing in place.

The emotional attachment of older adults to their living environment often transcends the realm of physical space. They are deeply connected to the elements, experiences, memories, and expectations within their living environment, forming a profound sense of “place attachment." This attachment is not only an emotional sense of belonging but also reflects intertwined cognitive, behavioral, and social aspects, turning space into meaningful "places." Such attachment is particularly evident in the process of ageing in place and constitutes an important aspect of older adults' life experiences and self-identity (Scannell et al., 2010).

From the perspective of the life stages that older adults go through, they demonstrate significant continuity in the process of ageing. They tend to maintain stable behavioral patterns formed over the past few decades of life and adapt to changes through action strategies closely connected to their own experiences. This continuity plays a crucial role in the lives of older adults, manifesting not only in daily habits and social activities but also in their cognition and choices regarding their living environment (Atchley, 1989).

Moreover, older adults encounter challenges in environmental adaptation during the process of ageing. The theory of personal control can help understand older adults' adaptation strategies to their living environment, which includes the concepts of primary control and secondary control. Primary control refers to individual's attempt to directly change the surrounding environment or using their own agency to maintain control over the environment, thereby enhancing self-efficacy. Secondary control refers to adopting an attitude of acceptance towards irreversible bodily ageing and limitations in the environment to alleviate feelings of helplessness. Older adults may enhance their sense of control over life by re-arranging their home environment, installing age-friendly facilities, and undertaking other primary control measures. However, as they age and experience declining physical function, secondary control becomes more important. Older adults need to learn to accept bodily limitations and environmental changes, maintaining a positive attitude towards life through adjusting their mindset and behavior (Heckhausen et al., 1993).

In the process of ageing, place attachment, continuity, and control strategies collectively constitute the momentum for older adults' lives at home. For older adults, the living environment is not merely a physical shelter but also a place of emotional connection, memory storage, and social interaction. This sense of place attachment provides older adults with a sense of security and familiarity, aiding in the maintenance of their self-identity and social roles. Simultaneously, ageing in place can be perceived as a strategy of continuity, aimed at preserving the internal psychological continuity and social behavioral continuity of older adults within their home or community environments. Moreover, ageing in place elucidates how older adults, when faced with non-voluntary changes in their living environment, adapt or reconstruct the place using primary or secondary control strategies.

2.2.2 Pressure of Ageing in Place

While ageing in place offers several advantages, it also poses various pressures and challenges, encompassing both physical and non-physical aspects.

Physical pressures primarily originate from the external physical environment, as many older adults' living environments remain ill-suited to their needs, resulting in numerous safety hazards. For example, homes may feature uneven floors, narrow corridors, or bathrooms lacking slip-resistant measures, all of which heighten the risk of falls for older adults (Bamzar, 2019). Additionally, challenges may arise from community and urban environments, such as narrow and steep stairs, a lack of

accessibility features within the community, or short traffic light durations (Romero-Ortuno et al., 2009). Furthermore, extreme weather conditions in residential areas can exacerbate the pressures of ageing in place, potentially adversely affecting older adults' health.

Non-physical pressures predominantly manifest as inadequate social support. With advancing age, older adults may experience declining physical function, health problems, and the loss of loved ones, leading to feelings of loneliness and helplessness (Fang, 2013). In their living environment, a lack of support from friends can impede older adults' ability to effectively cope with these pressures, potentially resulting in anxiety, depression, and other psychological issues. Moreover, if the community lacks a comprehensive support system tailored to older adults, they may feel helpless and isolated when encountering challenges and difficulties in their daily lives (Zhao, 2009).

2.2.3 Theoretical Models of Ageing in Place

From current research, the models pertaining to ageing in place concerning elderly individuals and the environment primarily include the ecological model of ageing and the person-environment fit theory model.

The ecological model of ageing underscores the adaptability of elderly individuals to their environment. According to this model, ageing is perceived as a continuous adjustment to external environmental changes and internal alterations in abilities over the lifespan (Lawton & Nahemow, 1973; Nahemow & Lawton, 1973). Personal capabilities, environmental pressures, emotional adaptation degrees, and the optimization of environmental functions are all interconnected. Moreover, this model incorporates the concept of Personal Control Theory, which distinguishes between environmental conformity and environmental agency. The former implies that as personal abilities decline, behavior becomes increasingly influenced by environmental characteristics, while the latter indicates that enhanced personal capabilities enable individuals to better utilize environmental resources (Nahemow & Lawton, 1973).

However, the ecological model of ageing somewhat underestimates the reciprocal effect of environmental pressures on individual functioning and behavioral capabilities. It primarily focuses on how elderly individuals adapt to existing environments, somewhat overlooking whether the external environment is suitable for them and whether elderly individuals are willing to alter their surroundings. Thus, in practical applications, it is essential to consider the degree of alignment between

elderly individuals and their environment, as well as the proactive responses of elderly individuals to environmental pressures (Peace, 2011).

The person-environment fit theory, developed based on the ecological model of ageing, rectifies the deficiency of the latter by considering not only how elderly individuals adapt to the environment but also providing another theoretical perspective for ageing in place. Its fundamental premise is that stress does not solely arise from individuals or the environment but results from the level of fit or congruence between the two. Fit or congruence is demonstrated not only in the extent to which personal capabilities adjust to the environment but also in the degree to which the resources provided by the environment meet individual needs (Nehrke et al., 1981).

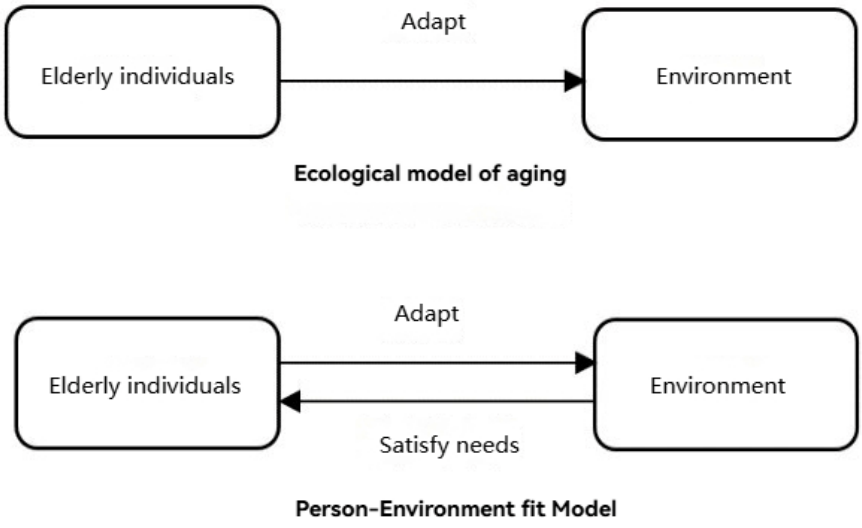
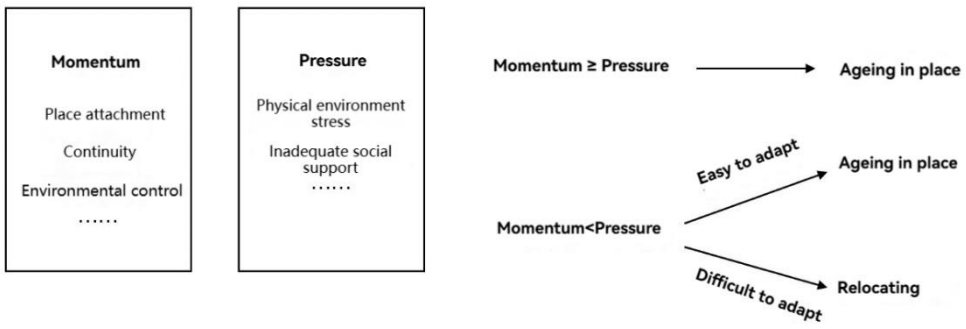


Figure 2-1: A Comparison of Two Theoretical Models of Ageing in Place (Created by the Author)

Figure 2-2: Practical Application of Theoretical Models of Ageing in Place (Created by the author)

The alignment between elderly individuals and the environment envisages



significant implications for individual quality of life, sustainability, independence, and psychological well-being (Kahana, 1982). According to this theory, the ideal ageing in place environment should be one that is in harmony with the elderly. If there is a lack of complete alignment or consistency between the environment and the individual, and the elderly person struggles to adapt to this inconsistency, relocating to another location for care may become a preferable option. Therefore, within the context of ageing in place, it is paramount to consider the interaction between the elderly and their environment to achieve harmony and adaptability between the two (Figure 2-1 illustrates a comparison of two theoretical models of ageing in place).

In conclusion, the theoretical models of ageing in place underscore the interplay, coherence, and adaptability between the elderly and their environment. In practical application, it is essential to consider both the individual characteristics of the elderly and the enabling factors and challenges posed by the environment to achieve coherence and adaptability between the two. Place attachment, continuity, and control that older adults develop within their long-term living environment serves as crucial momentum for maintaining their physical health and quality of life. Conversely, unsuitable conditions for ageing in place can exert pressure on the elderly (refer to Figure 2-2). Furthermore, as the momentum and pressures of ageing in place vary across spatial scales, the subsequent section will delve into the spatial scale considerations of ageing in place.

2.2.4 Spatial Dimensions of Ageing in Place

Assessing the suitability of ageing in place necessitates a profound comprehension of the activity patterns, requirements, and interactions between older adults and their environment across various spatial scales. While the ecological model of ageing and the person-environment fit model offer an analytical framework for understanding the interplay between individuals and their surroundings, further consideration is needed, particularly concerning the examination of spatial scales.

Early studies conducted by geographers have unveiled discrepancies in the activity patterns of older adults across diverse environments, encompassing urban centers, suburbs, small towns, and rural areas. These investigations not only take into account the geographical extent but also integrate various factors influencing older individuals' adaptation to their surroundings, such as health conditions and social network requirements. Rowles (1986) introduced the concept of "surroundings" from the vantage point of the geographical environment, positing that as older adults

become more oriented towards their homes, their social ties with neighbours grow increasingly significant. Additionally, he proposed that the environment comprises multiple distinct cognitive domains, including the home, neighborhood, community, city, geographical region, and country. Within each domain, older adults exhibit unique activity patterns, involving different forms of support from family, friends, and public services (Rowles, 1983). Furthermore, Peel's (2005) research on evaluating older adults' living spaces identified six spatial scales, encompassing the bedroom, home, surroundings outside the home, neighborhood, town, and beyond town.

In essence, older adults' perception of the environment follows a hierarchical structure, extending from the home to the community and then to broader regional concepts, each entailing specific activity patterns and support requirements. This offers crucial insights for investigating the influence of environments across different scales on the inclination to age in place, underscoring the need to consider potential impacts on older adults across various spatial levels.

2.3 The Influence of Community Environment on Ageing in Place

The World Health Organization (WHO) defines "ageing in place" as enabling older adults to reside independently in their current residence within the community, with adequate support and services to meet their desires and capabilities (WHO, 2004). In current academic research and policy discourse, ageing in place is often regarded as the most suitable ageing mode for older adults. Since older adults who choose ageing in place live in their familiar communities, the community environment directly influences their lives. Therefore, much of the literature explores how to improve the community environment to enhance the quality of life for older adults choosing to age in place (Wang & Shepley, 2018; Feng et al., 2018; Lyu & Forsyth, 2021; Steels, 2015).

However, according to the person-environment fit theory, not all community environments are suitable for ageing in place. Due to potential disparities between the objective community environment and individual subjective perceptions, we should not assume that ageing in place is always the optimal ageing solution. Hillcoat-Nalletamby and Ogg (2014) critically examined the concept of ageing in place and investigated whether dissatisfaction with housing and community environments would influence older adults' choice of ageing mode. Their research findings suggest that when the community environment fails to meet older adults'

physiological and psychological needs, older adults with chronic illnesses or disabilities are more likely to consider relocating or moving into long-term care settings. This indicates that ageing in place is not a one-size-fits-all ageing solution but rather varies with changes in older adults' life cycles and environmental congruence levels. Severinsen et al. (2016) interviewed 143 older adults who believed their housing and community environments were unsuitable for ageing in place and summarized the reasons for their preference for continuing ageing in place or relocating to long-term care settings. For older adults wishing to age in place, inconvenient community environments are not considered as barriers to relocation or moving into long-term care settings but rather as key factors in maintaining their narrative of continuity. In contrast, leaving reasons for older adults who do not wish to age in place include inconvenient public transportation, inadequate shopping facilities, and unsuitable community environments. Therefore, the influence of the community environment on older adults' intention to age in place should consider individuals' perceptions of the community environment and the congruence between individuals and the environment.

Current research on factors influencing urban residents' ageing in place intention focuses mainly on individual characteristics such as age, education level, economic status, health status, and family relationship characteristics such as marital status, family status, number of children, and whether there is someone to care for them. Analysis of older adults' living environments often focuses on housing conditions. Most studies on the impact of the community environment on the ageing in place intention only consider resources specifically designed for community ageing, such as community day care centers and health centers. This, to some extent, overlooks the importance of the community environment for older adults and the potential impact of the community environment on their ageing in place intention. To address these limitations in current research, this paper specifically focuses on the impact of physical and social environments at the community level on ageing in place.

2.3.1 The Influence of the Physical Environment on Ageing in Place within the Community

The existing literature on the influence of the community physical environment on ageing in place predominantly examines three key aspects: the walkability of the community environment, the overall built environment, and the impact of community elderly facilities and services on the lives of older adults.

The walkability of the community environment is a crucial determinant of older adults' walking mobility and is influenced by various environmental features, including road conditions, accessibility to destinations, street connectivity, and the available public transportation options (Arango et al., 2022). Research indicates that older adults prioritize purposive and convenient walking transportation, making factors such as destination accessibility and street connectivity significant determinants of their walking behavior (Liao et al., 2017). Moreover, deficiencies in community walkability, such as changes in road levels, uneven surfaces, environmental obstacles, and inadequate lighting, have been identified as primary contributors to falls among older adults (Kuor et al., 2015). Densely developed communities are often more favorable for older adults' walkability, as proximity to destinations enhances convenience and increases their sense of security (Alidoust et al., 2018).

Studies employing statistical methods such as correlation analysis, multiple regression analysis, and logistic regression analysis have explored the influence of the overall built environment of the community on older adults (Zhang & Li, 2019; Zhang et al., 2020). Parra et al. (2010) investigated the impact of both objective and perceived environmental factors on the quality of life of older adults, highlighting the significance of factors such as residential greenery and perceived safety of transportation and public spaces. Cerin et al. (2013) identified that a low-pollution environment and accessible recreational and public facilities contribute to promoting physical activity among older adults.

Research focusing on community physical environmental factors often examines their impact on the physical health and quality of life of older adults. Many studies have found that the availability of community elderly facilities and services can influence older adults' preferences for care arrangements. For instance, Sun and Shen (2017) discovered that urban elderly individuals residing in communities with nursing homes or care centers exhibit a stronger inclination to age in place, with reduced intenion to live with their children. Similarly, Xu and Jiang (2024) found that older adults residing in communities with daycare centers or nursing homes are more inclined to opt for social care arrangements. Moreover, regarding medical services, research has indicated that communities offering comprehensive medical services reduced intention among elderly individuals who live alone to consider institutional care (Ning et al., 2022).

2.3.2 The Influence of the Community Social Environment on Ageing in Place

The influence of the community social environment on ageing in place is a multifaceted issue that demands a comprehensive examination of factors like social support, social engagement, and psychological well-being.

Research by Chen (2023) delving into the elderly population in Beijing uncovered a significant positive relationship between social opportunities and the ageing in place intention. This correlation likely stems from robust community cohesion and interpersonal networks, which substantially bolster the psychological well-being of older adults (Teresa & Eileen, 2006). These elements contribute to sustaining a positive mood and outlook among older adults, thereby indirectly ameliorating chronic health conditions through increased physical activity. Moreover, a strong sense of community belonging and stable social networks have been shown to effectively mitigate feelings of loneliness, fostering psychological well-being and enhancing overall quality of life (Kemperman et al., 2019). Conversely, research has demonstrated that older adults with diminished physical strength and self-efficacy, residing in unsafe or unfriendly neighborhood settings, tend to experience heightened anxiety and reduced interactions with neighbors (Oh, 2003). This underscores the detrimental effects of unsupportive community social environments on the social engagement of older adults. Furthermore, in-depth interviews conducted by Finlay and Kobayashi (2018) revealed that insufficient community resources, particularly inadequate access to services and social recreational facilities, can exacerbate feelings of loneliness among older adults. This underscores the critical role of communities in furnishing appropriate material resources and social support to foster the social engagement and psychological well-being of older adults.

The community social environment also serves as a mediator for the impact of the community's physical environment on the lives of older adults. Barton et al. (2012) found that exercising in outdoor green spaces significantly contributes to the psychological rehabilitation of older adults, with factors related to social networks playing a crucial role. Enssle and Kabisch (2020) highlighted the positive impact of urban green spaces in promoting the development of social networks among older adults. Additionally, both material and social environmental factors play essential roles in influencing the quality of life of older adults. Research by Mathis et al. (2015) demonstrated that factors such as walkability, access to greenery, availability of recreational facilities, community crime rates, as well as social relationship networks

and community cohesion, significantly affect the quality of life of older adults. However, it is worth noting that Engel et al. (2016) conducted their study in low-income communities and found that the quality of life of older adults was significantly influenced by the social environment of the community, with no clear statistical association with the physical environment. The different results indicate that differences in social and physical environments among different communities may have varying effects on the quality of life and ageing preference of older adults.

Overall, when exploring the influence of community physical and social environments on ageing in place among older adults, most studies primarily focus on how these environmental factors affect physical health, social interactions, and overall quality of life. While some studies briefly touch upon the connection between community environments and older adults' ageing preferences, their investigations often narrow down to aspects related to community retirement resources, lacking a comprehensive examination of both the physical and social environments of the community as a whole. Extending research on the impact of community environments on the physical health and quality of life of older adults to delve into the mechanisms of older adults' adaptation to their environment and determining what kind of environment is more likely to meet their needs can better elucidate the forces and pressures of ageing in place, thus more effectively addressing the actual needs of older adults.

2.4 The Influence of Regional Environments on Ageing in Place

The perception of the environment among elderly individuals follows a hierarchical structure, spanning from the home, to the community, and finally to larger geographic regions, with each level potentially impacting the elderly. While the home and community exert influence at a relatively micro level, variations in climate, economy, culture, and eldercare resources within the regional environment can influence the decisions of elderly individuals regarding ageing in place or migration at a macro level. For instance, regions endowed with superior natural environments, characterized by abundant sunlight, proximity to green and aquatic spaces, and accessible healthcare resources, are more likely to attract elderly individuals from other areas and encourage those within the region to age in place (Poudyal, 2008). Moreover, studies have demonstrated that regions with robust public services can facilitate ageing in place for the elderly, whereas those with high tax rates and housing

prices may discourage elderly migration (Atkins, 2018; Duncombe et al., 2001). Given that existing literature predominantly explores the impact of regional environments on elderly migration decisions, with fewer studies addressing how these environments affect elderly ageing preferences, this section primarily examines literature on regional disparities in the ageing population and the types and mechanisms of elderly population migration in China, offering insights into the potential influence of regional environments on ageing in place.

2.4.1 Regional Disparities in the Ageing Population in China

Existing studies have identified regional disparity as a significant spatial characteristic of population ageing in China. This is primarily evident in variations in the degree of ageing across different spatial scales (Gao et al., 2015). Scholars contend that since the 1990s, regional disparities in ageing in China have primarily manifested in two aspects: differences in the degree and trends of population ageing between economic regions or provinces due to uneven economic development, and the imbalance in ageing between urban and rural areas caused by population migration (Wang et al., 2013). As this paper focuses solely on exploring the factors influencing the ageing in place intention of urban elderly individuals, regional environmental impacts on ageing are considered only in terms of disparities between regions and provinces.

Descriptive studies related to regional disparities in ageing are abundant, typically employing population data at the provincial and municipal levels and utilizing statistical analysis methods to identify and calculate differences in ageing across various spatial scales. Research by Li et al. (1999) revealed that the degree of population ageing in eastern China was significantly higher than in western China. Specifically, provinces and municipalities with high levels of population ageing are mainly concentrated in the Yangtze River Delta region (Shanghai, Jiangsu, Zhejiang), the Bohai Rim region (Beijing, Tianjin, Shandong), and the Northeast region (Liaoning, Jilin, Heilongjiang) (Zhao et al., 2012). Additionally, Li et al. (2008) found that while the inter-provincial disparity in ageing in China as a whole is widening, the inter-provincial disparity in some eastern provinces is narrowing. Concerning the urban pattern of population ageing, high levels of ageing are observed in cities across eastern, central, and western regions, but generally, economically developed cities are not included in areas with high levels of ageing (Yu et al., 2013).

The driving factors behind regional disparities in ageing are comprehensive and multifaceted, with different scholars attempting to explore the causes of the current spatial pattern of population ageing from various perspectives. Chen and Hao (2014) found that per capita GDP and birth rate are the most important factors influencing the current spatial pattern of ageing, while the urbanization rate has a significant positive impact on ageing in central and western regions. Wang et al. (2015) suggest that the gap in economic development directly leads to polarization in population ageing between eastern and western regions, and differences in social security play a guiding role in the evolution of regional disparities in ageing patterns. Additionally, regional disparities in ageing are also influenced by population migration, as the migration behavior of elderly individuals is contrary to ageing in place, which will be further examined in the next subsection regarding elderly migration phenomena and its driving factors.

2.4.2 Types and Mechanisms of Elderly Migration

Elderly migration can be categorized into four types based on distance and destination: long-distance migration to medium-sized cities, long-distance migration to large cities, short-distance migration to suburban areas, and short-distance migration to central urban areas (Wan & Qin, 2022). Among these, intra-provincial short-distance migration accounted for over 90% of elderly migration between 2001 and 2011, while major cities such as Beijing, Shanghai, Tianjin, and Guangzhou were primary destinations for long-distance migration during this period (Zhang & Zhou, 2013). Overall, elderly individuals predominantly migrate from central and western regions to eastern regions. Additionally, elderly migration tends to exhibit characteristics of "upward migration," indicating a movement towards economically developed or environmentally comfortable areas (Wan, 2023). When considering the influence of regional environments on the ageing in place intention, the intentions of those who migrate across regions should not be overlooked.

Regarding the mechanisms of migration, factors related to regional environments primarily include the level of regional economic development, regional culture, and climate. Lv et al. (2019) found that retirees accounted for the highest proportion of elderly migrants in 2015, with many relocating within economically developed large cities, particularly to improve housing. Influenced by traditional Chinese culture, regions characterized by the ideology of "staying rooted in one's native land" or "returning to one's roots" may exhibit resistance to elderly migration (Li, 2003; Song,

2005). In terms of climate, there has been an increase in elderly migration to provinces like Hainan and Yunnan, both of which boast favorable natural conditions despite relatively underdeveloped economies. This suggests a potential rise in "environmentally oriented migration" in the future (Qin et al., 2024). However, some studies also suggest that family factors primarily drive elderly population migration, with limited influence from regional, urban-rural, and institutional environments (Wan, 2023).

3 Research Design

3.1 Research Framework and Research Hypotheses

3.1.1 Research Framework

Among the current theoretical models concerning ageing in place, theories of person-environment interaction stand out as widely applied and crucial frameworks (Zhang, 2021). These models primarily delineate person-environment interaction models focusing on the degree of alignment between older adults and their environment, particularly examining whether older adults can adapt to their surroundings to mitigate discrepancies between the individual and the environment as they age. Whether pursuing alignment or striving for adaptation, these models underscore the interplay between older adults and their immediate environment, and the consequential impact of this interaction on the quality of life of older adults (Lawton & Nahemow, 1973; Nahemow & Lawton, 1973).

One of the most prominent models in this realm is the person-environment fit model for older adults. This model intricately examines the interplay between various environmental factors and individual needs and preferences, emphasizing the alignment between these requirements and environmental resources. It advocates for a personalized approach to the "ideal" ageing environment. According to this model, the extent to which older adults' living environment aligns with their personal characteristics significantly impacts their quality of life, life continuity, independence, and physical and mental well-being (Nahemow & Lawton, 1973). The theoretical framework of this study is grounded in the person-environment fit model for older adults, which aims to explore the influence of the environment on the ageing preferences of various older adult demographics.

The living environment of older adults encompasses various spatial scales. As suggested by Rowles (1983), it encompasses distinct cognitive domains, ranging from the intimate setting of home to the immediate neighborhood, the broader community, the urban landscape, geographical regions, and even the national context. Across these scales, older adults receive support from family, friends, and public services, while facing diverse influences from built environments, social support networks, socioeconomic factors, eldercare resources, climate conditions, and cultural norms. Drawing from insights from planning and geography disciplines and leverageing available datasets, this study primarily investigates the impact of both the relatively micro-level community environment and the macro-level regional environment on ageing in place intention.

Based on the person-environment fit model for older adults, this paper aims to construct a research analysis framework encompassing individual characteristics, community environment, regional environment, and older adults' ageing in place intention. Regarding individual characteristics, drawing from existing research, this paper selects variables from four dimensions: basic characteristics, health characteristics, family relationship characteristics, and economic characteristics, to explore their impact on older adults' ageing in place intention. The examination of individual characteristics in this paper serves to outline the profile of older adults with ageing in place intention and identify which individual characteristics may pose challenges to aligning with certain environments, thus potentially hindering ageing in place intention.

The community environment primarily influences older adults at a micro-level, encompassing both the community physical environment and the community social environment. The community physical environment comprises objective material environment and subjective perceived environment (Parra, 2020). While existing research predominantly examines how objective material environment impacts the lives and health of older adults (Yu et al., 2017; Yang & Liu, 2015), it's important to note that not all objective physical environmental factors are perceived similarly by older adults, and their perceptions of the environment may also differ from those of other populations (Feng et al., 2017).

Because the CLASS questionnaire lacks measurements of the objective physical environment and does not pinpoint the specific location of older adults within their communities, this study utilizes older adults' satisfaction with the community physical

environment as the measurement variable for the community physical environment. Previous research suggests that social support in the community is vital for helping older adults maintain a positive and contented outlook (Yang et al., 2018; Huang et al., 2005). Hence, this study employs the social support variable to investigate whether the community social environment influences the ageing in place intentions of older adults.

The regional environment primarily impacts ageing in place on a macroscopic scale. There are regional disparities in the distribution characteristics of the elderly population. Besides, climate, economic development, allocation of elderly care resources, and elderly care culture vary among different provinces and regions (Zhang & Duan, 2023). Therefore, this study aims to integrate the socio-economic conditions, climatic factors, availability of elderly care resources across different provinces, and cultural traditions of various regions to examine how the regional environment influences the intention of ageing in place.

Moreover, existing research suggests that the community social environment may interact with the physical environment to jointly influence the lives of the elderly. Therefore, introducing the interaction term of physical environment satisfaction and social support can help explore their mutual moderation effects on the intention of ageing in place among the elderly (Jin et al., 2017). From the perspective of person-environment fit, the environment has different effects on different groups of elderly people, and different types of elderly people have distinct needs for the environment (Tao, 2014). When studying the interaction between individuals and the environment, attention should be paid to both the individual's ability to adapt to the environment and the degree to which the environment meets individual needs (Nehrke et al., 1981). The optimal ageing-in-place environment should align with the needs of the elderly. To study the moderation mechanism between the community environment and individual characteristics, interaction terms of community environment and individual characteristic variables are included. Similarly, to examine the moderation mechanism between the regional environment and individual characteristics, interaction terms of regional environment and individual characteristic variables are included, aiming to more comprehensively consider the influence of micro and macro environments on the intention of ageing in place among different types of elderly people. The basic research framework is shown in Figure 3-1.

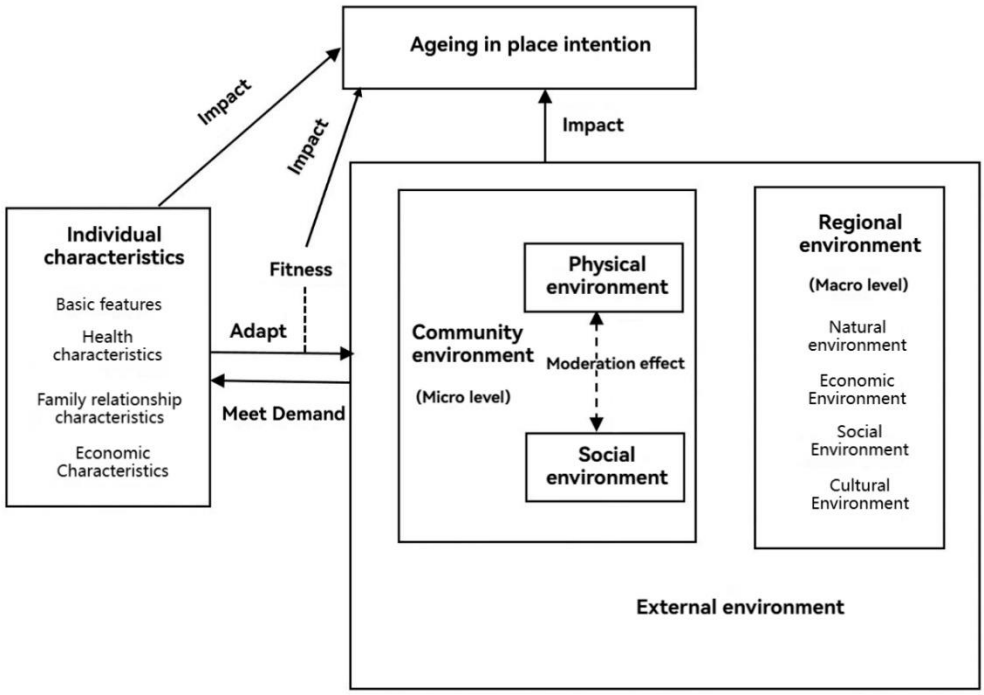


Figure 3-1: Basic Research Framework

3.1.2 Research Hypotheses

Based on the research framework and existing literature, the following hypotheses are proposed in this study:

Hypothesis 1: Variations in individual characteristics among elderly individuals will impact their ageing in place intention.

The individual characteristics of elderly individuals encompass basic features, health characteristics, family relationship characteristics, and economic characteristics. It is hypothesized that these diverse facets of individual characteristics will exert varying degrees of influence on the propensity of elderly individuals ageing in place intention.

Hypothesis 2: Community physical environment satisfaction positively influences the elderly's ageing in place intention.

Existing research suggests that a favorable physical environment within the community positively impacts the well-being and health of the elderly (Jiang & He, 2023; Zheng & Peng, 2019). A satisfactory community physical environment directly enhances the elderly's quality of life. Features such as efficient transportation systems, safe pedestrian pathways, and thoughtful community design contribute to easing daily activities for the elderly, thereby reducing their stress levels (Yang et al., 2023). These aspects directly contribute to the elderly's satisfaction, fostering a greater intention to remain within the community. Moreover, a clean, secure, and pleasant community

environment supports the elderly in maintaining good physical health. This state of well-being not only boosts their satisfaction with life but also bolsters their confidence in sustaining independent living within the community.

Therefore, it is posited in this study that the satisfaction of the elderly with the community's physical environment correlates closely with their ageing in place intention. A comfortable, secure, and accessible community environment not only directly fulfills the daily needs of the elderly but also, by enhancing their quality of life and health, amplifies their assurance and desire to continue living independently within the community, thereby reducing the likelihood of relocation to nursing homes or other care facilities.

Hypothesis 3: Community social support positively influences the elderly's ageing in place intention.

Social support holds significant importance in the lives of elderly individuals and greatly impacts their decision of ageing. Sufficient social support within the community not only enhances their psychological well-being but also strengthens their bond with the community (Zhao, 2009). Consequently, a higher level of social support within the community may diminish the inclination of the elderly to relocate or seek residence in nursing homes, fostering a greater desire to age in place.

Hypothesis 4: The regional environment impacts the elderly's ageing in place intention.

The influence of the regional environment on the elderly's ageing decision is intricate and multi-faceted. There are regional disparities in the distribution of the elderly population, with provinces and regions exhibiting variations in climate conditions, economic development levels, allocation of elderly care resources, and elderly care culture (Zhang & Duan, 2023).

Firstly, climate factors play a crucial role in the decision-making process for elderly individuals when selecting a long-term living location. They must consider whether the climate conditions in a particular area are suitable for residence and contribute to overall health and comfort. Extreme weather conditions such as severe cold, extreme heat, or excessive dryness can pose risks to the physical health of the elderly. Furthermore, climate conditions can impact the mobility and social interactions of the elderly. In regions with favorable climates, older adults can engage more freely in outdoor and social activities, which positively impacts their physical and mental well-being.

Secondly, the level of economic development and the availability of elderly care resources vary among provinces and regions, influencing the inclination of elderly individuals to age in place. Economically affluent areas generally boast better elderly care facilities and service provisions. In these regions, older adults are more likely to access high-quality medical, health, and leisure services within nursing homes, potentially reducing their preference for ageing in place. Conversely, economically disadvantaged areas may lack essential elderly care resources, compelling older adults to opt for ageing in place due to limited alternatives.

Lastly, differences in elderly care ideologies and cultural norms are evident across different regions. Some regions prioritize the cultural tradition of filial piety, where children are expected to care for their ageing parents, making the placement of elderly parents in nursing homes viewed as unfilial. Conversely, in other regions, elderly individuals may have more autonomy in selecting their care arrangements. These cultural disparities can significantly influence the inclination of elderly individuals to age in place.

Hypothesis 5: The moderation between satisfaction with the community physical environment and community social support will influence elderly individuals' ageing in place intention.

The significance of this moderation effect lies in its potential to either reinforce or constrain the relationship between the physical environment and social support within the community. For example, a welcoming physical environment can facilitate social interactions and neighborly assistance, thereby amplifying the benefits of social support. Conversely, in the absence of adequate community social support, elderly individuals may place greater emphasis on the quality of the physical environment. Insufficient social support may exacerbate their negative perceptions of environmental issues, consequently impacting their inclination to age in place.

Hypothesis 6: The moderation between individual characteristics and the environment will influence elderly individuals' ageing in place intention.

According to the person-environment fit model, the extent to which the living environment of elderly individuals aligns with their individual characteristics will significantly affect their physical health and quality of life. Given that community and regional environments may affect elderly individuals with varying characteristics differently, it is essential to explore whether this moderation effect influences the ageing in place intention. This investigation will shed light on which elderly

individuals are better suited for ageing in place under specific environmental conditions.

3.2 Data Source and Research Variables

3.2.1 Data Source

The individual data of older adults utilized in this study are sourced from the China Longitudinal Ageing Social Survey (CLASS). This dataset was formulated by the Institute of Gerontology at Renmin University of China and executed by the China Survey and Data Center at Renmin University of China. It constitutes a nationwide longitudinal social survey initiative encompassing 28 provinces of China, excluding Hong Kong, Macao, Taiwan, Hainan, Xinjiang, and Xizang. The survey targets individuals aged 60 and above, encompassing various domains such as socio-economic status, health and associated services, retirement planning and social support, as well as physical and mental conditions.

The most recent dataset available is the 2020 China Longitudinal Ageing Social Survey. However, owing to the persistent COVID-19 pandemic throughout 2020, recent studies leverageing CLASS data have predominantly utilized data from 2018 and earlier years (Xie & Zhou, 2022; Lu & Li, 2022; Song et al., 2022). Hence, this study employs the 2018 CLASS data for empirical analysis, focusing primarily on the impact of urban community environments on the intention of older adults to age in place. The final effective sample size is 4465.

Additionally, this research incorporates relevant variables from the 2019 China Statistical Yearbook, encompassing climate and socio-economic data for the provinces where the older adults reside. (The 2019 China Statistical Yearbook provides data up to the end of 2018.)

3.2.2 Research Variables and Descriptive Statistics

The dependent variable in this study is the older adults' ageing in place intention, which is a binary variable. Ageing in place refers to "maintaining a certain level of independent living in the community rather than residing in an elderly care institution" (Davey et al., 2004, p.133). This definition underscores the significance of older adults remaining in the communities where they have resided. In line with this definition and the research objective of investigating the impact of the environment on the ageing in place intention, older adults who indicated "own home" or "community

day care center or elder care institution" in response to the question "Where do you plan to primarily live in old age?" were categorized as willing to age in place. Those who responded with "children's home" or "elderly care institution" were categorized as not willing to age in place. Responses such as "haven't decided yet" and "can't answer" were excluded. The statistical outcomes of the dependent variable are depicted in Table 3-1, revealing that approximately 80% of older adults expressed an intention of ageing in place, which is lower than the proportion of home-based and community-based elderly care envisioned in Beijing's "9064"[1] Elderly Care System Construction Plan.

Table 3-1 The statistics of the dependent variable（n=4465）

Ageing in place intention	Frequency	Percentage
Not ageing in place	880	19.71%
Ageing in place	3585	80.29%

Based on existing research, this study incorporates several control variables primarily focusing on the individual characteristics of the elderly. These characteristics are categorized into four main groups: basic features, health characteristics, family relationship characteristics, and economic characteristics. Basic features encompass gender (female=0, male=1), ethnicity (Han=0, minority=1), age (continuous variable), and level of education (ranging from illiterate=1 to bachelor's degree or above=7). Health characteristics include self-rated health status (ranging from very unhealthy=1 to very healthy=5), the number of chronic diseases (continuous variable, encompassing 23 kinds), and daily activities capacity (evaluated based on five related variables, with scores ranging from 1 to 3, higher scores indicating stronger daily activity ability). Family relationship characteristics cover marriage (widowed or single=0, married=1), whether living alone (living alone=1, otherwise=0), family members (continuous variable), whether the elderly individual is caring for their parents (yes=1, otherwise=0), the number of children (continuous

[1] "9064" Elderly Care Service Framework: According to the "Opinions on Accelerating the Development of Elderly Care Service Institutions" issued by the Beijing Civil Affairs Bureau and other relevant departments on December 24, 2008, the goal was set for the year 2020, wherein 90% of the elderly population in Beijing would receive home-based care with social service assistance, 6% would avail community care services through government purchases, and 4% would reside in elderly care institutions for centralized care.

variable), Whether family would like the old to go to a nursing home (yes=1, otherwise=0). Economic characteristics contain the number of properties (continuous variable), and the logarithm of monthly household income (continuous variable). Descriptive statistics of these control variables are presented in Table 3-2.

Table 3-2 Descriptive statistical results of control variables

Variable categories	Variable names	Variable definitions	Means	Standard deviations
Basic features	Gender	Female=0, Male=1	0.47	0.50
	Ethnicity	Han=0, Ethnic minority =1	0.03	0.18
	Age	Continuous variable	71.37	7.33
	Education	Illiteracy=1，Part-time course=2，Primary school=3，Middle school=4，High school=5，Profession training college=6，Undergraduate and above=7	3.3	1.33
Health characteristics	Self-evaluated health condition	Very unhealthy=1，Unhealthy=2，Fair=3，Healthy=4，Very healthy=5	3.39	0.84
	Number of chronic deseases	Number of chronic diseases, continuous variable, 23 in total	1.50	1.55
	Daily activities capacity	For the assessment of the daily activities capacity, the values of the five relevant variables were averaged, with a minimum score of 1	2.92	0.26

		and a maximum score of 3. Higher scores indicate that the elderly are more capable of performing daily activities.		
Family relationship characteristics	Marriage	Widowed or Unmarried=0，Married=1	0.71	0.45
	Whether living alone	No=0，Yes=1	0.12	0.33
	Family members	Continuous variable（self-including）	2.50	1.17
	Whether caring for parent	No=0，Yes=1	0.06	0.24
	Number of children	Continuous variable	2.28	1.28
	Whether family would like the old to go to a nursing home	No=0，Yes=1	0.08	0.28
Economic characteristics	Number of properties	Continuous variable	1.06	0.39
	Log of monthly household income	Continuous variable	7.67	0.89

The explanatory variables at the community level in this study include physical environment satisfaction of the community and the level of social support within the community. The physical environment satisfaction is assessed through the CLASS questionnaire item "Your satisfaction with the following situations in this community," which covers aspects such as road conditions, fitness facilities, public safety, sanitation, street lighting, and barrier-free facilities. These factors have been identified in existing research as significantly impacting the well-being of the elderly (Arungu et al., 2022; Liao et al., 2017). Each item offers respondents five options:

"very dissatisfied," "somewhat dissatisfied," "average," "somewhat satisfied," and "very satisfied," scored from 1 to 5, respectively. The average score across all six items represents the elderly's satisfaction with the physical environment of the community, with higher scores indicating greater satisfaction.

Table 3-3 presents the statistical results of the physical environment satisfaction of the community. The Cronbach's α test result of 0.82 indicates a high level of internal consistency in measuring the variable.

Table 3-3 Descriptive statistical results of physical environment satisfaction

	Means	Standard Deviation
Road conditions	3.85	0.74
Fitness facilities	3.61	0.93
Public safety	3.87	0.78
Sanitation	3.78	0.77
Street lighting	3.68	0.86
Barrier-free facilities	3.41	0.94
Average Satisfaction	**3.70**	**0.61**
Cronbach α	**0.82**	

The social support received by elderly individuals within the community is assessed through questions in the social support section of the questionnaire. These questions include inquiries such as "How many friends can you meet or contact at least once a month?" "How many friends can you trust to discuss your personal matters?" and "When you need assistance, how many friends can provide help?" These queries span the subjective, objective, and utilization dimensions of support (Xiao, 1994). Respondents select from options ranging from "none" to "9 or more," with corresponding scores from 0 to 5, respectively, for each question. The average score across the three questions represents the level of social support within the community, with higher scores indicating greater support.

Table 3-4 presents the statistical results of social support within the community. The Cronbach's α test result of 0.84 reflects a high level of internal consistency in measuring social support within the community.

Table 3-4 Descriptive statistical results of social support

	Means	Standard Deviation
Meet or contact	2.37	1.24
Discuss personal matters	2.01	1.10

Provide help	2.01	1.21
Average social support	**2.13**	**1.04**
Cronbach α	**0.84**	

The explanatory variables at the regional environmental level in this study comprise the natural logarithm of the per capita GDP of the province, the number of nursing beds per thousand elderly population in the province, January average temperature, and the annual average relative humidity. [2]The natural logarithm of the per capita GDP of the province serves as an indicator of the regional economic status, while the number of nursing beds per thousand elderly population in the province reflects the availability of elderly care resources. January average temperature and annual average relative humidity depict climatic conditions. January average temperature in the provincial capital directly assesses winter temperatures in the province. The significance of winter temperatures lies in their impact on the daily outdoor activities of the elderly, especially in regions with extreme cold climates, where such activities may be restricted (Sun, 2013). Moreover, the migration patterns of elderly populations in the United States towards warm and humid "sunbelt" regions imply that temperature and relative humidity could influence the retirement decisions of the elderly (Rapport, 2007). Descriptive analysis results of the explanatory variables at the regional environmental level are presented in Table 3-5.

Table 3-5 Descriptive statistical results of regional environment variables

	Means	Standard Deviation
Log of the per capita GDP of the province	11.0	0.4
The number of nursing beds per thousand elderly population in the province	28.8	8.8
January average temperature	-0.3	8.4
Annual average relative humidity	65.9	11.6

[2] The regional-level data mentioned above is sourced from the "China Statistical Yearbook 2019."

3.3 Research Methodology

3.3.1 ArcGIS Spatial Visualization

GIS visualization serves as a tool for data representation and initial analysis. To investigate the influence of regional environments on the intention of elderly individuals to age in place, the average ageing-in-place rate is computed for each province and cultural region. Subsequently, ArcGIS software is employed to generate maps that visually illustrate the spatial distribution of ageing-in-place rates across provinces and cultural regions.

3.3.2 Baseline Model: Binary Logistic Regression

The baseline model of this study aims to investigate the factors influencing the intention of elderly individuals to age in place. Given that the dependent variable, "whether elderly individuals intend to age in place," is binary, this study employs a binary logistic regression model for initial analysis and comparison. The regression model is specified as follows:

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 p_i + \beta_2 s_i + \beta_3 C_i + \beta_4 H_i + \beta_5 F_i + \beta_6 E_i + \beta_7 R_i + \varepsilon$$

In the equation, the dependent variable $P_i$represents the probability that elderly individuals intend to age in place, β_0 is the intercept, and β_1、β_2、β_3、β_4、β_5、β_6、$\beta_7$respectively represent the coefficients corresponding to the independent variables. Within the independent variables, $p_i$denotes the physical environment satisfaction of the community, $s_i$represents the social support received by the respondents from the community, C_i denotes the basic features of the respondents, H_i represents the health characteristics, F_i denotes the family relationship characteristics, E_i represents the economic characteristics, R_i represents the regional environmental characteristics, and ε represents the residual of the regression model. The binary logistic model can be used to verify hypotheses 1-4, that is, to verify the impact of elderly individuals' physical environment satisfaction of the community, the social support received from the community, the individual characteristics of the respondents, and the regional environment on the intention of ageing in place.

3.3.3 Moderation Effect Model

The moderation effect model is utilized to examine the moderation effects among two or more variables, providing insights into how one independent variable moderates the influence of another independent variable on the dependent variable.

Given that the impacts of community physical environment satisfaction and community social support are intertwined, and the relationships between non-community environment characteristics and community environment are interconnected, we employ the moderation effect model to investigate the combined influence of community physical environment and community social environment on the intention of elderly individuals to age in place. This helps to validate hypothesis 5, which posits that the moderation effect of elderly individuals' community physical environment satisfaction and community social support will impact their intention of ageing in place. Additionally, we explore the moderation effect of elderly individuals' personal characteristics with the environment on their intention of ageing in place, thereby testing hypothesis 6, which suggests that the moderation effect of elderly individuals' personal characteristics with the environment will influence their intention of ageing in place. The specific selection of moderation variables will be determined based on the findings of the baseline binary logistic regression.

4 Empirical Analysis of Factors Influencing the Intention of Ageing in Place

This chapter employs a binary logistic regression model to examine the factors influencing elderly individuals' intention of ageing in place, incorporating their characteristics as control variables. The analysis focuses on the impact of community and regional environments on this intention. The chapter begins with essential statistical tests on the logistic regression model, including multicollinearity tests to check for high correlations between variables, and goodness-of-fit tests to assess the model's adequacy. Upon passing these statistical evaluations, the chapter proceeds with an empirical analysis of the regression results, investigating the independent effects of individual characteristics, community environment, and regional environment on the intention of elderly individuals to age in place. The mechanisms underlying these influences are also analyzed and explained.

4.1 Statistical Tests

4.1.1 Multicollinearity Test

Multicollinearity arises when independent variables in a regression model are highly correlated, leading to unreliable estimates. To detect multicollinearity in this study, the Variance Inflation Factor (VIF) is employed. A VIF value exceeding 10 typically signals severe multicollinearity, requiring the problematic variables to be replaced or removed. According to the VIF test results presented in Table 4-1, all VIF values are below 10, indicating the absence of significant multicollinearity issues. Consequently, these variables are suitable for inclusion in the model for further analysis.

Table 4-1 VIF test

Variables	VIF
Physical environment satisfaction	1.05
Social support	1.06
Gender	1.09
Ethnicity	1.04
Age	1.47

Education	1.27
Self-evaluated health condition	1.19
Number of chronic diseases	1.23
Daily activities capacity	1.22
Marriage	1.66
Whether living alone	1.90
Family members	1.47
Whether caring for parent	1.06
Number of children	1.32
Whether family would like the old to go to a nursing home	1.04
Number of properties	1.12
Log of monthly household income	1.39
Log of the per capita GDP of the province	1.42
Number of nursing beds per thousand elderly population in the province	1.4
January average temperature	1.73
Annual average relative humidity	1.92

4.1.2 Goodness-of-Fit Test

The goodness-of-fit test in a logistic regression model evaluates how well the model aligns with the observed data. This test compares the observed binary outcomes of the dependent variable with the predicted probabilities generated by the model. Specifically, it checks if the observed 0/1 values match the predicted 0/1 values across the covariate patterns in the data. The null hypothesis (H_0) for this test posits that there is no significant difference between the observed and predicted values. With a test result of $p = 0.33$, we fail to reject the null hypothesis, suggesting that the model fits the data well.

4.2 Analysis of Factors Influencing the Intention to Age in Place

Table 4-2 presents the results of the logistic regression analysis (Model 1), examining the factors that influence the intention of urban elderly individuals to age in place in 2018. The p-value for the Likelihood Ratio (LR) test is < 0.0001, indicating that the model is statistically significant at the 99.9% confidence level.

Table 4-2 Results of the logistic regression analysis

	(1)	
Basic features		
Gender	-0.022	(0.081)
Ethnicity	-0.445**	(0.203)
Age	-0.001	(0.006)
Education	-0.002	(0.033)
Health characteristics		
Self-evaluated health condition	0.122**	(0.050)
Number of chronic diseases	0.006	(0.029)
Daily activities capacity	-0.109	(0.159)
Family relationship characteristics		
Marriage	0.512***	(0.101)
Whether iving alone	0.270*	(0.157)
Family members	-0.277***	(0.038)
Whether caring for parent	0.321*	(0.181)
Number of children	0.041	(0.034)
Whether family would like the old to go to a nursing home	-1.030***	(0.125)
Economic characteristics		
Number of properties	0.389***	(0.111)
Log of monthly household income	0.276***	(0.050)
Social environment features		
Physical environment satisfaction	0.126**	(0.064)
Social support	0.001	(0.038)
Regional environment features		
Log of the per capita GDP of the province	-0.133	(0.110)
Number of nursing beds per thousand elderly population in the province	-0.015***	(0.005)
January average temperature	0.011*	(0.006)
Annual average relative humidity	0.010**	(0.005)
_cons	0.001	(1.415)
n	4465.00	
Chi-square	231.2***	

Relatively Risk Ratio (RRR) in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.2.1 Influence of Individual Characteristics on the Intention of Ageing in Place

This study categorizes the individual characteristics of the elderly into basic features, health characteristics, family relationship characteristics, and economic characteristics. Regarding basic features, the analysis reveals a significant negative relationship at the 95% confidence level between belonging to a minority ethnic group and the intention of ageing in place. This finding may be attributed to minority groups being less influenced by Han culture and having a weaker sense of "attachment to one's native land." Contrary to some prior research, the gender, age, and education level of the elderly do not exhibit a significant impact on the intention. Previous studies have suggested that elderly individuals with higher education levels are more inclined to choose institutional care (Yang & Li, 2013; Gao et al., 2012). Additionally, older elderly individuals, compared to their younger counterparts, have shown a stronger preference for family care (Chu et al., 2007; Ding & Ye, 2001). However, these studies primarily focus on elderly populations in single cities and do not account for the impact of different regional environments on the intention. As noted by Zhang et al. (2014), the development status of institutional care services in the city and community where the elderly reside is also a crucial factor influencing their care preferences.

Regarding health characteristics, the analysis shows that the elderly's self-rated health status has a significant positive relationship with the intention of ageing in place, significant at the 95% confidence level. This finding suggests that the healthier the elderly perceive themselves to be, the stronger their desire to live independently and remain in their original community as they age. This conclusion aligns with control theory: when the elderly perceive themselves as healthier, they feel more capable of exerting primary control (i.e., directly changing their environment or using their own abilities to manage their surroundings), thereby enhancing their confidence in ageing in place. Related studies have drawn similar conclusions, indicating that the proportion of elderly individuals choosing institutional care increases when they expect their health to deteriorate (Jiao, 2010). It is noteworthy that the other two objective physical health variables—number of chronic diseases and daily activity ability—do not show significant relationships with the intention. This finding suggests that when making decisions, the elderly's subjective perception of their health may be more influential than their objective health status (Ding et al., 2019).

In terms of family relationship characteristics, the analysis reveals several significant factors influencing the intention of elderly individuals to age in place. Elderly individuals living alone and those who need to care for their parents show a significantly positive relationship with the intention of ageing in place, significant at the 90% confidence level. This may be attributed to the inertia of their living patterns. According to the continuity theory, the elderly tend to maintain continuity in their living habits; thus, those living alone or caring for their parents may prefer to maintain their original living arrangements. Married elderly individuals are more likely to choose to age in place compared to those who are unmarried or widowed. Living with a spouse can better facilitate self-care and a peaceful old age, making married elderly individuals less inclined to relocate or move into nursing homes. This finding is supported by Tao and Liu (2019), who investigated data from CLASS 2014 and found that "intact couples"(couples both survived and healthy) among parents of only children prefer to ageing in place. Conversely, the number of cohabiting family members is significantly negatively correlated with the intention at the 99% confidence level. This could be because, in larger families, elderly individuals may feel they are a burden to their family members and thus prefer to move into nursing homes to reduce the care burden on their families (Horner & Boldy, 2008). To further validate these findings, a variable indicating whether family members are willing for the elderly to go to nursing homes was added to the control variables. The results show that if family members are willing for the elderly to go to nursing homes, the intention of age in place significantly decreases. The regression analysis reveals that the willingness of family members for the elderly to go to nursing homes is significantly negatively correlated with the intention of ageing in place at the 99% confidence level, thereby enhancing the robustness of the findings. Overall, many variables related to family relationships significantly influence the elderly's intention of ageing in place. This underscores the substantial impact that family dynamics have on the ageing decisions of urban elderly individuals in China (Wan, 2023).

Regarding economic characteristics, both the number of properties owned and the logarithm of monthly household income show a significantly positive relationship with the intention of ageing in place, significant at the 99% confidence level. This finding suggests that better economic conditions increase the likelihood of elderly individuals choosing to ageing in place. Elderly individuals with more robust economic resources often have access to higher quality housing and community

environments, which better accommodate their needs as they age, including necessities such as food, clothing, and shelter. Consequently, they are more inclined to ageing in place (Russel, 2011). The above analysis supports Hypothesis 3, confirming that various individual characteristics of the elderly significantly influence their intention of ageing in place.

4.2.2 Influence of Community Environment on the Intention of Ageing in Place

Regarding the characteristics of the community environment, physical environment satisfaction primarily measures three significant aspects identified in existing research that impact the elderly: the walkability of the community environment, overall satisfaction with the built environment of the community, and the availability of community facilities and services for the elderly. The study finds that the positive relationship between community physical environment satisfaction and the intention of ageing in place is significant at the 95% confidence level. This finding indicates that enhancing the elderly's satisfaction with the community physical environment promotes their intention of ageing in place. A community environment that is perceived as comfortable and satisfying by the elderly can improve their quality of life, thereby increasing their inclination to remain living at home. If the community is not only safe and comfortable but also effectively meets their needs, the elderly are more likely to choose to remain in the community. Consequently, Hypothesis 2 is validated, confirming that higher satisfaction with the physical environment of the community positively influences the intention of elderly individuals to age in place.

However, community social support received by the elderly does not have a significant relationship with their intention of ageing in place. Thus, Hypothesis 2 cannot be confirmed. This finding may be due to the more direct and perceptible impact of the physical environment on the elderly's lives, whereas the influence of community social support on their quality of life might be more indirect. Additionally, family-based care remains the predominant mode of elderly care in China. The lives of the elderly are still primarily centered around their families, and compared to family members, acquaintances and friends within the community may have a lesser impact on their decisions (Du et al., 2016; Xie et al., 2015). This observation is supported by previous analyses that highlight the significant influence of family relationship characteristics on the elderly's intention of ageing in place.

Although the influence of community social support on the elderly's intention is not independently significant after controlling for other variables, its impact should not be disregarded. Community social support might also moderate the effects of other variables, thereby indirectly influencing the elderly's intention of ageing in place. In Chapter 5, the interaction term between physical environment satisfaction and social support is included in the regression model to examine the moderation effect of social support on the relationship between physical environment satisfaction and the intention of ageing in place. This analysis aims to explore whether community social support enhances or mitigates the influence of physical environment satisfaction on the ageing decision of elderly individuals.

4.2.3 Influence of Regional Environment on Ageing in Place Intention

The analysis of the regional environment reveals mixed impacts on the intention of ageing in place among the elderly. The logarithm of the per capita GDP of the province of residence does not significantly affect this intention. Although regional economic development is a crucial factor in shaping China's ageing spatial patterns and can influence the migration behaviour of the elderly, it does not have a significant impact on their ageing in place intention. Conversely, the number of nursing home beds per thousand elderly people in the province has a significant negative relationship with the intention of ageing in place, significant at the 95% level. This suggests that living in provinces with more abundant institutional eldercare resources may reduce the elderly's ageing in place intention. This trend might be attributed to the greater availability and diversity of eldercare options in regions with a higher number of nursing home beds per capita. As a result, some elderly individuals, who might otherwise lack the means or ability to reside in nursing homes, are more likely to opt for institutional care when such resources are readily accessible. Overall, while regional economic development does not significantly influence ageing in place intentions, the availability of institutional eldercare resources plays a critical role in shaping these intentions. This analysis confirms Hypothesis 4, highlighting the importance of considering regional environmental factors in understanding the ageing in place intention of the elderly.

Regarding climate, both the average temperature in January and the average annual relative humidity exhibit a significant positive relationship with the ageing in place intention, significant at the 90% and 95% levels, respectively. This suggests that elderly individuals living in warmer and more humid areas are more adapted to their

environment, face fewer mobility limitations, and therefore have a reduced inclination to relocate or move into nursing homes.

Overall, these findings partially validate Hypothesis 4, demonstrating that regional environmental factors do indeed influence the elderly's intention of ageing in place. This underscores the importance of considering climate and other regional characteristics when assessing the factors that affect elderly individuals' ageing in place intention.

According to the regression results, the economic development level of the province does not significantly impact the preference for ageing in place. However, other factors such as elder care resources, climate, and geography may substantially influence elderly attitudes towards ageing in place. The impact of the regional environment is multifaceted, potentially encompassing economic factors, elder care resources, climate, geographical conditions, and cultural influences. The next chapter will utilize ArcGIS software to further analyze and interpret the potential effects of the cultural environment within the regional context from a cultural geography perspective. This analysis aims to provide a more nuanced understanding of how regional cultural factors may influence the intention of elderly individuals of ageing in place.

The empirical analysis uncovers several factors influencing the elderly's ageing in place intention, encompassing individual characteristics, community environment, and regional environment. Concerning individual characteristics, gender, age, and educational attainment do not significantly affect their intention. However, self-reported health status exhibits a notable positive correlation with the ageing in place intention. Family dynamics play a pivotal role, with elderly individuals living alone or assuming parental caregiving responsibilities displaying a stronger intention of ageing in place, while those cohabiting with a spouse also lean towards this intention. Moreover, a higher economic status correlates with a greater propensity to ageing in place. Community's physical environment satisfaction demonstrates a significant positive association with the intention, contrasting with the non-significant relationship observed for community social support. Turning to the regional environment, a higher ratio of nursing beds per thousand elderly individuals within a province is linked to a greater intention of ageing in place. Furthermore, elderly individuals residing in regions characterized by milder winters and higher average humidity levels exhibit a heightened inclination towards ageing in place.

5 Analysis of the Impact of Cultural Environment on the Intention of Ageing in Place

5.1 Interprovincial Spatial Distribution of Intention of Ageing in Place

In the empirical analysis, we found that variations in elderly care resources and climate across provinces might influence the intention of ageing in place. To further explore the spatial distribution patterns of this intention, we calculated the ageing-in-place rate for each province (the number of elderly intended to age in place in the province divided by the total sample size) and visualized it using ArcGIS 10.8 software. The natural breaks (Jenks) classification method was used for this visualization. The map of ageing-in-place rates by province is displayed in Figure 5-1.

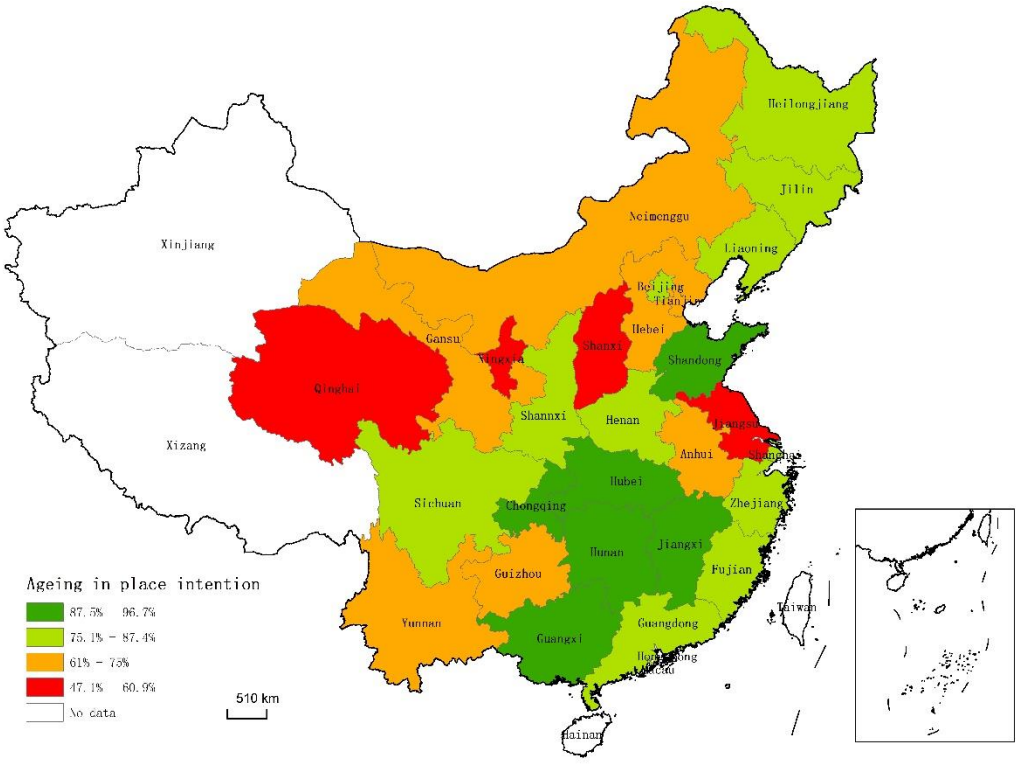


Figure 5-1 Ageing in place intention rates by province

From the visualization results, it is evident that the ageing-in-place rates in the Northeast and Central regions are significantly higher than those in the Western region, while the rates in the Eastern coastal regions show considerable variation between provinces. Provinces with the highest ageing-in-place rates, such as

Chongqing, Hubei, Hunan, Jiangxi, and Guangxi, are all adjacent to Hunan. In contrast, provinces with lower rates are concentrated in the Northwest of China. This pattern suggests that the interprovincial distribution of ageing-in-place rates exhibits a trend of local clustering.

5.2 The Impact of Regional Culture on the Intention of Ageing in Place

Due to the clustering trend observed in the interprovincial distribution of ageing-in-place rates and the regression analysis in Chapter 4 controlling for variables such as economy, climate, and elderly care resources, it is crucial to consider the influence of regional culture on the intention of ageing in place. According to the theory of Chinese cultural geography, the boundaries of cultural geographical divisions should be broad rather than fine. China's cultural regions are mainly divided into seven primary cultural regions: North China, North East China, East China, Central China, South China, North West China, and South West China. Each cultural region can be further subdivided into several secondary cultural regions (Hu et al., 2017). Excluding provinces with missing data, the North China cultural region includes Beijing, Tianjin, Hebei, Shanxi, and Shandong provinces; the Northeast cultural region includes Liaoning, Jilin, and Heilongjiang provinces; the East China cultural region includes Shanghai, Jiangsu, Zhejiang, and Fujian provinces; the Central China cultural region includes Henan, Anhui, Hubei, Hunan, and Jiangxi provinces; the North West cultural region includes Shaanxi, Ningxia, Gansu, Qinghai, and Inner Mongolia (Neimenggu); and the South West cultural region includes Sichuan, Chongqing, Guizhou, and Yunnan provinces. This study calculated the ageing-in-place rates for each primary cultural region and visualized them using ArcGIS 10.8 software, employing the natural breaks method (Jenks) for classification. The visualization results of the ageing-in-place rates for each cultural region are shown in Figure 5-2.

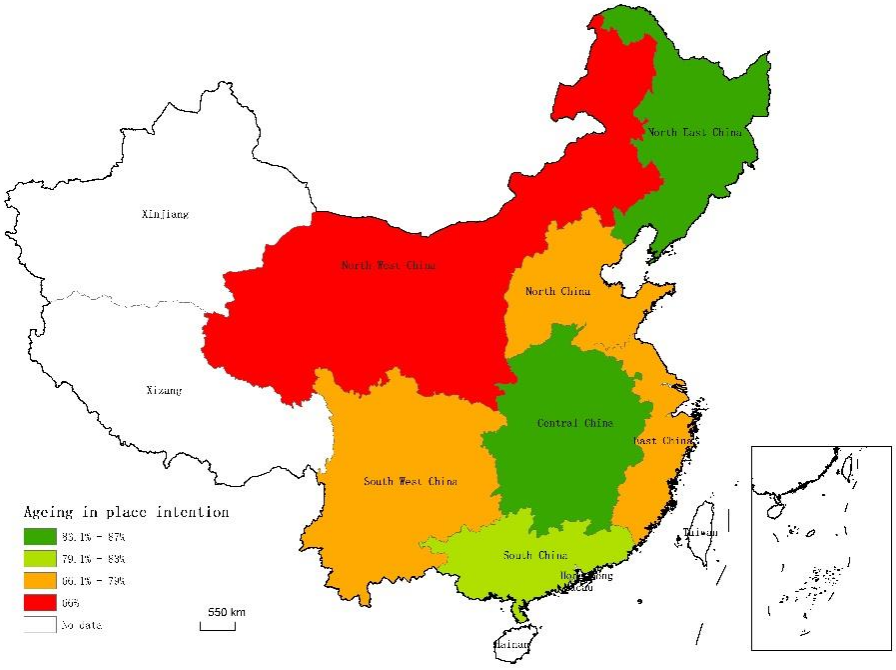


Figure 5-2 Ageing in place intention rates by cultural region

Based on the spatial visualization results, it can be observed that the spatial distribution of cultural regions closely mirrors the interprovincial spatial distribution of ageing-in-place rates. This similarity suggests that regional culture might significantly influence the intention of ageing in place. To further investigate this influence, the classification variable of cultural regions was incorporated into the logistic regression model from Chapter 4. The regression results are presented in Table 5-1. To facilitate the interpretation of these results, three separate regressions were conducted. Each regression used a different cultural region as the benchmark: the North East cultural region, the Central China cultural region (with the highest ageing-in-place rates), and the North West cultural region (with the lowest ageing-in-place rate). These benchmarks are represented by Model 2, Model 3, and Model 4, respectively.

Table 5-1 logistic regression results with cultural region variables

	(2)	(3)	(4)
	North East	Central	North West
（Other variable omitted）			
North	-2.281***	-0.387	2.056***
	(0.418)	(0.264)	(0.335)
North East	0.000	1.894***	4.337***

	(.)	(0.324)	(0.682)
East	-3.610***	-1.716***	0.727**
	(0.495)	(0.288)	(0.292)
Central	-1.894***	0.000	2.443***
	(0.324)	(.)	(0.484)
South	-2.053***	-0.159	2.284***
	(0.311)	(0.219)	(0.516)
North West	-4.337***	-2.443***	0.000
	(0.682)	(0.484)	(.)
South West	-3.477***	-1.583***	0.860***
	(0.509)	(0.362)	(0.267)
_cons	-2.253	-4.147*	-6.590***
	(2.177)	(2.219)	(2.259)
Sample size	4465		
Chi square	287.44***		

Relatively Risk Ratio (RRR) in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Based on the logistic regression results incorporating the cultural region variable, the ageing in place intention of elderly individuals in the Northeast cultural region is significantly higher, at the 99% level, compared to elderly individuals in all other cultural regions. The ageing in place intention of elderly individuals in the Central China cultural region, while significantly lower than that of those in the North East cultural region, is significantly higher, at the 99% level, compared to individuals in the East China, North West, and South West cultural regions. Furthermore, the ageing in place intention of elderly individuals in the North West cultural region is significantly lower, at the 95% level, compared to those in the East China cultural region, and significantly lower, at the 99% level, compared to those in all other cultural regions.

From the visualization of the cultural region distribution of the ageing in place rate and the results of the logistic regression including cultural region variables, it can be inferred that regional cultural differences have a substantive impact on the ageing in place intention of urban elderly individuals. The intention of elderly individuals in the North East and Central China cultural regions is significantly higher than that of elderly individuals in other cultural regions. The distinct characteristics of the North Eastern personality—robustness, practicality, and optimism—play a significant role

(Hu et al., 2017). Additionally, many elderly individuals in the Northeastern cultural region retain the pioneering spirit of "Breaking into the Northeast," demonstrating a readiness to face harsh natural conditions and challenges (Wang, 1997). This adaptability and capacity for both primary control (improving the environment to meet their needs) and secondary control (accepting and adapting to the environment) make the elderly in the Northeast more inclined to ageing in place. Moreover, the Northeastern cultural region includes the Yanbian Korean Autonomous Prefecture, where a strong tradition of respecting the elderly prevails. Since 1982, Yanbian has celebrated Elderly Day on August 15th, a significant occasion marked by family gatherings to honor and celebrate the elderly (Piao, 2012). In this cultural context, many families believe in providing their elderly with a life surrounded by descendants, thus preferring to care for them in their original place of residence. These cultural traits and practices contribute to the higher ageing in place intention of elderly individuals in the Northeast and Central China cultural regions, reflecting the substantial impact of regional culture on their preferences.

In Central China, traditional concepts such as "continuing the family line" and "raising children to provide for old age" remain deeply rooted in rural areas (Li & Zhu, 2016). Urban residents in the Central China cultural region may also be influenced by these traditional beliefs, relying less on state and societal elderly care institutions. Additionally, Hunan and Hubei provinces, located in the Central China cultural region, are deeply influenced by "Jingchu culture," which emphasizes individual life and personal freedom, exhibiting a "self-centered" value orientation. Consequently, elderly individuals in this region may prefer a more autonomous and independent ageing-in-place model (Luo, 2003).

The Northwest cultural region, encompassing Shaanxi Province, Ningxia Hui Autonomous Region, Gansu Province, Qinghai Province, and Inner Mongolia Autonomous Region (Neimenggu), features a significant minority population that is less influenced by Han Chinese culture and exhibits a weaker sense of "attachment to one's home." For example, Inner Mongolia's tradition of nomadic pastoral life, characterized by mobility and dispersal, involves people moving to areas where water and grass are available (Kui, 1997). In regions like Linxia and Tongxin, the Hui people have a tradition of commerce. Since the reform and opening-up, they have traveled extensively across the country for trade, often leading a nomadic lifestyle. Consequently, it is more common for the elderly in the Northwest cultural region to

relocate to more suitable environments for retirement or to live with their children. This partially explains why the western region is a major area of out-migration for the elderly (Wan, 2023). Moreover, the elderly in the Northwest cultural region are less influenced by Confucian culture, which may contribute to a higher acceptance of nursing homes and a lower ageing in place intention. This cultural context provides insight into the region's distinct elderly care preferences and the relatively lower rates of ageing in place compared to other regions.

Additionally, secondary cultural regions can partially explain the heterogeneity in the ageing in place intention within primary cultural regions. For instance, both Shanxi Province and Shandong Province belong to the North China cultural region, yet Shandong's ageing-in-place rate is among the highest in the country, while Shanxi's is among the lowest. This disparity could be attributed to Shandong's deep-rooted Confucian cultural heritage, being the birthplace of Confucius and Mencius. Confucian culture emphasizes filial piety, respect for elders, and the importance of rituals and righteousness (Li & Shen, 1996). Under this cultural influence, many people in Shandong regard sending elderly family members to nursing homes as an unfilial act, thus preferring that the elderly ageing in place. In contrast, Shanxi Province has a strong commercial tradition, with Shanxi merchants historically being prominent in trade across the nation. Shanxi merchants frequently traveled between the grasslands and the inland to conduct tea-horse trade. Additionally, in the early Ming Dynasty, southern Shanxi was a center for outward migration (Zhou, 1997). Consequently, the sense of "attachment to one's homeland" might be weaker among Shanxi people, resulting in a lower ageing in place intention. This commercial and migratory history may contribute to a cultural disposition that is more accepting of mobility and institutional care for the elderly.

6 Analysis of Moderation Effects on Ageing in Place Intention

The empirical analysis of factors influencing the ageing in place intention, presented in Chapters 4 and 5, reveals that individual characteristics of the elderly, community environment characteristics, and regional environment characteristics all significantly impact the intention when controlling for other variables. Among these factors, satisfaction with the physical environment of the community has a notable positive effect on the intention, while community social support does not exhibit a significant effect. However, existing research suggests that the community's social environment might mediate the impact of the physical environment on the elderly's life (Oldenburg, 1989). Therefore, this chapter will first explore the moderating role of social support on the relationship between community physical environment satisfaction and the intention of ageing in place.

Moreover, according to the person-environment fit model, the suitability of ageing in place for the elderly is partly determined by the degree of compatibility or congruence between the individual and their environment. The optimal environment for ageing in place should align well with the elderly individual's needs and preferences. If the environment does not fully match or align with the individual, and if the elderly cannot adapt to this mismatch, "relocating" for retirement may be a better choice. Therefore, this chapter examines the moderation effects of community environment and individual characteristics, as well as the moderation effects of regional environment and individual characteristics, on the ageing in place intention. The aim is to identify which individual characteristics make elderly people more adaptable to their environment and which characteristics make them less adaptable, thus necessitating the consideration of relocating for retirement.

6.1 Moderation Effects of Community Physical Environment and Social Environment

While the empirical analysis in Chapter 4 found that community social support does not significantly impact the ageing in place intention, this does not imply that its influence should be disregarded. To examine the potential moderating effect of social support on the relationship between physical environment satisfaction and the ageing

in place intention, a moderation term between physical environment satisfaction and social support was included in the regression model. This approach allows for a more comprehensive understanding of how these factors interact and influence the elderly's decisions regarding ageing in place.

Model (5) presents the logistic regression results incorporating the moderation term between social support and physical environment satisfaction. As shown in Table 6-1, the interaction term is significant at the 90% level and has a negative coefficient. This indicates that an increase in social support within the community diminishes the positive impact of physical environment satisfaction on the ageing in place intention. Thus, Hypothesis 5 is validated. The moderating effect of social support can be attributed to the role it plays in reflecting the social networks and sense of belonging that the elderly experience within their community. When the elderly receive substantial social support, their ageing in place intention becomes less dependent on their physical environment satisfaction. This suggests that robust social support and a strong sense of community can mitigate the need for relocation, even if the physical environment is not entirely satisfactory.

This inference can be elucidated through the "place attachment" theory (Arani et al., 2022). "Place attachment" refers to an individual's perception of being a member of a specific environment and is widely described as a positive bond between an individual and their environment (Altman & Low, 1992). Enhanced social capital and social networks can significantly increase the "place attachment" of the elderly to their community, transforming a mere space into a meaningful "place." In this context, the memories and identity associated with this "place" may become more significant to the elderly than the physical environment itself (Clark et al., 2023; Scannell et al., 2010). As highlighted by Lebrusan et al. (2022), the most critical aspect of "place attachment" is the "emotional attachment" to neighborhood relationships and living environments. This sentiment is encapsulated by the elderly resident's remark: "Even the 'stones' in the community know me, which motivates me even more to age in place." This underscores how emotional bonds and a sense of belonging within a community can outweigh physical satisfaction, reinforcing the elderly's ageing in place intention.

Thus, while community social support does not directly influence the ageing in place intention, it can indirectly affect their choice by moderating the impact of physical environment satisfaction on this intention. This moderating effect can be

understood through the lens of "place attachment" theory. Most current studies on the influence of social environments on ageing in place suggest that community social environments can directly affect the elderly's choice of ageing mode. While acknowledging this impact, this study proposes that for the elderly in China, the influence of the community social environment on their ageing in place intention is indirect. This is primarily due to the more immediate effects of the community physical environment and family relationships. The community social environment exerts its influence by moderating other factors, such as community physical environment satisfaction.

Table 6-1 Logistic regression results incorporating the moderation term between social support and physical environment satisfaction

	(5)
（Other variable omitted）	
Physical environment satisfaction	0.492***
	(0.152)
Social support	0.471*
	(0.241)
Social support ＃Physical environment satisfaction	−0.125*
	(0.064)
_cons	−4.791*
	(2.477)
Sample size	4465
Chi square	290.85***

Relatively Risk Ratio (RRR) in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6.2 Moderation Effects between Community Physical Environment and Individual Characteristics of the Elderly

In Chapter 4, the empirical analysis revealed that only satisfaction with the community's physical environment had a significant impact on the ageing in place intention, while social support did not. Consequently, in analyzing the moderation effects between community environment and individual characteristics, the regression model includes moderation terms between community physical environment satisfaction and relevant individual characteristics. The individual characteristics of

the elderly in this study encompass four dimensions: basic features, health characteristics, economic characteristics, and family relationship characteristics. According to the person-environment fit model, the alignment between health characteristics, economic characteristics, and the environment significantly affects the quality of life of the elderly in China (Lum et al., 2014). Moreover, examining the moderation effects between these characteristics and physical environment satisfaction provides valuable insights for policy recommendations in urban planning. Therefore, variables related to health characteristics and economic characteristics, along with their moderation terms with physical environment satisfaction, were included in the regression model.

Model (6) presents the logistic regression incorporating moderation terms between relevant individual characteristics and physical environment satisfaction. Table 6-2 indicates that within health characteristics, the moderation term between daily activities capacity and physical environment satisfaction is significant at the 95% confidence level, showing a negative coefficient. This suggests that improvements in the elderly's daily activities capacity diminish the positive influence of physical environment satisfaction on their ageing in place intention, while declines in the capacity amplify this influence. This phenomenon can be attributed to elderly individuals with greater daily activities capacity finding it easier to conduct daily tasks such as shopping, walking, and socializing, all activities significantly influenced by the community's physical environment. Their capability to manage these activities independently reduces the impact of physical environment quality on their overall satisfaction and, consequently, on their ageing in place intention.

Conversely, when elderly individuals face limitations in their daily life abilities, the convenience, safety, and accessibility of the community's physical environment become particularly crucial. The quality and satisfaction derived from the environment can significantly influence whether elderly people choose to continue residing in that community. This interpretation is consistent with the findings of Hillcoat-Nalletamby and Ogg (2014) regarding the alignment between ageing in place and environmental suitability. Their research suggests that when the community environment fails to meet the physiological and psychological needs of the elderly, those with chronic illnesses or disabilities are more likely to consider relocation or entering elderly care facilities.

From the theoretical perspective of person-environment fit, this highlights the dual impact of community conditions on the ageing in place intention. On the one hand, the sense of attachment and continuity developed over time in their community environment can enhance their quality of life and overall well-being, thereby reinforcing their intention. On the other hand, inadequate conditions for ageing in place may undermine this intention. For example, insufficient accessible facilities may limit their mobility and social interactions, while a lack of social harmony and support could contribute to feelings of loneliness among the elderly. Additionally, some studies suggest that for those considering alternatives to ageing in place, communities specifically designed to support elderly residents may offer better alternatives. Such environments may better cater to their needs compared to remaining in their current homes (Xiang et al., 2017; Zhang, 2020).

Regarding economic characteristics, the moderation between the natural logarithm of monthly household income and the physical environment satisfaction is statistically significant at the 95% confidence level, showing a negative coefficient. This finding suggests that as the monthly household income of elderly individuals increases, the positive effect of physical environment satisfaction on their ageing in place intention diminishes. This trend may stem from the fact that higher-income elderly individuals generally enjoy better economic conditions, affording them a higher quality of life independent of external environmental factors. In contrast, those with lower economic means often reside in less favorable living conditions where factors such as walkability and overall community infrastructure significantly impact their daily lives. Consequently, for elderly individuals with lower economic status, physical environment satisfaction in their community plays a more crucial role in their decision of ageing in place. Enhancing the quality of community environments for this demographic could better support their desire to remain in their current community throughout their later years.

Considering the analysis of the match between daily activities capacity and physical environment satisfaction discussed earlier, special attention should be given to the needs of impoverished disabled elderly individuals for community environments and elderly care resources and services. Many disabled elderly individuals, due to poor family economic conditions, are unable to improve their living conditions or afford institutional care fees. They are highly likely to face dual deficiencies in family caregiving and social support, thereby falling into difficult

predicaments (Zhang et al., 2014). The analysis results from the aforementioned moderation effect models partially support Hypothesis 6.

Table 6-2 Logistic regression incorporating moderation terms between relevant individual characteristics and physical environment satisfaction

	(6)
（Other variable omitted）	
Physical environment satisfaction	0.150***
	(0.040)
Health condition#Physical environment	−0.004
	(0.077)
Number of deceases#Physical environment	0.010
	(0.045)
Daily activities capacity#Physical environment	−0.482**
	(0.242)
Number of proporties#Physical environment	−0.125
	(0.185)
Household income#Physical environment	−0.161**
	(0.067)
_cons	−4.231
	(4.274)
Sample size	4465
Chi square	329.79***

Relatively Risk Ratio (RRR) in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6.3 Moderation Effects between Regional Environment and Elderly Individual Characteristics

In Chapter 4, the empirical analysis of influencing factors revealed significant impacts of regional environmental variables such as the number of nursing beds per thousand elderly population, January average temperature, and annual average relative humidity on the ageing in place intention. Therefore, in examining the moderation effects between the regional environment and individual characteristics, these three variables are incorporated into moderation terms with elderly health and economic characteristics for regression analysis. This investigation aims to elucidate how the macroscopic regional environment interacts with specific elderly individual

traits to influence the ageing in place intention, with the objective of formulating relevant policy recommendations.

Table 6-3 presents the logistic regression model incorporating moderation terms between relevant regional environment variables and elderly individual characteristics. From Model (7), it is evident that the moderation term between the number of nursing beds per thousand elderly population and the number of chronic deceases the elderly have is significant at the 95% confidence level. This finding suggests that an increase in the number of chronic deceases reduces the negative impact of the number of nursing beds on the elderly's intention of ageing in place. Additionally, the moderation term between the number of nursing beds and the elderly's daily activity ability is significant at the 90% confidence level, with a negative sign. This indicates that an improvement in daily activity ability increases the negative impact of the number of nursing home beds on the willingness to age in place, while a decline in daily activities capacity reduces this negative impact. This may be because when the number of chronic deceases and the severity of daily activity limitations are high, the elderly's quality of life in their current living environment becomes increasingly difficult to maintain. As a result, entering a nursing home for health care becomes a pressing need, and the availability of nursing resources has a diminished impact on their ageing in place intention.

In terms of economic characteristics, the moderation terms between monthly household income and the number of properties, as well as between monthly household income and the number of nursing beds per capita, exhibit a significant positive relationship. This suggests that higher economic status among the elderly mitigates the negative impact of the number of nursing beds per capita on their ageing in place intention. Wealthier elderly individuals are less concerned with the sheer quantity of available nursing resources and more focused on the alignment between their physical and mental health needs and their living environment. When this alignment is low, they can more easily access high-quality care services due to their superior economic conditions. Conversely, economically disadvantaged elderly individuals are more heavily influenced by the availability of nursing resources, particularly low-cost care services. When such resources are lacking, these individuals are less able to adapt or relocate, even if their current environment is unsuitable. The moderation effect analysis, from the perspective of macro-level nursing resources, provides further insight. It suggests that when the compatibility between the elderly

and their environment falls below a certain threshold, moving into a care institution becomes a more viable option than ageing in place. However, economically disadvantaged and disabled elderly individuals may find themselves in a challenging predicament. They often cannot improve their living conditions or afford institutional care, which exacerbates their difficulties.

Models (8) and (9) reveal that the moderation terms between average January temperature and annual average relative humidity with the economic status variables of the elderly exhibit a significant positive relationship. This suggests that for elderly individuals with better economic conditions, residing in warmer and more humid regions positively influences their ageing in place intention. Elderly people with higher economic status are more likely and able to relocate to areas with favorable climates if their current environment is less desirable. This finding underscores the pivotal role of economic resources in the decision-making process for ageing, especially when the local climate is not optimal. From a broader perspective, this conclusion highlights the significant influence of economic resources on the choice to age in place. It suggests that wealthier elderly individuals have greater flexibility and capacity to adapt their living arrangements according to climatic suitability, whereas those with limited economic means may be constrained to remain in less favorable environments.

Table 6-3 Logistic regression model incorporating moderation terms between relevant regional environment variables and elderly individual characteristics

	(7)	(8)	(9)
（Other variable omitted）			
Nursing beds	−0.439***	−0.013**	0.026***
	(0.090)	(0.006)	(0.006)
Average January temperature	0.112***	0.011**	0.115***
	(0.021)	(0.005)	(0.021)
Average relative humility	0.039***	0.033***	0.185***
	(0.009)	(0.009)	(0.053)
Nursing beds#Health condition	0.008		
	(0.006)		
Nursing beds#Chronic deceases	0.011**		
	(0.004)		
Nursing beds#Daily activities capacity	−0.043*		
	(0.024)		
Nursing beds#Number of properties	0.025*		
	(0.014)		

Nursing beds#Monthly household income	0.032***		
	(0.007)		
Average January temperature# Health condition		0.002	
		(0.006)	
Average January temperature# Chronic deceases		-0.002	
		(0.004)	
Average January temperature# Daily activities capacity		0.034	
		(0.024)	
Average January temperature# Number of properties		0.032**	
		(0.015)	
Average January temperature# Monthly household income		0.012*	
		(0.006)	
Average relative humility# Health condition			0.002
			(0.005)
Average relative humility# Chronic deceases			0.002
			(0.002)
Average relative humility# Daily activities capacity			0.016
			(0.013)
Average relative humility# Number of properties			0.024**
			(0.010)
Average relative humility# Monthly household income			0.017***
			(0.004)
_cons	9.573***	-2.653	9.408**
	(3.237)	(2.184)	(3.705)
Sample size	4465	4465	4465
Chi square	338.75***	295.15***	323.74***

7 Conclusion and Prospects

7.1 Research Conclusion

As China's ageing population continues to grow, understanding the preferences of elderly individuals regarding their retirement living arrangements becomes increasingly critical. "Ageing in Place" has emerged as a central concept within the framework of "active ageing" policies, aiming to foster independence and enhance social support for elderly populations. However, not all environments are conducive to ageing in place, and the suitability of retirement living modes varies among individuals. Therefore, determining which elderly individuals are more inclined to age in place under specific environmental conditions is pivotal for advancing active ageing strategies comprehensively. Moreover, investigating the factors influencing elderly people's ageing in place intention is crucial for shaping ageing policies, enhancing community environments, and delivering higher-quality elderly services.

Based on the perspective of active ageing and the theoretical framework of person-environment fit, this study utilizes data from the 2018 China Longitudinal Ageing Social Survey (CLASS) and the 2019 China Statistical Yearbook to explore the mechanisms by which individual characteristics, community environment, and regional environment influence urban elderly people's ageing in place intention. The research examines both the micro-level aspects of community environments and the macro-level aspects of regional environments. In terms of methodology, this study employs ArcGIS spatial data visualization, binary logistic regression, and moderation effect analysis. The research content focuses on the impacts of individual characteristics, community physical environment satisfaction, community social support, and regional environment on the ageing in place intention. It also explores the moderation effects between community physical environment satisfaction and social support, as well as the interaction mechanisms between environmental factors at different scales and individual characteristics, to understand the needs of the elderly and propose effective ageing policy recommendations. The main conclusions of this study are as follows:

1. The individual characteristics of elderly people influence their ageing in place intention.

The health characteristics, family relationship characteristics, and economic characteristics of elderly individuals significantly affect the intention. Overall, Han Chinese elderly people who self-evaluate their health positively, are married, live alone, have fewer people living with them, still care for their parents, whose family members do not want them to go to a nursing home, own more property, and have higher monthly household incomes are more inclined to age in place. Additionally, family relationships play a crucial role in shaping the elderly's preferences for ageing mode. These findings highlight the importance of not treating the elderly as a homogeneous group when formulating relevant ageing policies. Instead, targeted research should be conducted based on the characteristics of different elderly populations.

2. Physical environment satisfaction of the community has a significant positive impact on the ageing in place intention.

Enhancing the satisfaction of elderly people of the physical environment of their community can increase the likelihood that they will choose to age in place. A community physical environment that satisfies the elderly can meet their daily living needs, provide them with comfort and a sense of security, and thereby encourage them to stay in the community. It is important to note that satisfaction is the elderly's subjective perception and evaluation of the community's physical environment, while the objective physical environment refers to the actual, quantifiable environmental conditions, such as the greening rate, floor area ratio, and walkability of streets. Therefore, when improving the objective physical environment of a community, the subjective feelings of different elderly individuals should also be taken into consideration.

3. Community social support does not have a significant direct impact on the ageing in place intention, but it can indirectly influence this intention by moderating the effect of physical environment satisfaction.

Compared to the influence of the community’s physical environment on the lives of the elderly, the impact of community social support may not be as direct. As a result, community social support itself does not significantly affect the ageing in place intention. However, community social support can indirectly influence this intention by moderating the effect of physical environment satisfaction. This moderating effect can be explained through the theory of "place attachment."

4. Regional environment affects the ageing in place intention.

Regarding regional environmental variables, the per capita GDP of the province does not have a significant impact on the intention. Living in provinces with more abundant institutional elderly care resources may reduce the intention. In terms of climate, if the elderly live in warm and humid areas, their ageing in place intention significantly increases. Additionally, regional cultural differences have a substantial impact on the ageing in place intention. Elderly people in the Northeast Cultural Region and the Central China Cultural Region have significantly higher ageing in place intention compared to those in other cultural regions, while those in the North West Cultural Region have significantly lower intention.

5. The moderation effects between individual characteristics and the environment affects the ageing in place intention.

Regarding community physical environment satisfaction, a decrease in the daily activity capacity of the elderly will enhance the positive impact of physical environment satisfaction on their ageing in place intention. For elderly individuals with limited daily living abilities, a convenient, safe, and barrier-free community physical environment becomes particularly important, significantly influencing their willingness to continue living in that community. An increase in the elderly's household monthly income will reduce the positive impact of physical environment satisfaction on their ageing in place intention. For elderly people with lower economic status, community physical environment satisfaction has a greater impact on their ageing in place intention. Improving the quality of the community environment where these individuals live can better enable them to spend their later years in their original community.

Regarding the regional environment, the variables that moderate individual characteristics of the elderly mainly include elderly care resources and climate variables. An increase in the number of chronic diseases and a decline in daily activity ability among the elderly will reduce the negative impact of the number of nursing beds per thousand elderly on their ageing in place intention. The better the economic situation of the elderly, the lower the negative impact of the number of nursing beds per thousand elderly on their ageing in place intention. Additionally, for elderly individuals with better economic conditions, living in warm and humid regions enhances the positive impact on their ageing in place intention.

7.2 Policy Recommendations

Based on the findings of this study, the following policy recommendations related to ageing in place are proposed:

Building upon Conclusions 1 and 2, in the process of community planning and development, governments and relevant agencies should actively engage elderly individuals to understand their needs and expectations. This approach can help align the physical environment of communities more closely with the actual needs of elderly residents, thereby creating satisfying living environments conducive to ageing in place. Furthermore, targeted policies should be formulated based on the characteristics of different elderly groups. For example, diverse medical and health services should be provided within communities, such as regular health check-ups, healthcare guidance, and rehabilitation care, to enhance the health levels of elderly individuals. Additionally, consideration should be given to providing community-based family support services by establishing community family support centers. These centers can offer assistance with daily living, psychological counseling, and routine care to special groups such as elderly individuals living alone due to widowhood or those still caring for elderly parents, helping them address family and life challenges and enabling them to truly age in place within their communities.

Based on Conclusion 3, community planning efforts should prioritize specific physical environments that foster social support among elderly individuals, such as community parks, centers, and public fitness facilities. These configurations provide spaces where people can interact, facilitating social connections among the elderly. These places serve as platforms for accessing social support, thereby strengthening the moderating role of social support and amplifying the influence of community physical environments on the desire to age in place. This underscores the importance of designing community spaces that not only cater to physical needs but also promote social interactions crucial for elderly well-being and independence.

Based on Conclusion 4, it is imperative to bolster the provision of nursing services in provinces and regions where elderly individuals show a lower inclination to age in place. This entails ensuring an ample supply of nonprofit nursing homes, expanding nursing home capacity, and enhancing community-based elderly care services to adequately support the ageing population's preferences. Given regional cultural disparities, ageing in place cannot be universally regarded as the optimal

choice. For instance, in North West China and Inner Mongolia, a diverse array of ageing resources should be contemplated. This approach caters to the needs of elderly individuals who prefer ageing in place while also offering a spectrum of elderly care services for those who opt for nursing home care or relocation.

Based on Conclusion 5, community planning should prioritize the development of barrier-free facilities, improvements to the walkability of community roads, and the renovation of older neighborhoods. These efforts are particularly beneficial for elderly individuals with limited daily living abilities, as they rely heavily on safe and accessible environments within their communities to support ageing in place. Given that economically disadvantaged elderly often reside in older neighborhoods, revitalizing these areas can significantly boost their physical environment satisfaction and enhance their ageing in place intention. However, in cases where neighborhood upgrades are impractical, as noted by Hillcoat-Nalletamby and Ogg (2014) regarding the suitability of ageing in place environments, efforts should focus on persuading these individuals to consider relocation while ensuring adequate resettlement and compensation. Moreover, for disabled and economically disadvantaged vulnerable groups, the government must act as a safety net by offering support. This can be achieved through government procurement or subsidies aimed at providing free or low-cost community care services, as well as subsidies to facilitate their admission to nursing homes. Such measures are essential to ensure these vulnerable groups receive the necessary support and care they require.

7.3 Innovations and Research Gaps

7.3.1 Innovations

This study innovates primarily in the following three aspects:

1. From the perspective of active ageing, the study focuses on the impact of the environment on the ageing in place intention of elderly individuals, expanding the model of person-environment fit and applying it to the adaptation mechanism between environment and ageing in place.

2. The study incorporates both micro-level community scale and macro-level regional scale, extensively exploring the impact of environments at different spatial scales on the ageing in place intention. At the regional scale, the study innovatively introduces a cultural geography perspective, revealing substantial influences of cultural environment on the ageing in place intention.

3. The study employs moderation effect models, examining from a more nuanced perspective the impact of the fit between environments at different levels and elderly individuals' ageing in place intention.

7.3.2 Research Limitations

This study has several limitations:

1. Due to data availability constraints, the measurement of community physical environment in this study relies solely on subjective variables such as elderly satisfaction with the community physical environment, lacking objective physical environment data such as plot ratio, green space ratio, and the number of convenience facilities. Similarly, the measurement of community social environment lacks related data on community belonging and social participation, relying only on social support variables.

2. The CLASS data from 2018 lacks data from Xinjiang, Tibet, and Hainan, and there are significant differences in sample sizes among provinces. This limitation affects the exploration of how regional environments influence the intention. For example, the absence of data from Xinjiang and Tibet in this study's western region may impact conclusions regarding the influence of regional environments, especially cultural environments, on the ageing in place intention.

3. This study employs a logistic regression model, which belongs to the generalized linear model family along with linear regression. It explores the linear relationship between community and regional environments and the ageing in place intention. However, these relationships may exhibit nonlinear effects, such as threshold effects in the satisfaction of physical environment on the intention.

7.3.3 Future Directions

Future research can address the limitations of the current study to enhance and broaden the understanding of the factors influencing elderly individuals' intention for ageing in place:

1. Integrating objective and subjective data measurement: Subsequent studies can incorporate both objective physical environment data and subjective perception variables when evaluating community physical and social environments. This approach would offer a more holistic insight into how community environments impact elderly individuals' ageing in place intention.

2. Increasing regional data coverage and sample size: Future research can mitigate the limitations of inadequate regional data by broadening data sources and

expanding sample coverage. Specifically, for regions with sparse data, such as Xinjiang and Tibet, targeted data collection initiatives can be employed to enhance the precision of studying how regional environments affect elderly individuals' living.

3. Explore nonlinear impact relationships: Future research can employ a variety of statistical methods to investigate nonlinear impact relationships. For instance, segmented regression, locally weighted regression, decision trees, and machine learning algorithms such as random forest can be utilized to delve deeper into potential threshold effects or other nonlinear relationships between community environment satisfaction and the ageing in place intention. These approaches would provide more nuanced insights into how different levels of environment satisfaction influence elderly individuals' ageing in place intention.

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