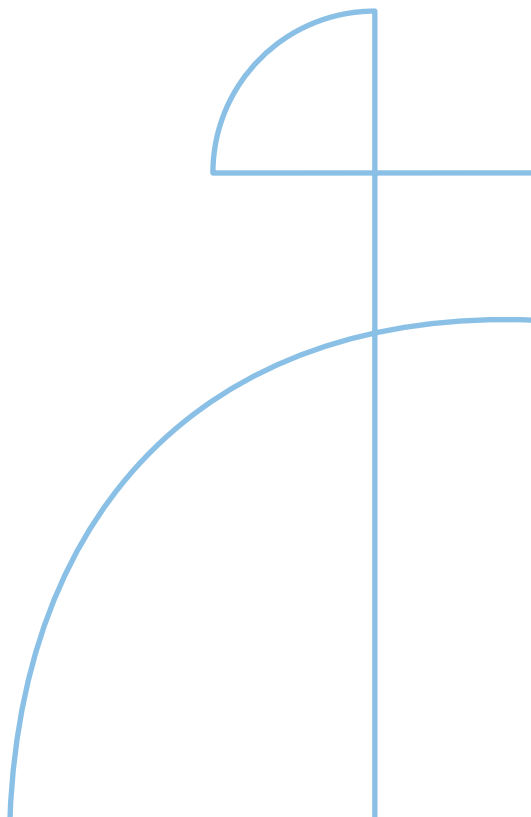
Doctoral Thesis in Real Estate and Construction Management

Housing for the elderly

Supply, demand and wellbeing

MARIA KULANDER

KTH ROYAL INSTITUTE OF TECHNOLOGY



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I dedicate my thesis and the work done to my family.

Abstract

The aim of this thesis is to further explore and analyse the housing situation of the elderly in terms of supply, demand and well-being. The thesis contributes to existing knowledge in the field of housing for the elderly. This includes a discussion of the dominant idea that the individual should age in place, i.e. in an existing home. The chosen context is Sweden. The doctoral thesis consists of four articles, of which three are published and one is under scientific review.

One of the contributions that this thesis makes is that the elderly are not a homogeneous group, but rather consist of younger elderly who are still active, and older elderly, who may need more help with daily life. This is of course also related to physical health factors, but these are not studied in more detail in the thesis, which has a focus on the perceived well-being of the elderly. Previous research has overestimated the willingness of the elderly to remain in their existing home, and thereby underestimated their willingness to move to other housing.

In addition to the elderly's own preferences, they are also affected by opportunities and flexibility in the housing market. The number of homes on the market is adjusted primarily through a price mechanism and only secondarily by building or demolishing homes, so the adjustment is slow. People who need to live in a retirement home also need a certificate from a social welfare officer, which is becoming increasingly difficult as the number of elderly people increases over time. It is also the municipality that decides whether and when a new retirement home is to be built. Previous research on retirement homes is limited, as they are not subject to market pricing and open demand. The thesis thus also makes a contribution in one respect as it also

addresses the effect of the Ädelreformen from 1992. The purpose of this was to streamline the allocation of housing for the elderly and at the same time provide fewer institutions, but the results of the thesis question whether the well-being of the age group has really been improved by the idea of aging in place.

All municipalities are responsible for ensuring that all people in the municipality have somewhere to live, but where and how people live can vary. Some municipalities also rely on being able to rent from other municipalities that currently have vacancies. The distribution of retirement homes across the country varies geographically and is influenced by factors such as urbanization, as well as the size of the municipality and the tax revenues for the municipality. This thesis addresses several different markets – both free pricing and the utility value system in the rental market and retirement homes – and different municipalities can choose different ways to solve their residents' housing needs based on local demand. Just as there is a population pyramid at the bottom for Sweden and the EU, it can be imagined that each municipality has its own population pyramid to base itself on when solving housing problems with regard to both housing for the elderly and overcrowding. The thesis contributes to increased knowledge about the elderly's options in the housing market, their own preferences and well-being, and suggests measures that can facilitate increased flexibility and adaptation to perceived needs.

Keywords
Housing market, elderly, well-being, Sweden

Sammanfattning

Syftet med denna avhandling är att vidare utforska och analysera äldres bostadssituation i termer av utbud, efterfrågan och välbefinnande. Avhandlingen bidrar till befintlig kunskap inom området bostäder för äldre. Detta inkluderar en diskussion om den dominerande idén om att individen ska åldras på plats, dvs i redan befintlig bostad. Den valda kontexten är Sverige. Doktorsavhandlingen består av fyra artiklar, varav tre är publicerade och en är under vetenskaplig granskning.

Ett av bidragen som denna avhandling ger är att de äldre inte är en homogen grupp, utan snarare består av yngre äldre som fortfarande är aktiva, och äldre äldre, som kan behöva mera hjälp med dagliga livet. Detta är givetvis också relaterat till fysiska hälsofaktorer, men dessa studeras inte närmare i avhandlingen som har ett fokus på äldres upplevda välbefinnande. Tidigare forskning har övervärderat de äldres vilja att bo kvar i sin befintliga bostad, och därmed undervärderat deras vilja att flytta till annat boende.

Förutom de äldres egna preferenser påverkas de också av möjligheter och flexibilitet på bostadsmarknaden. Antal bostäder på marknaden anpassas i första hand via en prismekanism och först i andra hand med att man bygger eller river bostäder, så anpassningen går långsamt. De personer som behöver bo på ett äldreboende behöver dessutom ett intyg från en biståndshandläggare, vilket blir allt svårare i och med att de äldre ökar i antal över tid. Det är också kommunen som bestämmer om och när ett nytt äldreboende ska byggas. Tidigare forskning om äldreboenden är begränsad, eftersom de inte omfattas av marknadsprissättning och en öppen efterfrågan. Avhandlingen gör därmed även ett bidrag i ett avseende då också effekten av Ädelreformen från 1992 tas

upp. Meningen med denna var att effektivisera allokering av bostäder för äldre och samtidigt ge färre institutioner, men avhandlingens resultat ifrågasätter om åldersgruppens välbefinnande verkligen förbättrats av idén om att åldras på plats.

Alla kommuner har ansvar för att alla personer i kommunen har någonstans att bo, men var och hur man bor kan variera. Vissa kommuner förlitar sig även på att de kan hyra in sig hos andra kommuner som för närvarande har vakanser. Spridningen på äldreboenden över landet varierar geografiskt och bland annat urbanisering påverkar här, liksom kommunens storlek och skatteintäkterna för kommunen. Denna avhandling tar upp flera olika marknader – såväl fri prissättning som bruksvärdessystemet på hyresmarknaden och äldreboenden – och olika kommuner kan välja olika sätt att lösa sina invånares boenden utefter lokal efterfrågan. Precis som det ligger en befolkningspyramid i botten för Sverige och EU så kan man tänka sig att varje kommun har sin befolkningspyramid att utgå ifrån när man löser bostadsproblem vad gäller såväl äldres boende som trångboddhet. Avhandlingen bidrar till ökad kunskap om de äldres alternativ på bostadsmarknaden, egna preferenser och välbefinnande samt föreslår åtgärder som kan underlätta en ökande flexibilitet och anpassning till upplevda behov.

Nyckelord
Bostadsmarknad, äldre, hälsa, Sverige

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Finally, yet important, I thank my family, friends, and relatives who remind me that sometimes a cup of coffee or a few days off are needed to reach the goal.

List of publications

Four research papers have been included in this doctoral thesis. The first paper is based on data collected during my first year as a doctoral student. These data are also presented in a licentiate thesis published as a monography (Kulander, M., 2013. *Do the elderly move at the right time?* Licentiate dissertation, KTH Royal Institute of Technology. ISBN 978-91-85783-30-4).

The papers in the doctoral thesis include

Paper A – Kulander, M. (2018). Moving later in life–preferences and opportunity. *International journal of housing markets and analysis*, 11(5), 852-874.
https://doi.org/10.1108/IJHMA-02-2018-0012

Paper B – Kulander, M., & Wilhelmsson, M. (2022). What determines the supply of housing for the elderly, and how is it related to the spread of COVID-19?. *Journal of aging and environment*, 36(4), 357-380.
https://doi.org/10.1080/26892618.2021.1963386

Paper C – Donner, H., & Kulander, M. (2024). Analyzing the relationship between housing and social engagement among the elderly. *Journal of aging and environment*, 1-17.
https://doi.org/10.1080/26892618.2024.2400656

Paper D – Kulander, M., & Söderberg, I.L. (XXXX). Moving intentions among older adults in rental housing: Elucidating the concept of aging-in-place. Submitted to: *International journal of housing markets and analysis*.

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1 Introduction

In many countries, as life expectancy increases, the number of elderly people has also increased. However, national institutions have not adapted to the new numbers. This means that many elderly people are ageing-in-place, and this concept is a dominant idea of how elderly people prefer to live. If this is the choice of the elderly, it could be a good thing to enable the individual to stay in a suitable and safe home. However, ageing-in-place may not be in the best interest of the individual. Unfortunately, there is no alternative due to financial or other reasons. In this thesis, the interest of the elderly is the focus; therefore, a person's living situation and their own perceptions of it as a preference are investigated along with the housing possibilities for this age group, here defined as those aged 65 years or above.

1.1 Problem

Average age and average life expectancy are rising, and the WHO Health Organisation encourages an active environment for the elderly. The population pyramids in several countries show the same thing: the elderly population has increased and they live longer with the help of medicine and a more active life. Figure 1 shows EU's population pyramid (Eurostat). As seen in the comparison between 2022 and 2100, the shape was predicted to worsen.

The demographic problem of a growing ageing population has been highlighted in research worldwide (e.g. Jivraj *et al*, 2020; Wang and Durst, 2023; Mo *et al*, 2023; Aitken *et al*, 2024). Elderly people live longer; however, this does not mean that they are healthy. There is an obvious problem with

support and care for the elderly, as demographics in many countries have changed from an earlier pyramid to a situation with fewer younger people supporting a growing number of elderly (King *et al*, 2021).

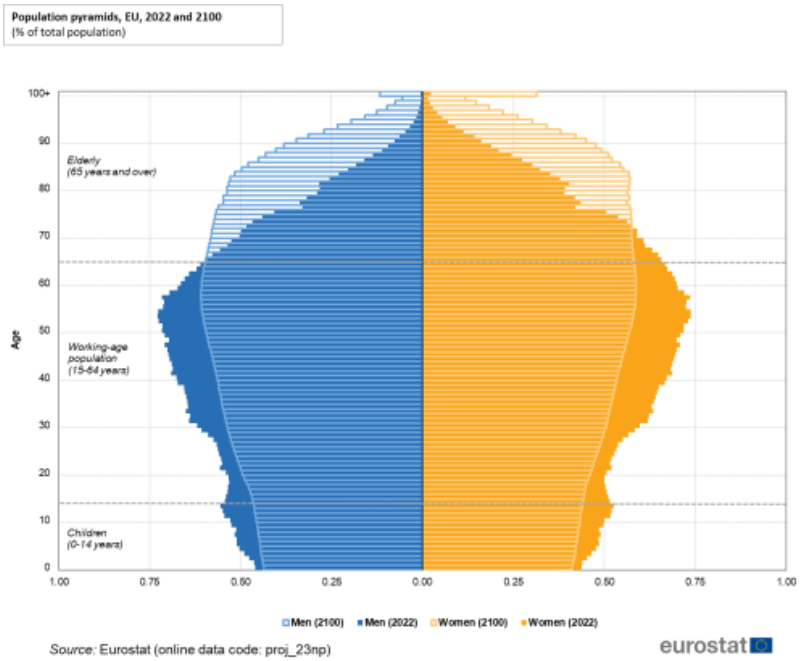

Figure 1: The population pyramid of the EU countries with data from Eurostat comparing the years 2022 and 2100.

This problem was also discussed by Oyegoke *et al* (2024) and Pimchan and Darawong (2024). Jonsson *et al* (2021) discussed the matching problem entailed in providing the best housing for the elderly as a complex problem twisted as a cobweb. The elderly must be included in the building process more proactively to increase the possibility of ageing-in-place. The problem of planning the supply of suitable housing for the needs of the elderly was also discussed by Verma *et al* (2023), while Wu *et al* (2022) highlighted the need to adapt the existing stock. Staube *et al* (2016) discussed the reasons for providing financial support for age-friendly housing and provided examples of possible solutions from a comparison between Latvia and the Netherlands, representing two different perspectives: one nation is young and is building new systems, and the other is adjusting older systems to the present situation.

There is a large body of literature on the dominant idea of ageing-in-place (e.g. Pettersson *et al*, 2020; Bosch-Farré *et al*, 2020; Yadav *et al*, 2023a), assuming that the elderly prefer to stay in their homes for as long as possible with different types of adjustments and help instead of having to move. However, the elderly are a heterogeneous group that mostly depend on health issues that affect accessibility and the need for different types of care, and the idea of ageing-in-place as the dominant alternative should be evaluated considering both needs and preferences.

1.2 Context of the thesis

In this thesis, Sweden has been explored, but comparisons with other countries are of great interest to policymakers, as there are no obvious solution to housing for an ageing population.

In Sweden, an alternative to ageing-in-place is to move to special housing (where there is support, service, and care provided). However, in Sweden, there are rules defining who can move there, and many elderly people with needs are considered too healthy to move into these apartments.

1.3 Aim of the thesis

This thesis aims to explore and analyse the housing situation of the elderly regarding supply, demand, and the effects on their well-being. This also includes a discussion of the dominant idea of ageing-in-place. The Swedish housing market was selected as the context of this study. The following research questions were formulated:

RQ1: What is the demand of housing among the elderly?
RQ2: What is the supply of special housing for the elderly?
RQ3: How is the well-being of the elderly affected by their housing alternatives?

Paper A addresses the first research question, which is also addressed in Paper D (see Figure 2). Paper B addresses the second research question. The third research question is addressed in Papers C and D.

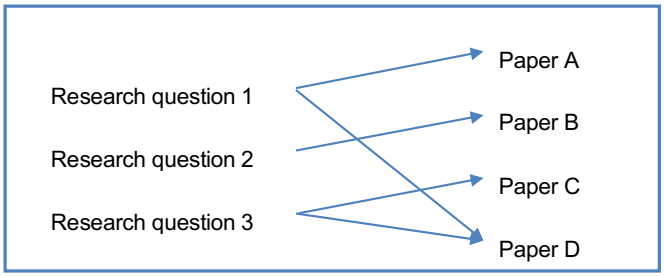

Figure 2: The research questions in relation to the four research papers presented in the thesis.

1.4 Structure of the thesis

Chapter 2 discusses themes from the international literature on housing for the elderly. Chapter 3 discusses the Swedish housing market for the elderly, including the statistics and definitions of different types of housing. Chapter 4 describes the methods, and a short summary of each paper is presented in Chapter 5. Chapter 6 presents concluding remarks, and the compilation part concludes with a list of references. Subsequently, these four papers are presented in full.

2 Themes from the literature

Some themes are debated more than others in the literature on housing for the elderly, and they are briefly mentioned here: 1) the life-cycle theory of housing, and whether people are moving according to that general idea, and 2) the dominant idea of ageing-in-place as an answer to the housing problem when the average age in most nations is increasing. This section elaborates the literature on these two themes.

2.1 Theoretical background – life-cycle theory

The theoretical background of this thesis is the *life-cycle hypothesis* for the housing market, originally proposed by Rossi (1955) and later used in other studies (e.g. Kending, 1984; Andersen, 2010; Haslauer *et al,* 2014). This hypothesis follows people's housing choices through life: some people move many times, while others only move once and, therefore, are ageing in place in that same house. Often, income or wealth determines not only whether the housing form of an individual is rental or owned but also the willingness to take risks. Younger individuals might have to start without any capital and, therefore, without any other choice than a rented home. This can be hard to find, as demand in some local markets can exceed the supply for rentals. However, some younger adults have savings or have wealthy parents who help them buy the first home – either with cash or assisting in taking on mortgages – thereby offering an entrance to the market of owned homes. Thus, the young can begin to allocate housing wealth. This phenomenon is often referred to as the property ladder (e.g. Morrow-Jones and Wenning, 2005; McKee, 2012; Knight and Wan, 2024), which describes leverage in moving between different forms of tenure and different sizes and locations of a home.

The willingness to take risks decreases with age. A rented home entails no financial risk and is flexible for the individual, as a rented apartment or house is easier to move away from than any owned alternative that needs a sales process and is dependent on market value. Having mortgages also carries the risk that the value of the property will decrease in the future or the income situation will change, thus making monthly payments difficult.

Elderly people were previously regarded as a homogeneous group (Andersen, 2010). Currently, the elderly live longer and form a more heterogeneous group (Andersson *et al*, 2019). Although people may move, there is often a negative

shock that triggers it (Judd *et al*, 2012). This could be due to the loss of one's partner or another family member, for example, or illness. According to Painter and Lee (2009), the relationship between tenancy and age suggested by the life-cycle hypothesis of housing is not a direct relationship, but is instead related to family status.

Pimchan and Darawong (2024) discussed other non-economic factors such as the importance of design functionality, proximity, safety and security, service quality, and the social environment. Proximity can be both positive and negative, depending on what is nearby, but all factors are significant, especially when spreading from one mouth to another. Palicki (2020) analysed housing preferences in various stages of the life cycle, especially for elderly and young buyers. Unlike other studies, they examine costs as well as preferences. The three attributes that are valued most by the group aged 70 years and older are the functionality of the flat, attractiveness of the view, and appearance of the building. Younger groups valued more technical attributes. Different countries have different paths for elderly people. Staube *et al* (2016) compared Latvia to the Netherlands. Both countries work more in the short term than in the long term, but the Netherlands has made 61 adaptations to age-friendly apartments. Oyegoke (2024) discussed the problem of matching a person to an adapted apartment. One solution could be a choice-based system validated through workshops, brainstorming, and focus-group sessions.

2.2 Ageing-in-place

The second concept considered important for this thesis is the idea of ageing-in-place, which is dominant in practice in many countries, based on both economic reality and evaluated preferences of the elderly.

This is the case in, for example, the UK, where quality of life and cost efficiency are essential (Sixsmith and Sixsmith, 2008). To date, mostly positive effects have been reported. The study was based on qualitative data collected from 40 people, 80-89 years old. Bosch-Farré *et al* (2020) studied how to age in place in a healthy way (HA) and the enablers and barriers to that. Three themes were discovered: meanings and connotations of HA and life quality; HA within the community; and enablers and barriers to HA in place: financial situations, family environment, and physical and mental health were the most important when it comes to life quality. People living in small communities often have a

positive attitude, whereas those living in urban environments have a more negative view.

In a postal survey of 6,859 members of the Australian Senior Australia, followed by structured interviews with a subsample of respondents, Boldy *et al* (2010) found that half of the members wanted to move, mostly 55–75 years old. Another 30% of the respondents had just moved, and 30% of the members had not moved in 20 years. The reason for choosing ageing-in-place was that it was a comfortable home, while the elderly who wanted to move reported that this was because the home brought in too much maintenance. As an initiative to help with loneliness, the use of telecare and other technical support is now being attempted in the UK. The ageing-in-place policy may be a good thing if a person has chosen it, but if the elderly are to choose where to live, the government in Australia needs to provide more support (Boldy *et al*, 2010). These studies have found that, in addition to the positive effects of ageing-in-place, there may also be negative effects such as isolation and loneliness. Moreover, it is difficult for older adults to live independently.

Yeo and Heshmati (2014) compared elderly living in Japan and Sweden with respect to safety, socio-psychological aspects, treatment environment, and living residence aspects to find an optimal system for South Korea. Japan is more private and flexible, while the elderly in Sweden are often ageing in place, except for those with dementia who live in some kind of group housing. The Swedish system and Swedish housing market for the elderly is described in more detail in the following chapter. Often, neighbourhood and neighbourhood quality are as important as inside (Verma and Huttunen, 2015). Travel for groceries, shopkeepers, or hairdressers may be the only social contact with the outside world.

3 The Swedish housing market for the elderly population

This thesis consists of four studies conducted in Sweden. Therefore, a short description of the Swedish housing market with a specific focus on the elderly is required.

3.1 A regulated market

The housing sector in Sweden is highly regulated. Kopsch (2023) provides an overview of the national system that divides Swedish housing policy into three sectors: social policy, building policy, and financial policy.

According to the life-cycle hypothesis of housing, at different times in life, there is a need for different types of tenure forms because of the different needs of organising capital and spreading risks. According to this hypothesis, the elderly often have low income and are no longer willing to take on risks, but the elderly as a group also becomes more heterogeneous, and recent publications on financial aspects and ageing-in-place are rare. Yadav *et al* (2023) explored the situation for older women with low pensions living in Sweden – a group that the authors argue has not previously been studied from this perspective. By conducting a qualitative study with focus groups, Yadav *et al* (2023) identified three main themes: adjusting to a low pension, home as a home and an asset, and thoughts about the future (home). Women in this study were managed independently and did not receive home care. However, ageing with chronic illness prioritised health over money, giving the effect for

the individual that a relocation may have to become necessary. These results show the need for affordable housing in all Swedish municipalities.

Abramsson and Hagberg (2020) discussed the trend in rural and semi-rural areas in Sweden. They sent 1,386 surveys to persons 80 years and older asking them, among other things, when they moved to their present home. They found that younger people moved to cities, whereas older people were ageing-in-place. Yadav *et al* (2025), in Sweden, found the same pattern but also investigated the moving intentions of the elderly living in disadvantaged areas and found that crime and social disorder trigger a desire to move.

According to Andersson *et al* (2019), most elderly people over 65 years live at home in the normal housing market (not in special housing). The proportion of elderly people living in rented apartments increases with age, but the quality of these apartments is worse in small municipalities than in larger. This means that if and/or when the person finally moves into special housing due to an absolute need for this (and through a decision by the municipality), health is not the best, and the time at the new home in the special housing unit may not be so long. According to Swedish plans and building codes (SFS 2010:900; Boverket; Andersson *et al*, 2019) every municipality should ensure that everyone has somewhere to live. This could apply to a wide range of different kinds of housing, and it is not the right to, for example, ownership.

3.2 Some descriptive statistics

According to Statistics Sweden, there were 4,932,000 households in Sweden as of 31 December 2023, an increase of 48,200 households or just under 1% compared to the previous year. The most common form of housing for households was single-family homes with ownership rights (39% of households), followed by multi-family buildings with rental rights (29%) and multi-family buildings with tenant-ownership rights (21%). The average residential area in Sweden at the end of 2023 was 42 m² per person. The number of residential apartments on 31 December 2023 amounted to 5,212,028. These were divided into 2,129,193 apartments (41%) in single-family houses, 2,720,424 apartments (52%) in apartment buildings, 283,437 apartments (5%) in special housing, and 78,974 apartments (2%) in other buildings.

During the Swedish “Million program” in 1965-1974, one million apartments were built (100,000/year). These apartments were often larger than those built earlier (Kopsch, 2023). Now, 50 years later, these apartments need to be renovated, and those living in apartments are older and sometimes in need of assistance. Elderly people may want to age in place; however, they might have a better quality of life if they live in special housing, depending on their health. When it comes to the building sector, the stock increases slowly due to high production costs; therefore, new production has more market-based rents for the first 15 years. This complicates moving to a smaller apartment, as it might also be more costly per square meter.

3.3 Different types of housing

The definition of different forms of accommodation is *ownership, renting*, *right of use*, and a small percentage of *cooperative tenancy* (Boverket). In ownership, only you have a legal title to a house and have the right and responsibility to do changes. Only you can take out a mortgage deed as well as pay all the costs. In a rented apartment, someone else owns the house and you can rent one of the apartments in that house. In addition to rent, property managers take care of practical issues. For example, if a laundry machine is out of order, the property manager replace it with a new one. You do not own an apartment in a condominium. You have paid for the right to use one of the apartments, and simultaneously you become a member of a condominium association. All the members of this association own the building together and care for the association’s economy. A house has an assessment value, but a single condominium does not have an assessment value. However, the association pays property taxes. Although condominiums are quite common in Sweden, owned condominiums are not as common as in other countries. A small percentage lives in cooperative tenancies. In this type of tenancy, you pay a deposit sum when you move in, and then there is rent. When you move out, you get the deposit back. Every person could choose between these types of tenancy.

For the elderly, there is also *senior living, assisted living/security accommodation,* and *special housing*. Senior living can be either a condominium or rented apartment. There is usually no service, but if you are older than 55 years, you can move in. In security accommodation, the target group is 65 years old and the service is better. To move into special housing, a

medical certificate is required, stating that you need special attention and care that cannot be attended to in the home. Many people try to “age in place” for as long as possible with the help of homecare for a certain number of hours a week. However, at a certain point, a move is necessary.

4 Method and data

Different datasets and forms of data analyses were used in the four studies presented in this thesis. The methodological choices are briefly described here as well as the approach to each study concerning data collection and analysis.

4.1 Data collection

The relationship between research questions and methods are illustrated in Figure 3.

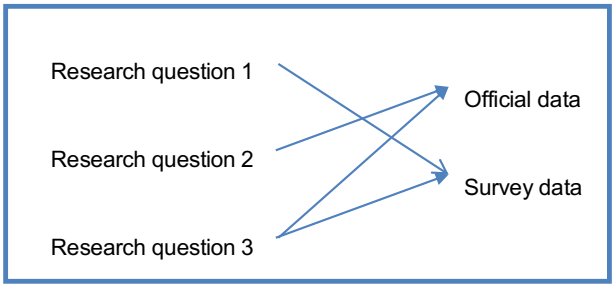

Figure 3: The research questions in relation to the data collection methods presented in the thesis.

Two types of data were used: primary data collected from two different surveys (Papers A and D) and secondary data from official sources (Papers B and C).

4.1.1 Survey data

The first survey, presented in Paper A, was built on data from the licentiate thesis. The market chosen for data collection was the municipality of Gävle. The total population of individuals aged 65-85 years in Gävle at that time was 16.265. For this study, several postal codes representing different types of ordinary housing were chosen. Among the elderly aged 65–85 years with these postal codes, a systematic sampling of every fourth individual was conducted, and 1.000 respondents were contacted.

A questionnaire was constructed based on a literature review and a specific interest in the experiences of the elderly. The questionnaires were distributed once with no reminders, and the answers were only shown in an aggregated manner; thus, ethical approval was not considered necessary. Ethical approval was uncommon at the time of this study (2011). The respondents' addresses were obtained from the Statens Personadressregister (SPAR). Of the 1.000 in the sample, 660 individuals answered the questionnaire (individual data) (response rate of 66%).

The second survey, presented in Paper D, was conducted nationwide by the independent market research company Kantar using their SIFO panel. A questionnaire was constructed based partly on earlier findings from 2013 but also on later literature and a specific interest in well-being, as measured by satisfaction with life. The survey was sent out from January to February 2024 by Kantar SIFO to obtain answers from 1.006 citizens aged 65-93 years. A total of 1.002 people answered all questions.

Here, the reason for conducting an ethical review was justified, as the questionnaire had more open questions that could be interpreted in different ways and specifically asked about psychological health. The Swedish Ethical Review Authority approved this survey (registration number 2023-06057-01).

In both cases, the main interests of the surveys were the individual and the possibilities of affecting the personal future and future living situation.

4.1.2 Official data

When it comes to supply, there are many official data. Problems for a researcher entailed with the legislation of the GDPR can be overcome if municipality data or data from other bigger groups such as nationwide data are used. In smaller groups, individuals are at a risk of being recognised.

Macro data (aggregated data) from Statistics Sweden and the National Board of Health and Welfare were used in Paper B. The longitudinal dataset covered 2013-2019 and was complemented by data on COVID-19 from 2020.

The authors of Paper C also used secondary data from a large-scale public health survey on social engagement among the elderly, conducted by the Public Health Agency of Sweden across all Swedish municipalities. Responses from 2020, 2021, and 2022 for individuals aged 80–84 years were analysed. Additionally, the study incorporated official statistics from Statistics Sweden regarding the distribution of different forms of housing as well as data on income levels and whether a municipality is classified as urban, suburban, or rural.

4.2 Data analysis

The statistical methods used for data analysis were similar, but not the same.

4.2.1 Survey data analysis

The paper presenting the results from the first survey (presented in Paper A) was based on a binary choice model with the question "Have you considered moving (Yes/No)?". If the answer to the first question was yes (Y), the second question asked where the respondent wanted to move. Five submarkets were identified: i =1…5. If the respondent was reluctant to move and thought that their apartment was appropriate, the question asked was why. A utility function was used, where to maximise the demand for adapted housing H^{α} in U = f (G, H^{α}) where G = other goods.

Data from the second survey (presented in Paper D) used binary logistic regression to separate the factors affecting moving intentions. The factors used in the regression were respondent specificity, present residence, and general attitudes.
Y = a weighted index of the three answers for willingness to move.

STATA was used to run the regressions of the first survey, whereas SPSS was used for the regression of data from the second survey.

4.2.2 Data analysis on official data

In the first study, based on official data on special housing (presented in Paper B), a utility function was used to find the equilibrium between demand and supply through U=f (size, urbanisation, financial strength, political factors, and housing market).

The data were analysed using the ordinary least squares method (OLS) with four dependent variables: the number of units (apartments) over time, number of units per capita, average size of elderly units, and average size of elderly units per capita. The utility function is used together with house prices in logarithmic form to determine an equilibrium. The term $\varepsilon^{s}{}_{t}$ determines if the term is positive or negative, which means if building new special houses are needed.

The statistical method used to analyse data on the well-being and housing situation of the elderly (presented in Paper C) is a regression analysis to explore the two econometric models. $Y = X\beta + \varepsilon$ is used, where X is a vector of different factors and Y denotes a fraction of individuals with low levels of social engagements.

STATA was used to run all regressions on official statistics.

5 Paper summaries

This thesis is a compilation of four papers, all produced after the licentiate thesis was presented as a monography (Kulander, 2013). Here, the four papers of the thesis are presented in short, with references to the background, aim, method, data, findings, and contributions of the study.

5.1 Paper A

Kulander, M. (2018). Moving later in life–preferences and opportunity. *International journal of housing markets and analysis*, *11*(5), 852-874.

Background: Many countries have an increasing proportion of elderly, and Sweden's policy has been to help people stay at their current homes for as long as possible, sometimes with home care. The problem assessed was to determine whether this was also a preference of the elderly or whether they had considered moving (Abramsson and Andersson, 2015). Preferences were measured using the stated preferences in a questionnaire. In addition, transaction costs matter (Quigley, 2002; Parliament, House of Commons, 2018).

Aim: This study analysed housing demand for the elderly and moving chains. Three hypotheses in the form of research questions were analysed in connection with the life-cycle hypothesis. RQ1: What are the preferences for

living arrangements? RQ2: Do the elderly want to downsize, and if so, what kinds of homes do they want to move to? RQ3: If they want to age in place, what are the reasons?

Method and data: Data were collected from Gävle, a medium-sized city in Sweden. A pilot study with interviews was conducted in nursing homes with 5 managers and 18 residents. Subsequently, 1,000 questionnaires were sent out to every fourth address in a certain postal number (zip code), received through the Statens Personadressregister, SPAR. A total of 660 respondents in the 65-85 age group answered the survey. A utility function max $U = f(G, H^{\alpha}) = f$ (goods other than housing, adapted housing) was used within the income restriction. The question is: What is the probability that $\alpha=1$? A binary choice probit model, Model 1: "have you considered moving?", was tested.

Findings: Most people wanted to age in place ($\alpha=0$). $\alpha=0{,}25$, and about 25% wanted to move, most of them to a senior living within the normal housing sector. Age had a positive effect (D85) as had good financial status. A senior living room can be either a rented apartment or condominium. Those who wanted to age in place were often recent movers, but a negative correlation was found with owning a house and being older (85), as this is often related to physical factors.

Contribution: The elderly as a group have earlier been treated as a homogeneous group. However, as the elderly live longer, the health of younger older adults is better than that of older adults, and the group is now considered more heterogeneous after retirement. This study analysed whether the elderly were content with ageing in place or if they preferred to move. This study provides a basis for future policies in the housing sector, especially for age-friendly infrastructure and municipalities.

5.2 Paper B

Kulander, M., & Wilhelmsson, M. (2022). What determines the supply of housing for the elderly, and how is it related to the spread of COVID-19? *Journal of aging and environment*, *36*(4), 357-380.

Background: Relatively little research has been conducted on the supply of special housing for the elderly. Planning special housing capacities for the elderly and developing indicators for the planning process are important

features of elderly care research. Planning based solely on the proportion of population over a certain age is insufficient (Gibson, 2020). Therefore, this study aimed to analyse the spatial distribution of special housing for the elderly in Sweden from 2013 to 2018.

Aim: The aim of this study was to add new knowledge to improve the ability to structure and plan long-term care. This study analysed the supply of special houses across Sweden to understand whether they are evenly distributed.

Method and data: In the tenure form of special housing, apartments are intended for people in need of long-term care; for this, an aid decision (biståndsbeslut) from the municipality is needed. As these elderly are especially vulnerable and the pandemic had just started, data were taken from both Statistics Sweden and the National Board of Health and Welfare (2013-2018). The statistics consisted of the number and size of dwellings in the house.

A utility function was used to find the equilibrium between supply and demand:

$$U_{ti} = f(\text{size, urbanisation, financial strength, political factors, housing market})$$

This utility function was used together with house prices in a logarithmic model to determine the equilibrium.

Findings: Geographically large municipalities have more homes for the elderly per capita and per elderly person, whereas more urbanised municipalities have fewer homes (see Figure 4). In addition, tax revenue has a positive impact. This may be because the number of elderly individuals differs between municipalities. However, the surplus or deficit of special housing in the municipality did not seem to correlate with the distribution of COVID-19. This study compares different municipalities.

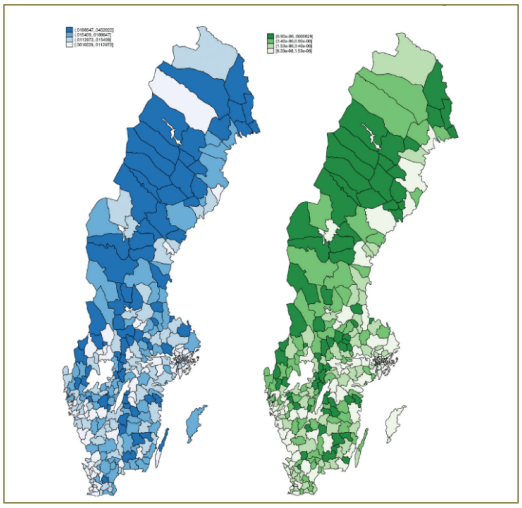

Figure 4: Maps illustrating the number of special housing units per capita and per elderly resident in Sweden in 2018. The authors drew the maps from the STATA data.

Contribution: To the authors' best knowledge, this is the first study on special housing in Sweden, thereby contributing important information for policymakers at different levels. Since the "Ädelreformen" reform in Sweden took place in 1992, the municipalities have a responsibility for the elderly care and regions that are responsible for health care. This study compared different municipalities according to the supply of special housing and the factors that contribute to the differences in supply between municipalities. An important contribution at the time of publication of the study was the investigation of the possible relationship between the supply of special housing and the spread of COVID-19, as this was of great interest to authorities worldwide in their quest to minimise the pandemic.

5.3 Paper C

Donner, H., & Kulander, M. (2024). Analysing the relationship between housing and social engagement among the elderly. *Journal of Aging and Environment*, 1-17.

Background: While housing policies for the elderly vary, the elderly population is increasing globally. In Sweden, there is considerable variation in how municipalities support the elderly, either by providing resources for ageing at home or offering accommodations in elderly-care facilities. Illustrating this, the proportion of individuals aged 80–84 years living in elderly-care facilities ranged from 3.7% to 21.3% across 130 Swedish municipalities. Since there is an established relationship between housing and health outcomes (Baker *et al*, 2016; Thomson *et al*, 2009), housing policies for individuals aged 80 years and older impact their overall well-being. Specifically, mental health is likely to be affected, as social interactions and networks influence health (Hamrin, 2022; Rogers, 1996; Wolf & Bruhn, 1992). Additionally, there is likely to be a relationship between home and neighbourhood characteristics and the extent to which individuals engage with others. The study specifically hypothesised that there is a relationship between different forms of housing and levels of social engagement—a measure of social interactions and participation in society— that is linked to both mental and physical health.

Aim: This study explored the relationship between social engagement and housing among the elderly (aged 80–84 years) by conceptualizing different forms of housing as a continuum of exposure to others and opportunities for social engagement. Single-family houses are one extreme of this continuum, offering little exposure to others, while elderly-care facilities represent the other extreme, providing social engagement through proximity to neighbours and organised activities. Apartments fall in between.

Method and Data: This study was based on a large-scale public health survey conducted by the Public Health Agency of Sweden, which was distributed to the Swedish population across all municipalities to assess the levels of social engagement among the elderly. Responses from 2020, 2021, and 2022 for individuals aged 80–84 years were analysed. Additionally, the study incorporated official statistics on the distribution of different forms of housing as well as data on income levels and whether a municipality is classified as urban, suburban, or rural. This allowed us to explore the relationship between social engagement and housing among the elderly using econometric models.

$Y = X\beta + \varepsilon$ where Y denotes a fraction of individuals with low levels of social engagements.

Findings: A higher proportion of elderly individuals living in elderly-care facilities is associated with a lower proportion of elderly individuals

experiencing a lack of social engagement. Consistent with the notion that closer proximity to neighbours results in greater social engagement, this study indicates that a higher proportion of elderly individuals living in single-family houses is associated with a greater proportion of elderly individuals who report a lack of social engagement. We discuss how these findings relate to housing policies for the elderly.

Contribution: This is the first study to explore the relationship between various forms of housing and social engagement among the elderly population. These findings help guide local policy decisions regarding whether to support ageing-in-place policies or invest in elderly-care facilities. As social engagement is measured based on a range of activities that the respondent has participated in over the past 12 months, this measure addresses the major issue of reliability associated with self-assessed health measures typically used in research on housing and the elderly.

5.4 Paper D

Kulander, M., & Söderberg, I.L. (XXXX). Moving intentions among older adults in rental housing: Elucidating the concept of aging-in-place. Submitted to: *International journal of housing markets and analysis*.

Background: The growing problem of an ageing population has been highlighted in research worldwide (e.g. Wang & Durst, 2023; Mo *et al*, 2023; Aitken *et al*, 2024). An important aspect of the description of the growing group of elderly as a possible problem is the question of planning the supply of suitable housing for their needs (Verma *et al*, 2023) and the adaptation of the existing stock to support their needs (e.g. Wu *et al*, 2022). The literature on the idea of "ageing-in-place" (e.g. Bosch-Farré *et al*, 2020; Pettersson *et al*, 2020; Yadav *et al*, 2023a) is based on the idea that the elderly prefer staying in their homes as long as possible with different types of adjustments and help instead of having to move.

Aim: The aim of the study was to explore factors affecting the active moving intention of older adults, defined as 65 and older, as well as the preferred features of a new home among those with a present intention to move. The study also investigates factors that could affect moving intention among older adults without a present intention to move. The study answers calls for more

knowledge on the demand for housing and attitudes towards moving among the elderly, as well as the present dominant idea of ageing-in-place. The study critically explored the idea of aging-in-place from the perspective of the residents. The following three research questions were formulated: RQ1: What differentiates older adults (65+ years) with an active intention to move from their current homes from older adults without such intention?; RQ2: What are the important factors of a preferred new home among older adults with an active intention to move?; RQ3: What could affect the intention to move among older adults without a present intention to do so?

Method and data: This empirical study was based on a survey conducted in January-February 2024 among 1,006 Swedish citizens aged 65-93 years, all living in rental housing. The three research questions were quantitatively investigated using statistical analysis. Binary logistic regression separated the factors affecting the respondents' intention to move. The 16 factors tested in the regression were respondent-specific variables, variables on present residential attributes, and four variables of respondents' attitudes towards general home characteristics.

Findings: The study shows that the lack of an elevator is the strongest predictor of intention to move among the elderly. Other statistically significant factors were education, age, life satisfaction (SWLS), and present financial situation. The study showed that respondents who were more educated, younger, more satisfied with their lives, and who perceived themselves as less wealthy were more inclined to want to move. The study also shows that the elderly who want to move rate housing costs as the most important factor in choosing a new home. The elderly who do not want to move rate practical issues such as the possibility of getting moving assistance and moving out cleaning as most important and do not prioritise social values or specific characteristics of the new home.

Contribution: This study provides new insights into the preferences of the elderly in Sweden, questions the idea of ageing-in-place as most desired by the elderly, and provides a more general indication of the multifaceted needs of an ageing population. This is of interest to policymakers in many countries that meet the increasing demand for housing suitable for a growing number of elderly.

6 Concluding reflections

Here are some concluding remarks on the four papers and their overall contributions. This includes conclusions in relation to the stated research questions of the thesis, limitations, contributions to earlier research and society as well as pointing to the need for further studies.

6.1 Conclusions of the thesis

To summarise the conclusions of this thesis, a good start is to reflect on the answers to the research questions stated in the introduction. These questions were answered with the help of empirical studies presented in four papers.

RQ1: What is the demand of housing among the elderly?

As expressed in Papers A and D, the demand for housing differs depending on the stage of life and the possibility of having a housing career. Factors that affect the intention to move, according to Paper D, are the lack of an elevator, higher education, lower old age, and higher satisfaction with life. The probability to move is approximately 25%, and with good income, the best choice is either a senior living or a security accommodation. However, most elderly individuals wanted to age in place, if possible.

RQ2: What is the supply of special housing for the elderly?

As indicated in Paper B, smaller municipalities, such as those in the north of Sweden, have fewer elderly people, and therefore, more housing per elderly

person. The same phenomenon occurred when measured per capita. However, the rooms in these municipalities are larger than those in Stockholm. More urbanised municipalities, such as Stockholm, have more elderly inhabitants and larger populations. Thus, there are fewer homes per capita. The rooms are also smaller so that maximum number of people can access them. In addition, tax revenue and spreads differ across municipalities. However, the surplus or deficit of special housing in the municipality did not seem to correlate with the distribution of covid-19.

RQ3: How is well-being of the elderly affected by their housing alternatives?

In the 80–84-year age group, social engagement, as measured by the number of activities, was higher for residents living in special housing than for those living in single-family houses. This means that well-being increases when people are around, like in a special house, as expressed in Paper C. When you live in special housing, there are common areas where you can meet your neighbours, and you feel better about being seen than if you live alone in your own house, perhaps without an elevator and far between neighbours. To "age in place" might also mean physical hindrance to meet friends. Also, as mentioned in Paper D, when renting apartments were analysed, "satisfaction with life" was among the most important factors for having an active intention to move.

This thesis aimed to explore and analyse the housing situation of the elderly regarding supply, demand, and the effects on their well-being. An important contribution is understanding the heterogeneity of the elderly as a group, as pointed out by Andersson *et al* (2019). Earlier research may have underestimated the diversity of demand among the elderly and overestimated the demand for ageing-in-place. Housing supply can adapt slowly to demand if there is a mismatch. Demand for the elderly is affected by the fact that the municipality decides on the need for special housing and the relationship with the well-being of the elderly, partly because not all of them are well enough to express their needs and partly because factors such as social needs affect well-being. As expressed in Paper B, the Ädelreform may not have been such a success as the politicians expected. The reform intended to increase efficiency and quality so that responsibility shifted to local actors and fewer institutions. Fewer institutions means that more persons are obliged to "age in place". Every municipality is responsible for existing and future planning for special houses. They are responsible for nursing, whereas regions are responsible for elderly healthcare. This thesis analyses whether special houses in Sweden are

evenly distributed. The spread is geographically uneven, and urbanisation differences matter.

In many cases, some municipalities trust other municipalities to help them remain vacant, but the size of a municipality's income tax has a positive impact on the supply of special housing. This can lead to more alternatives during ageing. Age alone is not a reason to move according to the life-cycle theory, but together with income or wealth and the willingness to take risks at a certain age, it has a significant effect on the choice of living. There are also transaction costs that may not always be of financial art. More people may move, leading to more vacancies in larger and more expensive apartments for families with children if those who want to have help with moving and cleaning after moving receive this help. Elderly people who want to move but are considered healthy may feel lonely on their own and have a better life in special housing. It may also be easier for older adults to perform activities arranged in special housing than on their own.

The decision of the elderly to move is based on the presence of an elevator in the building. Otherwise, the elderly tend to move as if their education is high and satisfaction with life is high. Younger people move more frequently than older people. Most people want to age in place, but approximately 25% of the elderly want to move, especially to a kind of senior living if there are affordable houses available. A move is often triggered by an accident or the loss of someone else. Moving into a special house is harder, since it demands a doctor´s approval, but politicians ought to listen to what the elderly want, as they want to live a full life and not just survive.

This study recommends policymakers to further investigate and take action against the differences in the distribution of special housing for the elderly, as this uneven supply may affect both the possibility of meeting the demand and well-being of the elderly. This might even be a question of discrimination of the rights of the elderly, as there might be elderly in parts of Sweden who have to age in place when they would have been better off and preferred to live in special housing adapted to their needs.

This thesis highlights the practical problems of matching the supply and demand of housing for the elderly in a regulated housing market where different types of housing have different requirements: owned homes, where prices regulate demand and supply; rental homes, where different queue systems decide (bruksvärdessystemet) access to a new home; and special housing, where the demand is decided by the municipality.

As there are differences between the ways in which a person finds a suitable home during their lifetime, there is also friction in the flow of matching homes in the market. The population pyramid illustrated in Section 1 provides a reason for recommending that policymakers act against the uneven distribution of alternatives for the elderly. This includes examining both the distribution of special housing and the possibility of actively matching rental homes, at least within the public rental sector, to suit the needs of the elderly. In doing so, there is also the possibility that other problems in the rental market, such as overcrowding, could be addressed.

6.2 Limitations

A second aspect of the concluding reflection should mention the possible limitations of the thesis as a compilation of studies on housing for the elderly, addressing supply, demand, and well-being. One possible limitation of the thesis is that some papers used aggregated data from Statistics Sweden or the Public Health Agency of Sweden, while others used surveys based on questionnaires from the authors. Survey data are usually considered more reliable than public data, as it is possible to ask for all things of interest, whereas public macro data are available with regard to rules and regulations, such as the GDPR, which could imply that some information is hidden. However, the sources used were considered reliable.

The target group, the elderly, is, in some ways, difficult to study because their age and health might raise problems with their cognitive abilities and the possibility of answering questions in surveys or interviews. This issue has not been mentioned in the literature on housing for the elderly but can give a biased sample, as the elderly with problems engaging in the research are excluded and their voices are not heard. Of course, this is problematic for researchers trying to obtain a better picture of the housing demands of this specific group.

Another possible limitation is the choice of method. To investigate this demand, one could also use different types of interviews to gain a more in-depth understanding of the different aspects of the ideas of older adults. Additionally, physical and psychological well-being can be studied through one-to-one interviews or focus groups. These types of methods are used by others (e.g. Bosch-Farré *et al*, 2020; Hamrin *et al*, 2022; Yadav *et al*, 2023)

but have not been used in the studies reported here, as the main interest lies in a more general than specific understanding of aspects in relation to housing.

Another limitation is the depth of analysis of the different perspectives on housing for the elderly. There is definitely more to investigate regarding the supply, demand, and well-being of the elderly, and as the field is of growing interest due to the growing number of elderly people, the three perspectives covered here – supply, demand, and well-being – need to be explored further.

6.3 Contributions and suggestions for further research

There is a need to reflect on the contribution of the thesis in relation to earlier research as well as to society, and to state suggestions for further research.

Some of the main contributions of this thesis are discussed briefly. One contribution of this study is its focus on Sweden. There are more studies in this context, as reported in the literature section, but they all call for more research, as the area of housing for the elderly is underexplored. Consistent with earlier international research, this thesis shows that most people in Sweden want to "age in place". However, when the daily living situation is perceived as a heavy burden on the individual, the person might prefer to move to senior living – either a rented or condominium–within the ordinary housing market. None of the elderly studied here really wanted to move to a so-called special living, a type of home where a special aid decision is needed in Sweden (biståndsbeslut), unless it is necessary. As this is a specific form of housing for the elderly that may not be comparable to solutions in other countries, international comparisons are difficult. More comparative studies are needed to investigate national and local initiatives that comply with society's need for special housing and the preferences of the elderly. Thus, more knowledge on the demand for housing for the elderly can be obtained (Andersson *et al*, 2019). The proportion of elderly living in rented apartments are increasing, but the quality of these apartments is worse in small municipalities.

One of the studies entailed in this thesis was conducted during the COVID-19 pandemic and made it possible to check for a connection between the spreads of infection and the elderly in special housing. The hypothesis tested was that proximity among tenants in special housing would lead to a higher number of COVID cases. However, this was not the case, and producing this new knowledge in the aftermath of the pandemic can be considered an important

contribution to this thesis. This study also showed that although the most vulnerable elderly in Sweden live in special housing, the surplus or deficit of special housing in a municipality and the spread of COVID were not correlated. The investigation of factors affecting the supply of special housing among Swedish municipalities also showed that financial strength in the form of tax revenue in a municipality impacts the supply and level of urbanisation of the municipality. Apart from contributing to earlier research, these results may be useful for informing policymakers on where to build new special housing units (SFS 2010:900; Boverket; Andersson *et al*, 2019).

At some age, one may not want to "age in place" any longer, because of loneliness and bad physical health. This is most often the case for the older elderly, while the younger elderly seem to repress the fact that they will soon become older. There is an inherent problem for research in that investigations of housing demand among the elderly are related to the possibility of participating in the studies and communicating preferences. The older the respondents, the more likely they have problems stating their points of view. The empirical studies reported in this thesis used surveys as a method, possibly implying a bias towards answers from the younger elderly and healthier older adults. As the elderly are a heterogeneous group, more studies are required to develop methods of investigation that enable the oldest and least healthy to give their views on their housing preferences. Although this is a demanding task, it should not be overlooked. Only a few pilot interviews were conducted in the study described in Paper A. They all indicated an interest of the elderly in providing their views and contributing to the gathering of new knowledge on demand. There appears to be a correlation between the well-being of older adults and their housing situation. If the demand for special housing is high, policymakers and building sector may have to increase the supply in certain municipalities. However, this demand comes from the municipality and not from the elderly themselves, as moving to special housing requires a decision from the municipality's social services unit.

One study specifically covered rented apartments, which is a common form of tenure in Sweden. Among the elderly renters, the individuals that are most likely to move are those that live in buildings that lack an elevator, but also individuals with higher education, higher satisfaction with life (SWLS), higher perceived wealth, and those that are among the younger elderly. It appears that the more privileged tend to be willing to move from their rental apartments to new homes. The older, less educated, and those with a lesser perception of

their own wealth, as well as reporting lower levels of satisfaction with life does not indicate interest in moving from one's present home. This is an important finding with practical implications for policymakers and rental housing companies, as it might leave those in more need of care too long in apartments that are not best suited for assisting these tenants. Practical details were mentioned when asked what would inspire the group to move. Helping with moving or cleaning out apartments, as well as IT and technical help, were brought forward instead of social factors. This important contribution provides new knowledge to the rental sector on the types of services that could be developed to inspire the elderly to move in time. Further detailed empirical studies of the different practical hindrances to moving in old age are called for, incorporating the aspects of the home as a workplace for caregivers.

Elderly people who reported wanting to move preferred being close to nature. This is also interesting and probably because this was the younger respondents. The literature shows that the elderly also have opinions about how they want their environment to look; for example, there should be benches along the footpaths, making it possible to rest and look at the view. However, this requires further investigation, using methods that enable more in-depth studies.

This thesis introduces different aspects of supply, demand, and well-being of the elderly population. Not all dimensions of the complex problems of an ageing population have been covered, and more studies are required. This thesis contributes new knowledge on the housing needs and preferences of the elderly, as well as the supply of special housing in Sweden to meet the needs of the most vulnerable. This is of interest for both research and practice, as the demographic changes in most countries entail an ageing population, where people live longer but do not necessarily get healthier. There is an urgent need to explore the problems and possibilities of the housing market in relation to the elderly, and this thesis contributes to this literature.

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