

The economic potential of home sharing cooperatives for active ageing of older people

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Abstract

Active ageing in place through home sharing programmes has been largely ignored in the literature compared to other models such as senior cohousing. This article seeks to analyse the economic viability of a theoretical proposal for an older people's neighbourhood cooperative. The objective of this cooperative is to facilitate shared housing with the goal of acquiring economic resources through renting housing for remodelling and providing support services. A qualitative methodology is employed to gather the opinions of the older people in focus groups, accompanied by a quantitative methodology involving a cost-benefit economic study. This assessment utilizes parameters such as location, housing type, adaptation level and financing formula. The methodology is applied to two case studies in the cities of Seville and Malaga (Spain). The qualitative results reflect positively on the model and highlight the diversity of care situations for older people. This flexibility allows for the establishment of a cooperative model with varying degrees of self-sufficiency based on adaptation level, services, and conditions for sharing space. Finally, the article discusses the advantages of the

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model for public policies related to the active ageing of older people and housing. It emphasizes the potential to increase the rental housing supply.

KEYWORDS

aging in place, cooperative housing, elderly, home sharing, independent living arrangement

1 | Introduction

In an era marked by demographic shifts and socio-economic transformations, the gradual aging of the population, particularly in developed economies, has emerged as a critical societal challenge. As the proportion of older individuals rises, the demand for residential care facilities and support services surges, exerting pressure on state budgets and local authorities. The need to finance pensions and care services, while adapting urban spaces and residential typologies to cater to the specific requirements of the elderly, has become an urgent priority (Wang & Durst, 2022). As this demographic wave continues to shape the future of public policies and business strategies (Del Valle Ramos & Almoguera Sallent, 2020), it becomes increasingly intertwined with the growing necessity for innovative solutions to accommodate the evolving needs of older individuals. One such solution is the concept of home sharing cooperatives, presenting a promising avenue to address the multifaceted impact of an aging populace.

Intentional community living models have demonstrated the potential to significantly improve the aging experience for older adults (Glass & Vander Platts, 2013). These forms of cooperative living have emerged in many countries as a means to counteract the challenges of social isolation and declining social networks (World Health Organization, 2021), offering a promising alternative for seniors. However, economic constraints further complicate the scenario. In OECD countries, publicly funded long-term care systems still leave nearly half of older people with care needs at risk of poverty (OECD & European Commission, 2024). At the same time, as newer generations distance themselves from traditional elder care models, the need for self-sufficient and economically viable housing options intensifies, particularly for those with limited incomes (Glass & Skinner, 2013).

In Spain, existing housing options provided by the public sector cater mainly to urgent emergency care situations (García Conde & Rodríguez Rodríguez, 2021). On the other hand, the senior co-housing model emerges as a viable solution, an example of a collaborative living arrangement in which a group retrofits or designs a building to suit their needs. This model has been extensively researched (Hou & Cao, 2021) and incorporated into Spanish public housing policies as the 'temporary housing programme, cohousing models, intergenerational housing and similar arrangements' (Boletín Oficial del Estado [BOE], 2022). However, it requires a substantial upfront economic investment and carries the risk associated with long development periods, averaging around a decade (Scanlon & Arrigoitia, 2015). Herein lies the relevance of innovative models like home sharing cooperatives, which not only provide a social support structure but also offer a cost-effective solution for aging individuals.

Within the realm of collaborative living, the concept of home sharing cooperatives tailored specifically for aging populations remains underexplored in academic literature. Traditionally, older individuals have resorted to shared housing due to economic constraints, but the surge in

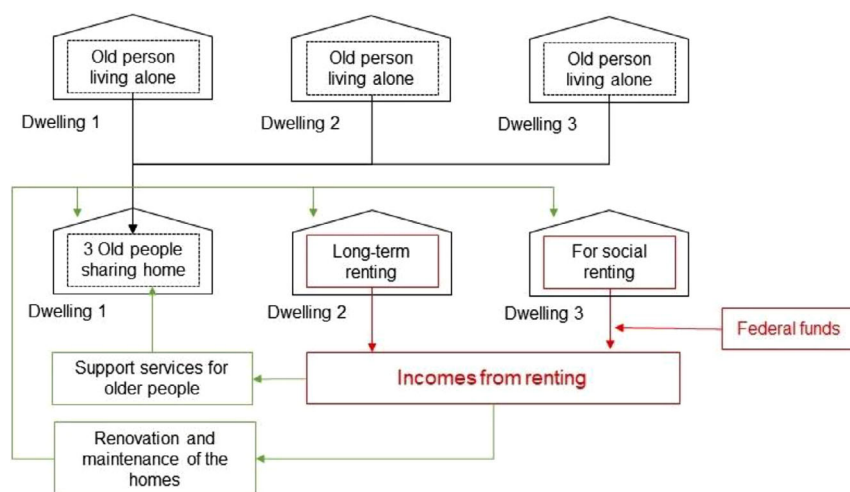


FIGURE 1 An OPNC according to Rosa-Jiménez and Nebot (2021) as an initial hypothesis. The incorporation of federal funds is optional and would be aimed at supporting state-funded social rental housing. [Colour figure can be viewed at wileyonlinelibrary.com]

solitary living is driving a return to these models (López Doblas, 2018). Notably, this trend has been examined in various countries, including Spain, Canada, Korea, and the United States (García Conde & Rodríguez Rodríguez, 2021; Martínez et al., 2020; Oh, 2008; Schreter, 1986). In Spain, there are no state social housing programmes that promote these models. Some regional or local administrations develop them on an ad hoc basis. This resurgence includes the possibility of renting out rooms for financial gain or in exchange for services, a concept evident in programmes offered by many universities in Spain where students offer assistance and companionship to older individuals in exchange for accommodation.

Particularly for economically challenged elderly sectors that are not socially excluded, there is a scarcity of research focusing on such cooperative models. Addressing this gap, Rosa-Jiménez and Nebot (2021) propose a theoretical model known as the Older People's Neighbourhood Cooperative (OPNC). This model suggests members share their owned dwellings while renting out excess space to generate economic resources for housing adaptations and care services (Figure 1).

The OPNC is a housing solution with a comprehensive approach that intertwines economic, social, and community dynamics to cater to the multifaceted needs of aging populations. As society grapples with the challenges posed by an aging demographic, these cooperative models offer a dynamic and inclusive pathway to ensure comfort, support, and a sense of belonging for older individuals, transcending traditional housing norms to create a more supportive community for all its members. This model has not yet been adopted by any national or local policy, even though the OPNC offers three characteristics that can facilitate the formulation of public policies, encompassing housing, social, and economic innovation:

- a. OPNC as a service cooperative: The evolving needs of the elderly, encompassing safety, comfort, social connectivity, and stimulation, have propelled the search for innovative living arrangements (Power, 2017). These critical requisites find resonance in the establishment of service cooperatives, legal entities aimed at providing member-specific services at reduced costs while prioritizing revenue enhancement and service quality (Lee, 2011). Furthermore, from an economic perspective, the social attributes of cooperatives are notable: economic

- equality, permanent affordability, non-speculative nature, and mutual co-ownership, emphasizing the societal and communal essence (Chatterton, 2013, 1662).
- b. Home ownership as OPNC's initial capital: The OPNC facilitates members in maintaining ownership of their homes, which are contributed as initial capital to the cooperative. The inclination towards home ownership among older individuals reflects a desire to age in place, avoiding the hassle of relocation, as observed in Australia (Olsberg & Winters, 2005). However, some studies highlight that this preference may not always translate into better quality of life or health outcomes (Böckerman et al., 2012). Factors such as health, functionality, and access to appropriate care are key determinants of residential choice in later life, and delaying residential placement may not always be beneficial, both in terms of costs and health outcomes (Bakx et al., 2020). Spain presents a similar trend, where aging in place becomes more prevalent as individuals age, particularly among those with lower income levels and less education, who often prefer living with family members (Costa-Font et al., 2009; Klimaviciute et al., 2017).
 - c. The OPCN brings together the three predominant trends when an older person lives alone (Abramsson & Andersson, 2016; Davey, 2006): Downsizing to smaller and manageable homes, adapting their larger family homes, and choosing to rent. Through this model, some members adapt their larger family home for sharing with other members—the size of their home is downsized by sharing with other partners –, and their housing can be rented among other families. Rather than constructing new adapted housing, the model is in line with what some scholars advocate retrofitting older individuals' housing, analysing the economic costs in different residential types and regions like Singapore and the United Kingdom (Addae-Dapaah & Wong, 2001; Lansley et al., 2004). Furthermore, in Spain, the OPCN may be integrated as a new policy within the State Plan for Access to Housing 2022–2025, which offers support for the conservation and enhancement of housing as the program for improving housing accessibility. The OPCN differs from other more established models such as senior co-housing cooperatives, where members transition from larger homes to smaller private dwellings complemented by ample communal areas designed for shared use, including kitchens, gardens, and recreational rooms (Choi, 2004). Nevertheless, economic studies reveal that participatory construction processes significantly prolong the duration of constructing such co-housing cooperatives, often requiring up to 13 years to secure land, a drawback particularly pronounced in high-demand areas like London (Scanlon & Arrigoitia, 2015).

However, the OPNC model, while innovative, faces certain limitations. It lacks direct opinion from the older individuals it aims to serve, is rigid in financing approaches—such as renting out rooms— and does not account for diverse housing or remodelling needs. As such, the aim is to do a further exploration and refinement of this model to ensure it is truly aligned with the diverse needs and preferences of the aging population it intends to support. In other words, is the OPCN viable as a model of active aging from an economic point of view and according to the opinion of older people? To achieve this objective, research was carried out between 2021 and 2023 to analyse the feasibility of the OPCN model in relation to the social, legal, economic, and architectural dimensions. In this study, each hypothesis corresponds to the different possibilities of setting up a cooperative for elderly people according to the degree of sharing of living space.

This paper only presents the partial results in relation to the economic feasibility, and it is structured as follows. Section 1 describes the initial hypothesis according to Rosa-Jiménez and Nebot (2021). Section 2 outlines the two-phase study methodology, incorporating qualitative and quantitative data through case studies conducted in the cities of Seville and Malaga in Spain. Section 3 describes the first phase of empirical data and includes the results from the

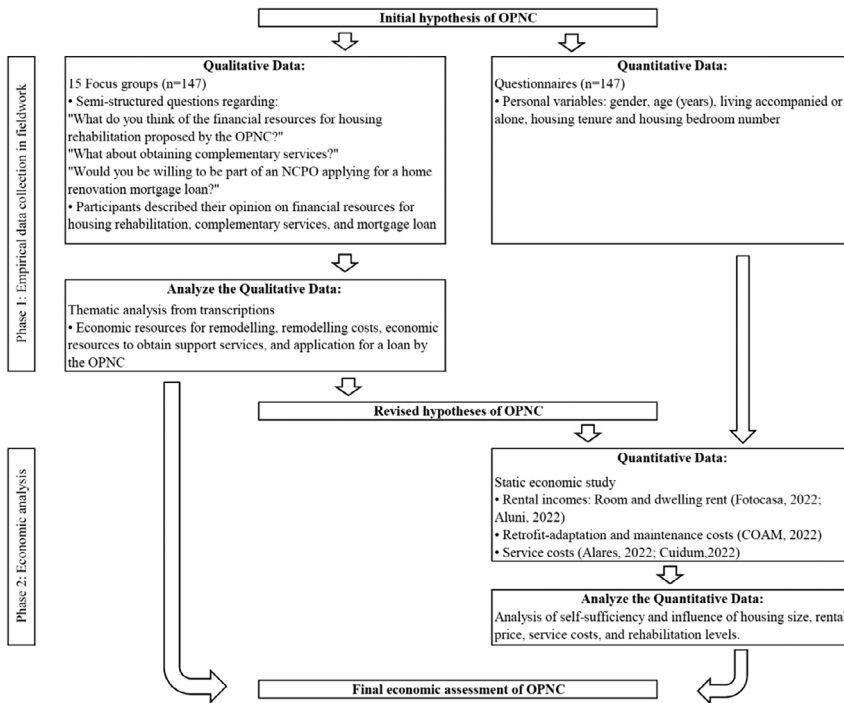


FIGURE 2 The two-phased methodology applied in the study.

focus groups. Section 4 introduces the second phase of the economic study, which integrates the findings from the preceding phase both into newly formulated hypotheses and the multitude of variables impacting the economic self-sufficiency of the model. Section 5 develops the discussion highlighting the advantages of the model, and recommendations for its possible implementation in public policies concerning the active aging of older individuals. Finally, section 6 presents the concluding remarks: by fostering collaborative living models tailored to the specific needs of the aging population, OPNCs offer a potential pathway to address the challenges posed by an aging demographic, promoting inclusivity, support, and a sense of community among older individuals. Through this innovative approach, a sustainable and fulfilling aging experience can be envisioned, bridging the gap between an aging populace and the need for supportive living environments.

2 | Methodology

The research method is empirical and combines qualitative and quantitative data. The study was conducted in the Andalusian cities of Malaga and Seville in southern Spain. Both are cities with more than 500,000 inhabitants, along with significant issues such as high rates of aging, unwanted loneliness (Meléndez et al., 2025), and the lack of a long-term housing rental market (Vidal et al., 2024). Furthermore, both case studies exhibit neighbourhoods marked by a profound sense of community with active participation and municipal policies in support of innovative cooperative initiatives for urban regeneration. Two phases were used to analyse the economic viability of the OPNC (Figure 2): Empirical data collection in fieldwork and economic analyses.

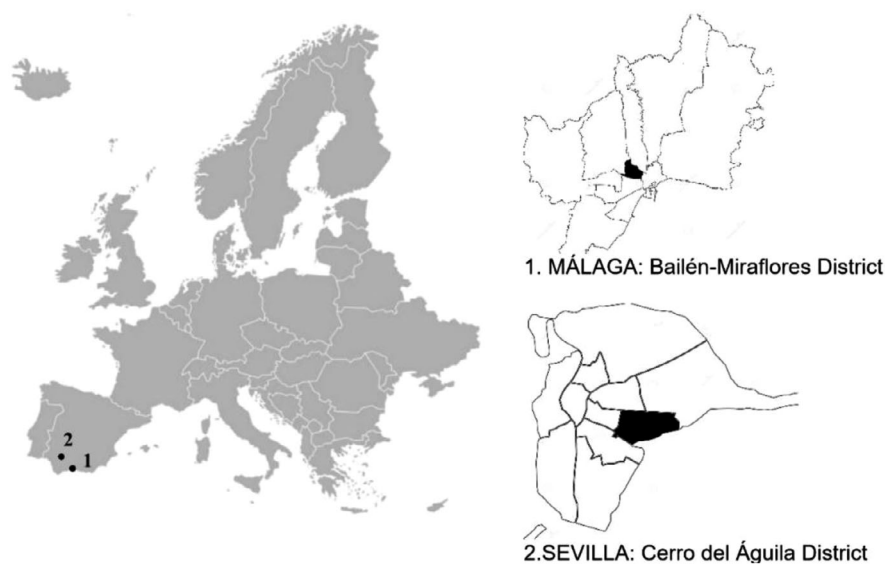


FIGURE 3 Location of the study areas in Spain: (1) Malaga; and (2) Seville.

During the first phase, a combined qualitative and quantitative methodology was employed to explore the economic perspective of the elderly regarding the initial model. This involved conducting focus groups and semi-structured interviews with groups of elderly individuals to gather qualitative data, along with administering a questionnaire focused on socio-economic information. In the second phase, the initial economic model was reformulated according to the elderly groups' opinions and implementations of new models for the OPCN, and a comprehensive cost-benefit analysis was conducted.

Data were collected in two neighbourhoods situated in each city. Seville serves as the administrative capital of the Andalusia region in southern Spain, while Malaga is a coastal city boasting a highly developed economy. The chosen case studies are situated in the districts of Bailén-Miraflores (Malaga) and Cerro-Amate (Seville). Both districts are located on the outskirts of the city centre and exhibit elevated rates of individuals living alone, as indicated in Table 1. Furthermore, these areas are characterised by a social housing stock constructed since 1950 (Figure 3). Bailén-Miraflores serves as an illustration of a middle-income district with a thriving rental market. The study encompasses several neighbourhoods, including Gamarra, Haza del Campillo, Las Chapas, Los Castillejos, Los Millones, and Nueva Málaga. On the other hand, Cerro-Amate exemplifies a low-middle-income district with a less pronounced rental market. The case study focusses specifically on El Cerro del Águila.

3 | Phase 1: Empirical Data Collection In Fieldwork

3.1 | Methods and Data

In the first phase, objective information on the neighbourhoods (population, gender, number of people over 65 and 80 years old, and average monthly rents) was collected and focus groups were used as a means of collecting data through semi-structured group interviews. This method

TABLE 1 Social characteristics (2021) of the districts where the study neighbourhoods are located.

Variable	Málaga city		Baileán-Miraflores (Málaga)		Seville city		Cerro-Amate (Seville)		
	Parameters	%	%	%	%	%	%	%	
Population (inhab.)	Total	579,984*	100.0	61,569*	100.0	694,492**	100.0	88,244**	100.0
	Women	301,392	52.0	32,385	52.6	364,878	52.5	45,445	(51.5)
	Men	278,592	48.0	29,184	47.4	329,614	47.5	42,799	(48.5)
	65–79 years old	80,829*	13.9	8,749*	14.2	97,869**	14.09	11,806**	13.4
	Women	45,221	(55.9)	4,900	(56.0)	55,994	(57.2)	6,578	(55.7)
	Men	35,608	(44.1)	3,849	(44.0)	41,875	(42.8)	5,228	(44.3)
	≥ 80 years old	31,895*	5.5	4,048*	6.6	39,205**	5.6	4,427**	5.0
	Women	20,644	(64.7)	2,524	(62.4)	26,072	(66.5)	2,927	(66.1)
	Men	11,251	(35.3)	1,524	(37.6)	13,133	(33.5)	1,500	(33.9)
Average annual income per person (€/year) (INE, 2022)		11,902		12,270		13,085		8,809	
Average rents per month	Rent*** (€/m ²)	11				8			
	Rent 3-bed dwelling*** (€)			913				715	
	Rent 1-room**** (€)			300				300	

Note: * Ayuntamiento de Málaga (2021); ** Ayuntamiento de Sevilla (2021); *** Fotocasa (2022); **** Alumi.net (2022). The percentages in parentheses correspond to the relative values.

of qualitative data was selected for its specific usefulness, as indicated by Lewis-Beck et al. (2004). The research received approval from the University's Ethics Committee. All participants underwent the informed consent procedure by signing it, and the research findings were communicated to the members of the focus groups.

Following the Vancouver Protocol (World Health Organization, 2007), focus groups were conducted in person by two research teams (Malaga & Seville teams). To recruit participants, information sessions were previously conducted in the study neighbourhood, and the Social Services of the City Council in each city assisted in disseminating the research among the elderly. The duration of the sessions varied between 1 and 2 hours (Dick, 2003), and the age stipulated for participation in the focus groups was set from 55 years and older. Prior to the sessions, participants completed a survey providing socioeconomic data to determine the economic viability of the model, including information on housing tenure, current living status (alone or accompanied), number of bedrooms in their housing, and type of pension or income. The focus groups were designed based on two profiles: (1) active older adults who are engaged in their communities and more inclined to participate in cooperative housing initiatives, with focus groups held in association venues and municipal activity centers; and (2) vulnerable older adults experiencing unwanted loneliness and receiving care from municipal services, who are potentially more in need of daily communal living. The fieldwork relied on pre-existing networks that were more consolidated in Málaga, which explains the greater volume of research conducted in this city.

The characteristics of the participants are presented in Table 2, revealing a similar profile with respect to the gender distribution (approximately two-thirds women and one-third men). However, there are notable differences between Malaga and Seville, with higher income and ownership percentages in Malaga. Additionally, Malaga exhibits a higher percentage of dwellings with three or more bedrooms (80.18% compared to 74.22% in Seville) and higher housing rental prices. Regarding pensions, the Spanish social pension primarily consists of the contributory pensions and non-contributory pension. Contributory pensions are based on the contributions made by individuals to the social security system during their working life. Non-contributory pensions are provided to individuals who are deemed to be in financial need and have not contributed enough for a contributory pension. Malaga has a higher percentage of participants with a contributory pension, almost 70% compared to Seville with almost 60%.

Between 2022 and 2023, a total of 147 individuals participated in 15 focus groups, with the group size ranging between 10 and 12 people, as established by Myers (1998). In Malaga, 12 focus groups were conducted, with a total of $n = 111$ participants. In Seville, three focus groups were conducted, with a total of $n = 36$ participants. The focus groups were primarily conducted at the headquarters of neighbourhood associations and associations of elderly people within the study areas or in close proximity to them.

The interviews included open-ended questions and were structured into three main inquiries:

- a. Financial resources for renovation and adaptation of dwellings: How do you feel about obtaining financial resources for the housing renovation proposed by OPNC?
- b. Financial resources for services: What about obtaining complementary services?
- c. Mortgage loan: Would you be willing to be part of an OPNC applying for a mortgage loan to renovate your home?

The interviews were carefully structured to extract insights into the behaviours and opinions of the older residents within the neighbourhoods. During these interviews, two researchers

TABLE 2 Characteristics of the focus groups.

Socioeconomic variable	Characteristics	Malaga		Seville	
		N	%	N	%
Gender	Female	74	66.67	25	69.44
	Male	37	33.33	11	30.56
	Total	111	100.00	36	100.00
Age	< 65 years old	16	14.41	6	16.67
	65–79 years old	78	70.27	22	61.11
	≥ 80 years old	17	15.32	8	22.22
	Total	111	100.00	36	100.00
	Average age	71.80		73.44	
Living	Accompanied	62	55.86	25	69.44
	Alone	49	44.14	11	30.56
	Total	111	100.00	36	100.00
Housing tenure	Owned	91	81.98	26	72.22
	Other (rental or transferred)	20	18.02	10	27.78
	Total	111	100.00	36	100.00
Housing bedroom number	5	0	0	1	4.35
	4	17	15.32	2	8.69
	3	72	64.86	14	60.87
	2	18	16.22	4	17.40
	1	4	3.60	2	8.69
	Total	111	100.00	23	100.00
Pension	Contributory	77	69.37	21	58.33
	Non-contributory	24	21.62	9	25.00
	Others	10	9.01	0	0
	No income	0	0	6	16.67
	Total	111	100.00	36	100.00

Note: Data obtained from the survey conducted by focus group participants.

assumed two fundamental roles: moderator and rapporteur. The moderator was responsible for introducing the guiding questions to the group and overseeing the responses with the assistance of the rapporteur. The rapporteur, in turn, was responsible for transcribing the main contributions and observing the overall behaviour of the group. Each semi-structured group interview was tape-recorded and later transcribed in a more detailed form for analysis. The analysis was done manually, by compiling the phrases and comments that were repeated most frequently and gathered the main ideas according to the three themes proposed in the economic approach of the research.

3.2 | Focus Group Findings

The conclusions derived from the focus groups reflect a positive assessment of the OPNC model. Nevertheless, they have raised specific concerns regarding its economic viability and emphasised

the importance of considering various situations when remodelling dwellings. The four inputs that were not considered in the initial OPCN scenario and that we incorporate in this study are:

- a. Incorporation of new sharing housing hypotheses given the lack of confidence in the economic viability of the model at low socio-economic levels. In Málaga, there was a highly positive response to acquiring financial resources through the rental of transferred dwellings to the cooperative, eliminating the need for an initial capital contribution, pensions, or savings for housing retrofitting. Examples of these responses included:

I see it as a good thing that the renovation can be paid for out of the rent (Focus group #2, Malaga).

It is a good thing that there is no upfront money and that the costs are paid from the rent of the houses (Focus group #4, Malaga).

This approach was seen as a means and an opportunity to increase the availability of rental flats in the neighbourhood at a controlled price, considering the scarcity of supply and the high rental costs. Additionally, it was perceived as a preferred alternative to residential care homes, which impose a high monthly fee. Not everyone possesses a substantial pension or a family capable of covering such expenses.

It's great because you still have your pension and we also have the money from the flats you are renting (Focus group #7, Malaga).

What we charge is very little for the money you have to pay in a nursing home (Focus Group #9, Malaga).

In Seville, with a socio-economic situation of lower economic and property incomes, the focus groups expressed concerns about the economic feasibility of the model. They believe it would be challenging to undertake the three renovations of the dwellings within the specified rental price. There is scepticism regarding the possibility of receiving grants and subsidies for the remodelling due to the extended duration between the ruling and implementation of the works.

I don't think that with the rent of a house you can pay for the renovation of the house (Focus group #15, Seville).

Furthermore, focus groups in Seville also voiced scepticism regarding the feasibility of obtaining sufficient resources from renting out the dwellings. They believed it would be challenging to cover the costs of hiring household help to assist with their required care. Considering that these resources would also need to cover remodelling expenses, they concluded that it would not be economically viable.

It is impossible to pay for a woman to clean and accompany us with the monthly rent of a flat. (Focus group #14, Seville)

Given the scepticism about the model proposed by the lower socio-economic income areas, in addition to the initial hypothesis, other sharing housing hypotheses are incorporated, allowing all possible alternatives of cohabitation models to be assessed.

- a. The economic analysis must consider the diversity of renovation needs of the dwellings provided by the partners. The focus groups in Malaga requested a certain level of flexibility and adaptability in the model to accommodate various levels of refurbishment of the dwellings provided to the cooperative. Some of these refurbishments would be more or less costly, depending on whether some dwellings had already undergone partial retrofitting and adaptation or if they required complete remodelling. The variable 'p' for degree of remodelling is introduced, which makes it possible to incorporate different degrees of renovation of the dwellings depending on their initial state.
- b. Low need for support services. In this regard, focus groups in Málaga expressed that generating income through renting out their dwellings was well-received. This approach allows them to financially support certain care services without having to allocate a monthly amount from their individual income, granting them independence from their relatives. However, the majority of participants mentioned that their current care needs were already been met by family members and/or public services. This is an important aspect, as various studies have shown that informal care entails significant hidden costs for family caregivers, both in terms of physical and mental health (Pinquart & Sörensen, 2003; Schulz & Sherwood, 2008; Vitaliano et al., 2003), as well as in terms of economic and employment opportunities (Van Den Berg et al., 2004). This will result in a one-off procurement of support services for service costs (C_s).
- c. The importance of the cooperative manager. Setting up a cooperative entails management needs, for which older people are not prepared. It also requires professionals who provide very clear information on the functioning and consequences of the decisions they have to make. For example, the cooperative's loan application raised scepticism, particularly concerning the necessity of collectively applying for a mortgage, revealing a lack of legal knowledge on the subject. The role of the cooperative manager would be fundamental in explaining the need for them to older people who are very suspicious and unfamiliar with the banking system.

I see this as problematic because of the management of joint expenses (Focus group #1, Malaga).

4 | Phase 2: Economic Analyses

4.1 | Method

The methodology employed to analyse the economic viability of the OPNC is grounded in a static economic study of income and expenses. This approach is a conventional method in economic research, representing an estimate that concentrates on scrutinizing the current revenues and expenditures of a specific group (Kuznets, 1930). Notably, literature has revealed a scarcity of cost-benefit, cost-effectiveness or cost-utility studies for residential care facilities catering to older individuals (Easton et al., 2017). The utilization of this methodology to ascertain the economic viability of the OPNC model is justified due to the relatively stable financial situations of the targeted population group. This characteristic facilitates a timeless analysis with minimal or no inclination for variables to deviate from the system. Moreover, it offers transparent and direct insights

into the causal relationships between variables, as well as the identification of potential risks and opportunities.

The main study variable is the annual individual contribution per member or dwelling per year (I_{p-1}^*). To streamline the analysis, the research does not account for tax burdens for the following reasons: VAT, for instance, is not levied on the rental of existing homes, thus, any VAT applied to construction expenses would be reimbursed by the State. Additionally, corporate taxes are disregarded due to the absence of profits, given that an accounting balance of income and expenses is always considered. The analysis is conducted over an amortisation period 't' (in years), requiring the total cost (C) of the services provided by the OPNC to be balanced against potential income (I) in accordance with Equation 1:

$$C = I \quad (1)$$

We consider the following costs and incomes as follows in Equation 2:

$$C_h + C_s + C_o = I_r + I_f + I_p \quad (2)$$

Table 3 summarizes and explains the meaning of each variable and its mathematical expression. For an economic self-sufficiency status, where public funds are very low or non-existent ($I_f = 0$), the partner fees (I_p) can be expressed as Equation 3:

$$I_p = C_h + C_s + C_o - I_r \quad (3)$$

Each of the terms is discussed below:

- a. The cost of retrofitting and adapting the dwelling, including the required maintenance (C_h), comprises the sum of remodelling costs (C_{hr}), financial costs associated with remodelling (C_{hf}) and maintenance costs (C_{hm}):

C_{hr} . The dwellings of all the members are renovated and adapted for the ageing population. All housing is modified so that all members have the same benefits, otherwise only a part of the members would benefit from the adaptations and improvements of their houses. Furthermore, as this will improve the overall housing stock and future generations will be able to live in more affordable housing. According to Addae-Dapaah & Wong (2001), housing that individuals have lived in before ageing becomes more challenging to use, unsafe, or less accessible for older persons due to age-related declines in physical and cognitive abilities (Vitt & Siegenthaler 1996, 261). The degree of remodelling (p) includes retrofitting facilities and is associated with design considerations (Null, 2014) and adaptative characteristics (Lansley et al., 2004). We define C_{hr} as the summation of three concepts that can be estimated utilizing the material execution budget (B) (see Table 3). This method provides a synthetic approach to determine the construction cost per square meter of the built surface. It relies on an estimation based on averages or modules, as advocated by professional associations (Cheung, 2005; González Valderrama, 2007).

Financial costs of the remodelling (C_{hf}). According to literature, various systems exist for financing the needs of older people. In Singapore, Addae-Dapaah & Wong (2001) discovered that older people generally prefer the financial support of their children, followed by savings, for remodelling financing. Conversely, Wiesel (2012) emphasises the potential of equity release or reverse mortgages for older people. These equity releases systems enable for a lifelong lease,

TABLE 3 Definitions of factors and variables used in the economic analyses.

General factors	First-order factors	Second-order factors	Calculation variables
$C = C_h + C_s + C_o$	<p>$C_h =$ Cost of retrofitting and adaptation the dwelling, including the required maintenance</p> <p>$C_h = C_{hr} + C_{hf} + C_{hm}$</p> <p>Expressed as a function of the built-up living area (S_c):</p> <p>$C_h = [(1 + \phi) (\alpha_c I_c + \alpha_t I_t + \alpha_x I_x) p + \alpha_m I_m t] m S_c$</p>	<p>$C_{hr} =$ Remodelling costs</p> <p>$C_{hr} = C_{hrc} + C_{hrt} + C_{hrx}$</p> <p>Where:</p> <p>$C_{hrc} =$ Construction cost</p> <p>$C_{hrt} =$ Cost of the project technicians (Isaac et al., 2010).</p> <p>$C_{hrx} =$ Cost of the building permit</p> <p>Expressed as a function of B</p> <p>$B_r = 1.2 \cdot m \cdot p \cdot S_c$</p> <p>$C_{hr} = (\alpha_c I_c + \alpha_t I_t + \alpha_x I_x) B_r$</p>	<p>$B_r =$ Material execution budget of the remodelling (€).</p> <p>$m =$ Average remodelling construction value (€/m²) (COAM, 2022).</p> <p>$p =$ Degree of remodelling of the dwelling (COAM, 2022).</p> <p>$S_c =$ Constructed surface (m²)</p> <p>$\alpha_c =$ Percentage of cost reduction per contractor quote based on the volume of work</p> <p>$I_c =$ Budget increase due to the profit of the contractor.</p> <p>$\alpha_t =$ Percentage of cost reduction per technicians' quote based on the volume of work</p> <p>$I_t =$ Coefficient of the technicians' fees (COAM, 2022).</p> <p>$\alpha_x =$ Reduction percentage based on the local council grant policy.</p> <p>$I_x =$ Coefficient calculated based on the municipal taxes.</p>
		<p>$C_{hf} =$ Financial costs of the remodelling</p> <p>$C_{hf} = \phi C_{hr}$</p>	<p>$\phi = f(r, t)$</p> <p>$r =$ Simple mortgage interest (in %)</p> <p>$t =$ Amortisation period (in years)</p>
		<p>$C_{hm} =$ Maintenance costs</p> <p>$C_{hm} = \alpha_m I_m B_n t$</p>	<p>$\alpha_m =$ Reduction percentage per quote from the maintenance company based on the number of dwellings.</p> <p>$I_m =$ Maintenance coefficient, typically ranging between 1.0-2.0% (COAM, 2022).</p> <p>$B_n =$ Cost of replacing the building, where the value = $m S_c$</p> <p>$t =$ Duration of maintenance in years.</p>
	<p>$C_s =$ Costs of the services provided to older people</p> <p>$C_s = t \sum_i S_i A_i$</p>	<p>$t =$ Number of years of amortisation</p> <p>$S_i =$ Total number of hours contracted in service "i" per year</p> <p>$S_i = \sum_h n_{hi}$</p> <p>$A_i =$ Gross cost per hour of service "i"</p>	<p>$n_{hi} =$ Number of annual hours of service i required by dwelling 'h'.</p> <p>$i =$ Type of service</p> <p>$h =$ Dwelling that requires service "i".</p>
	<p>$C_o =$ Other costs</p> <p>$C_o = C_{oe} + C_{om}$</p>	<p>$C_{om} = 0,10 (C_s + C_h)$ with a maximum of 30,000€/year.</p>	<p>$C_{oe} =$ Cost of establishing cooperative.</p> <p>$C_{om} =$ Cost of professional manager.</p>

(Continues)

TABLE 3 (Continued)

General factors	First-order factors	Second-order factors	Calculation variables
$I = I_r + I_f + I_p$ $I_r =$ rental incomes $I_f =$ federal funds $I_p =$ partner fees	$I_r =$ Rental incomes $I_r = I_{rh} + I_{rr}$ $I_r = 12 t [(1 - \beta + \beta \mu)$ $P_h H S_u + P_r R]$	Renting out the whole dwelling (I_{rh}). $I_{rh} = (1 - \beta + \beta \mu)12 t P_h H S_u$	$t =$ Number of years of amortisation. $P_h =$ Monthly revenue from renting out the housing per useful surface ($\text{€}/\text{m}^2$). $H =$ Number of complete dwellings allocated to free-market rental. $S_u =$ Useful area of the rental dwelling $\beta =$ Percentage of housing used for social rentals. $\mu =$ Reduction coefficient with respect to the market price.
		Renting rooms (I_{rr}) $I_{rr} = 12 t P_r R$	$t =$ Number of years of amortisation $P_r =$ Monthly cost of renting room ($\text{€}/\text{m}^2$) $R =$ Number of rooms to be rented
	$I_f =$ federal funds		Not considered in this study.
	$I_p =$ partner fees		$I_p > 0$ not self-sufficiency $I_p \leq 0$ self-sufficiency

using the dwelling as guarantee (Addae-Dapaah & Leong, 1996). In contrast to these systems, the establishment of a cooperative allows for the arrangement of a bank loan, with a simple and fixed interest considered for this study. Thus, C_{hr} , given an interest rate (r) and amortisation period (t), is proportional to C_{hr} , as it is expressed in Table 3.

Maintenance costs (C_{hm}). According to Davey (2006), the ability of older people to remain in their homes depends on their capacity to maintain their dwellings in a good state of repair. In this study, the cost of annual maintenance is calculated as a percentage of the cost of the building as new work, denoted as B_n (COAM, 2022).

- a. Costs of services provided to older people (C_s). In the countries of Southern Europe, the family continues to be the primary provider of care for older people (Klimaviciute et al., 2017). However, when the family cannot provide that support, home medical care can enhance the probability of the elderly living independently and maintaining their desired residential status, even if their health is relatively poor (Engelhardt & Greenhalgh-Stanley, 2010). In this regard, the annual cost of support services for OPNC members depends on the number of hours contracted for each support service (such as household help, 24-h live-in caregivers, etc.), which in turn is determined by the needs of the members in each household.
- b. Other costs (C_o). Determining these costs poses a challenge due to the diversity of situations that may arise. Two considerations have been considered in the study. Firstly, the model deals with existing dwellings, as the cooperative solely holds the right to use rather than ownership of the dwelling. Hence, owners are still responsible for individually covering insurance and tax expenses. Secondly, the study exclusively focuses on the costs associated with establishing (C_{oe})

and operating the cooperative (C_{om}). Although cooperative management can be undertaken by its members, in the case of elderly individuals, it necessitates a professional management. The cost of professional management can be estimated as a proportion of the cooperative's costs, with the highest potential cost being the employment of a full-time manager responsible for various functions, including economic and financial management (accounting and mortgage handling), legal aspects (cooperative establishment and service contracts), commercial operations (rent management), and social responsibilities (member assistance and assembly organization).

- c. I_r are generated by the sum of the income from renting out the entire dwelling (I_{rh}) and/or renting rooms (I_{rr}). Housing rental income depends on the number of dwellings used for that purpose that are available after the grouping of members. The housing stock of the OPNC is rented out on the free market, with a small portion designated for social renting. An example of social rentals in the literature is Rosewood Manor (Canada), where social rentals are offered at 25% lower than the market one (at \$300) and never exceed 30% (Sixsmith et al., 2017).

If we substitute C_h , C_s , and I_r by Equation 3, the total contribution of the OPCN's partners for an amortisation period 't' is I_{p-t} , and is defined in Equation 4:

$$I_{p-t} = [(1 + \phi)(\alpha_c I_c + \alpha_t I_t + \alpha_x I_x)p + \alpha_m I_m t] m S_c + t \sum_i S_i A_i + C_o - 12 t [(1 - \beta + \beta \mu) P_h H S_u + P_r R] \quad (4)$$

Therefore, Equation 5 expresses the total contribution of the annual OPNC:

$$I_{p-1} = I_{p-t}/t \quad (5)$$

And finally, Equation 6 shows the annual individual contribution per member or dwelling:

$$I_{p-1}^* = I_{p-1}/N \quad (6)$$

Where:

N = Number of dwellings (equal to the number of OPNC members)

The economic self-sufficiency status of OPNC is attained when the income derived from room rentals or housing rentals proves adequate to cover all of the cooperative's expenses. This occurs when partners do not need to make any contributions ($I_{p-t}^* = 0$), or even when they receive income from it ($I_{p-t}^* < 0$). The economic viability condition described is highly conservative, as it does not factor in the potential for cooperative members to contribute certain percentages towards payment. This limitation arises from the static nature of the economic study, which does not consider possible changes that the economy might undergo during the established amortization periods.

4.2 | Study hypothesis

The results of the focus groups impact are, on one hand, the necessity to analyse a broader array of situations concerning the renovation needs of the housing, and on the other hand, the scepticism regarding the economic viability of the model. Therefore, for the economic study,

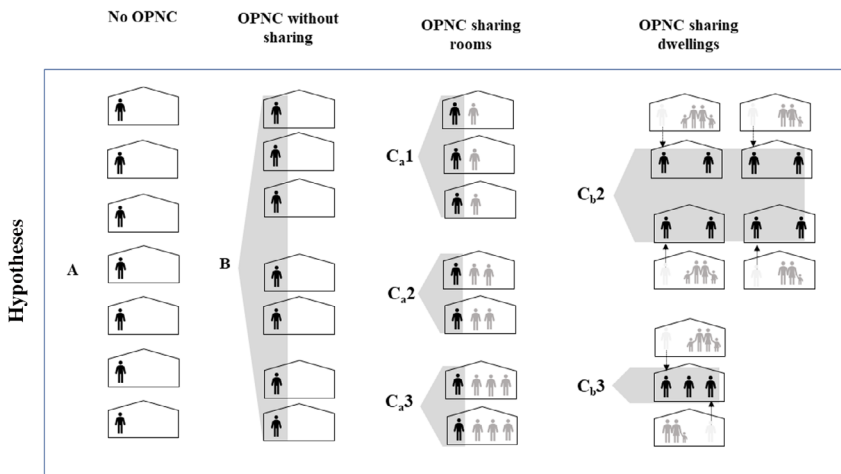


FIGURE 4 OPNC hypotheses compared in the cost-benefit analysis. [Colour figure can be viewed at wileyonlinelibrary.com]

we incorporated all the situations in which a single elderly person who wishes to age in their neighbourhood may find themselves. We compared four of them, assuming initially that all older people are owners of a dwelling free of encumbrances and mortgages, with no dependency and who live alone (Figure 4):

- (i) Hypothesis A: Active ageing in the neighbourhood without OPNC. Older people age in place and at home without establishing an OPNC. They finance the retrofitting and/or adaptation of their dwellings through their savings and/or assistance from their children (Addae-Dapaah & Wong, 2001) or through equity releases (Wiesel, 2012). They receive support and cleaning services twice a week, contracted with a private company. They do not benefit from economies of scale discounts. Their social networks rely on family members and/or those around them. If dependency arises, they privately hire a support person.
- (ii) Hypothesis B: Active ageing with OPNC without grouping or renting. Older people age in place and at home, but an OPNC is established. Members form a cooperative to reduce remodelling costs within an amortisation period. They share the contracting of a twice-weekly support and cleaning service.
- (iii) Hypothesis C_a : Active ageing with OPNC and renting out rooms. In addition to situation B, all members generate income by renting out their rooms to specific groups, such as university students or other older individuals. They can rent 1 room ($C_{a,1}$), 2 rooms ($C_{a,2}$), or 3 rooms ($C_{a,3}$).
- (iv) Hypothesis C_b : Active ageing with OPNC and grouping of members to rent out housing units. This is the Rosa-Jiménez and Nebot (2021)'s initial model. In addition to situation B, all members share their housing with other members and leave their housing units to rent them out, moving to another nearby one within their neighbourhood unit. Members contribute their housing for a transfer period of t years (amortisation time of the investment). Members are distributed fairly, so that they are always on the ground floor in blocks of flats with no lifts. Two ranges of grouping are established:
 - a. Two people per housing unit ($C_{b,2}$): Each four members are grouped in two housing units, freeing two units to be rented out.

TABLE 4 Remodelling costs (C_{hr}) and maintenance costs (C_{hm}) considered as a function of the degree of remodelling (p) and number of bedrooms.

p	Main spatial modifications	C_{hr} (€)		C_{hm} (€/year)	
		Four bedrooms	Three bedrooms	Four bedrooms	Three bedrooms
0.5	New layout with change of party-walls.	42,570	32,895	851.4	657.9
0.3	Installing a third bathroom Fitting bannisters in the corridor.	25,542	19,737		
0.2	Adapting the kitchen.	17,028	13,158		
0.1	Enlarging and partial adaptation of door and windows, checking shutters, adapting 1 bathroom.	8,514	6,579		
0	Suitable housing	–	–		

Note: * Each value of p also includes modifications of the lower levels.

- b. Three people per housing unit (C_{b3}): Three members are mainly grouped per housing unit, freeing two units to be rented out.

In all hypotheses, the housing structures are consistently comprised of identical building types. According to the values presented in Table 2, we identify two distinct categories:

- a. Social housing units featuring four bedrooms, two bathrooms, a living room, kitchen, and laundry facilities. The floor area includes a usable space $S_u = 90 \text{ m}^2$ and a constructed area $S_c = 110 \text{ m}^2$. This category constitutes 15.32% of the housing in Málaga study case and 8.69% in Seville.
- b. Social housing units comprising three bedrooms, a bathroom, a living room, kitchen, and laundry facilities. The floor area includes a usable space $S_u = 70 \text{ m}^2$ and a constructed area $S_c = 85 \text{ m}^2$. This category represents 64.86% of the housing in Málaga study case and 60.87% in Seville.

Similarly, across all hypotheses, dwellings maintain the same consistent standards in terms of finish quality, and retrofitting requirements. To address these considerations, various degrees of remodelling (p) are considered. In cases where partners provide a house that has undergone prior renovations and adaptations and necessitates no further refurbishment, the value of $p = 0$, indicating that only maintenance is required. Conversely, if the dwelling requires renovation and/or adaptation to a new housing programme, a maximum remodelling percentage of 50% ($p = 0.50$) of the cost of constructing a new dwelling is considered. Any value exceeding this threshold is deemed excessive, prompting consideration of purchasing a new dwelling. Table 4 outlines the diverse types of renovations feasible based on different “ p ” values and associated costs. The values obtained align with those found in existing literature, such as a maximum of approximately €25,000 in the United Kingdom (Lansley et al., 2004) or €15,000 in Singapore (Addae-Dapaah & Wong, 2001).

Finally, for the comparative calculation of the four hypothesis, and in relation to the methodology developed in point 2.2, it is necessary to specify some limitations of the study. First, the construction costs (C_h) calculated correspond to both the maximum and minimum values for all hypotheses. Additionally, in hypotheses C_a and C_b , three intermediate remodelling costs have been analysed, as shown in Table 5. Second, the study considers only one source of financing for each hypothesis.

TABLE 5 Degree of remodelling (p) and (I_r) considered for each hypothesis.

Hypotheses	p					I_r
	0.5	0.3	0.2	0.1	0	
A	•	—	—	—	•	—
B	•	—	—	—	•	—
C _a	•	•	•	•	•	Renting rooms (I_{rr})
C _b	•	•	•	•	•	Renting dwellings (I_{rh})

Note: • = Considered; — = Not considered.

The calculation values applied to determine the contributions of partners in the Malaga and Seville case studies are outlined in Table 6. Two amortisation scenarios, namely $t = 5$ years and $t = 10$ years, have been studied due to the uncertainty and risk associated with the elderly changing their dependency situation. During this time, members transfer the use of their homes to the cooperative, and once the period ends, they may choose either to continue accessing new services or to regain the use of their homes and withdraw from the cooperative. Conversely, in the hypotheses of forming an OPNC (B and C), the benefits of economies of scale have been applied compared to hypothesis A. This results in a lower interest rate (r) and discounts provided by the builder ($\alpha_c, \alpha_t, \alpha_m$) and the municipality (α_x).

Regarding services, given the self-sufficient of older people, and the low need for services identified in the focus groups, for all the hypothesis, household help service (C_{sc}) is initially established twice a week for 5.5 h to oversee medication, monitor the older person, promote active living, and help with tasks such as cleaning, ironing, and food preparation.

An important factor in the model analysis is the potential impact of dependency. This aspect is crucial, given the latent risk that one or more members may develop (or see accelerated) a situation of dependency requiring specific care. As noted by Pestieau and Ponthiere (2012), older adults often deny the possibility of becoming dependent and therefore do not purchase insurance, even though two out of every five people over the age of 65 experience some level of dependency. This highlights the importance of accounting for this risk in the analysis. Consequently, dependency is not introduced as a new hypothesis but rather incorporated it as a specific option within hypothesis A and C_b3. In this scenario, a high level of dependency is assumed, which implies not only the hiring of household help services (C_{sc}) but also the presence of a live-in caregiver available 24 h a day (C_{ss}). Furthermore, under the C_b3 hypothesis, the dwelling must have four bedrooms, one of which is reserved exclusively for the caregiver.

4.3 | Economical evaluation

4.3.1 | Reduction of costs proportional to the degree of sharing of living space and economic self-sufficiency for OPNCs with a small number of partners

The results reveal two significant findings. First, the data demonstrate that the size of the cooperative's membership is not a decisive factor. As depicted in Figure 5, the cost differentials between a cooperative with nine members and one with 90 members are a mere 5%. Second, the study indicates that a higher degree of shared spaces corresponds to a considerable reduction in costs and a lower contribution from partners. This can lead to achieving the level of self-sufficiency or even obtaining benefits, contingent upon the group's sharing dynamics and the extent of renovations

TABLE 6 Values of variables used in the economic analyses.

Variable	Symbol	Unit	Hypothesis A	Hypotheses B and C	Comments
Number of years of amortisation	t	Year Year	10 5	10 5	Maximum period considered Minimum period considered
Simple mortgage interest	r	%	3.00	2.00	Subsidised value for B and C
Average remodelling construction value	m	€/m ²	774	774	Housing unit party wall multifamily buildings Increased 20% as a remodelling (COAM, 2022) Decreased by 20% due to basic implementation quality (CAOM, 2022)
Cost reduction per contractor quote	α_c		1.00	0.85–0.75	Discount depending on the number of housing units (n): 0.85 if $n \leq 27$, 0.80 if $n < 45$ and 0.75 for $n \geq 45$
Cost reduction per technicians' quote	α_t		1.00	0.85–0.75	
Reduction percentage per quote from the maintenance company based on the number of dwellings.	α_m		1.00	0.85–0.75	
Budget increase due to the profit of the contractor.	I_c		1.21	1.21	Value for public works
Technicians' fees	I_t		0.1724	Annex 1	(CACOA, 2007)
Reduction percentage based on the local council grant policy.	α_x		1.00	0	B and C is financed by the local council when the cooperative is set up
Coefficient calculated based on the municipal taxes.	I_x		0.075	0.075	Municipal construction taxes in Malaga
Maintenance coefficient	I_m		0.01	0.01	The maintenance coefficient is usually estimated at $I_m = 0.01$ (COAM)

(Continues)

TABLE 6 (Continued)

Variable	Symbol	Unit	Hypothesis A	Hypotheses B and C	Comments
Household help service	C_{sc}	€/year	9,400	6,400	Service of 5.5 h, 2 days a week, per home $n_{hc} =$ 52.14 weeks/year x 2 days/week x 5.5 h/day = 575.62 h/year Hipotesis A. Service offered by company rental services per hour $A_1 = 16.33€/h$ (Alares, 2022) $C_s = 575.62 \text{ h/year} \times 16.33€/h = 9,400€$ Hipotesis B and C. Service contracted by the NC as per Spanish legislation $A_1 = 11.11€/h$ $C_s = 575.62 \text{ h/year} \times 11.11€/h = 400€$
24-h live-in caregivers service	C_{ss}	€/year	26,000	26,000	Cost of one live-in caregiver for 24/7 service per housing according to the budget offered by a specialized company (Cuidum 2022)
	C_{oe}	€	–	10,000	Taxes and costs of establishing the cooperative (only first year)

(p) they undertake. Figure 5 illustrates that, for four-bedroom dwellings, establishing an OPNC (hypothesis B) results in a remarkable 68–73% reduction in renovation and social support costs compared to the absence of a cooperative (hypothesis A).

Should older individuals choose to form a cooperative where they reside in their homes and rent out two rooms (C_a2), the cooperative becomes self-sufficient if renovations ($p = 0$) are unnecessary and costs decrease to only 35% for more extensive renovations ($p = 0.5$). From this point onwards, if three rooms are rented (C_a3), self-sufficiency is reached at $p = 0.3$, while a complete renovation ($p = 0.5$) means paying only 11%–16% of the original costs. The most beneficial option is scenario C_b3 , which is the one initially proposed by Rosa-Jiménez and Nebot (2021), which is self-sufficient for renovation levels of $p = 0.4$. This scenario is practically self-sufficient at full renovations ($p = 0.5$) where they would only have to pay between 2% and 8%, or they could reach the maximum profit level, reaching up to 49%, if no renovation works are required. Since the NCPO

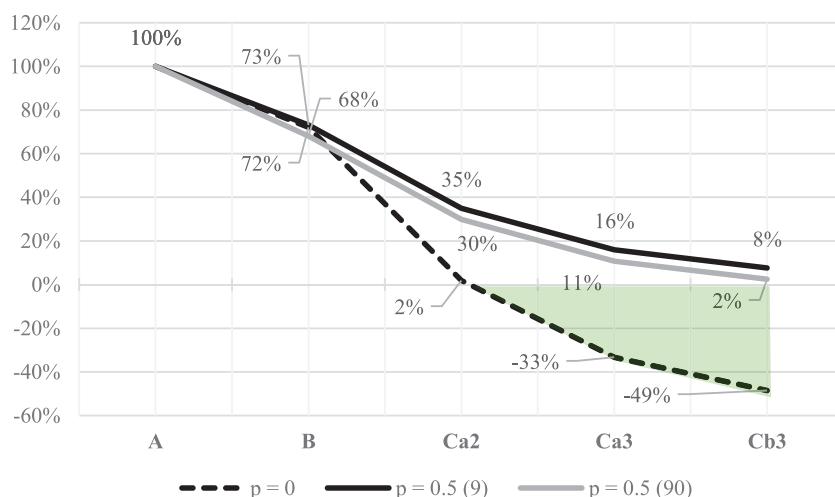


FIGURE 5 Percentages of renovation and social support costs paid by cooperative members, based on the cooperative hypotheses and the number of members (in brackets), for a four-bedroom housing unit and $t = 10$ years (profit area in green). [Colour figure can be viewed at wileyonlinelibrary.com]

is a non-profit social enterprise, this increase in profits translates into either the possibility of hiring more support services or creating a fund for the future dependency of the members. It also follows that older people who are unwilling or unable to make substantial financial contributions should opt for the scenarios with a higher level of space sharing: scenarios C_{a3} and especially C_{b3} .

Figure 6 scrutinises these effects for the context of case studies conducted in Malaga and Seville. Assuming a maximum degree of remodelling ($p = 0.5$), an older individual (without OPNC or hypothesis A) confronts annual expenses of €16,000 (for 3 bedrooms) and €18,000 (for 4 bedrooms), encompassing household help services, over a 10-year period. Economic self-sufficiency is attainable by opting for hypothesis C_b , owing to income generation from homes or room rentals. Moreover, benefits can be realized if the required reforms are of low level or non-existent ($p = 0.3$ to $p = 0$). The arrangement of three partners in a four-bedroom dwelling (C_{b3}) is practically self-sufficient, with the partner only having to contribute 8%, or €1,450 per year in the case of a renovation of $p = 0.5$. In a 3-bedroom dwelling self-sufficiency is achieved at $p = 0.3$ with three partners cohabiting (C_{b3}), or at $p = 0.1$ with only two partners sharing the dwelling (C_{b2}). However, alternative scenarios of self-sufficiency can be realised based on different study hypotheses. For instance, the model achieves self-sufficient with either a four or three-bedroom dwelling that rents two bedrooms (C_{a2}) and $p = 0$, or with a 4-bedroom dwelling that rents three bedrooms (C_{a3}) and undergoes renovations up to 30% of the replacement cost ($p = 0.3$).

The results unambiguously indicate that housing boasting a greater number of rooms and larger dimensions yield a more favourable return for the model. This correlation is logical, given that larger housing units can accommodate a higher number of residents, consequently enhancing the income generated through renting out the property. This trend is evident in the case of four-bedroom dwellings, where the model achieves near-complete self-sufficiency by $t = 10$ years. Conversely, self-sufficiency experiences an incremental rise for $p = 0.3$ in three-bedroom dwellings, accommodating three residents. However, it is important to note that these units offer less individual space, making it challenging for occupants to have a private bathroom. Additionally, there is a higher prevalence of three-bedroom dwellings compared to those with four or more rooms in the surrounding.

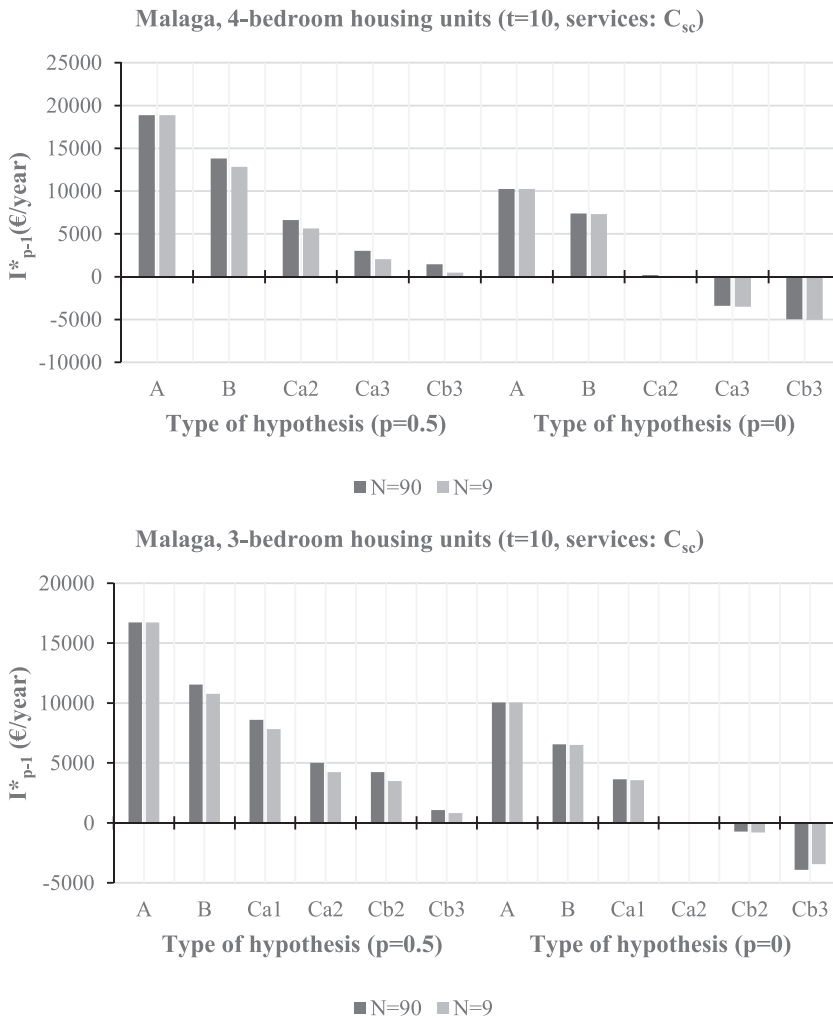


FIGURE 6 Annual individual contribution per member or dwelling (I^*_{p-1}) according to degree of remodelling (p), type of hypothesis, and number of dwellings (N) for the Malaga case study encompassing household help services over a 10-year period (negative values are income).

4.3.2 | Economic Self-Sufficiency in Low-Priced Rental Markets and for Intermediate Housing Renovations

The income of the OPNC is contingent upon the rental prices in the neighbourhood of its location, and as such, the geographical location plays a pivotal role in determining the model's self-sufficiency level. In the conducted case studies, both the average prices for the city of Seville and the El Cerro del Aguila neighbourhood were found to be lower than those in Malaga (see Table 2). Consequently, similar to the various housing types, self-sufficiency in the four-bedroom dwellings in Seville is constrained to a maximum of $p = 0.2$ (10% lower), resulting in the doubling of remodelling costs to $p = 0.5$ (€3600 per year per member). As illustrated in Figure 7, the income from four-bedroom dwellings is even slightly lower than that of renting out three rooms (C_{a3}). Notably, self-sufficiency is only diminished in three-bedroom dwellings concerning service

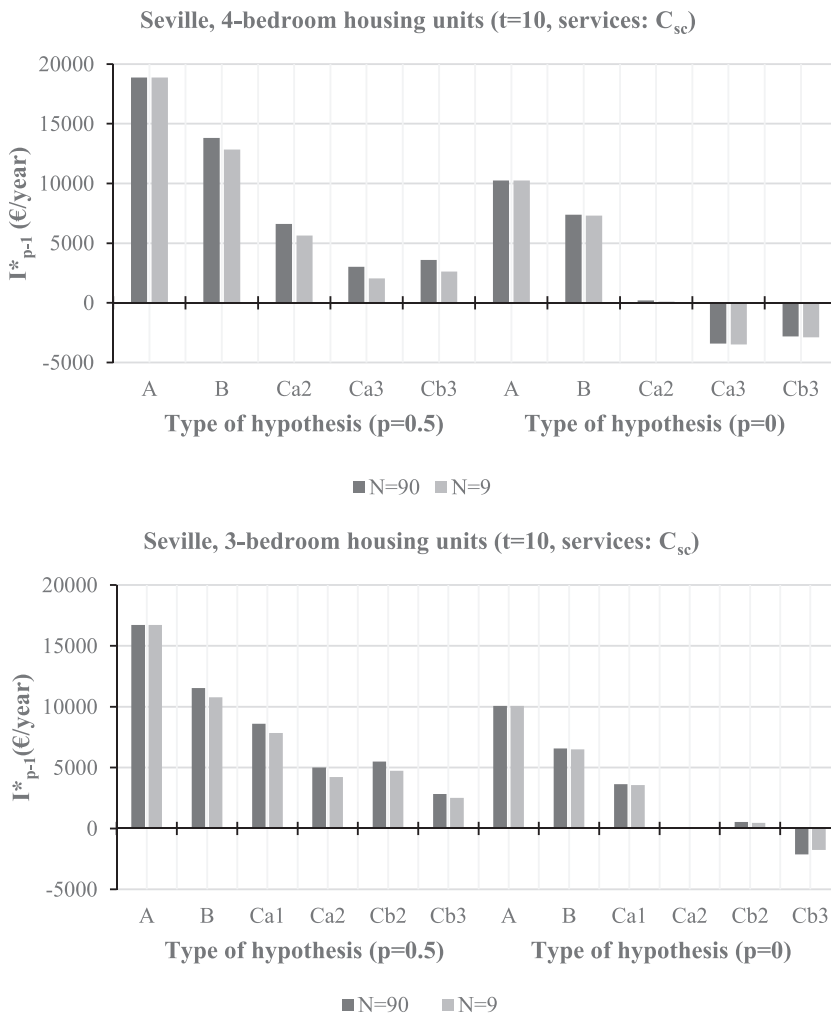


FIGURE 7 Annual individual contribution per member or dwelling (I^*_{p-1}) according to degree of remodelling (p), type of hypothesis, and number of dwellings (N) for the Seville case study encompassing household help services over a 10-year period (negative values are income).

provision (€530 per year) when two members are grouped (C_{b2}), or to a maximum of $p = 0.2$ when three members are grouped (C_{b3}).

4.3.3 | Feasibility of the Model for Short Payback Periods

Reducing the amortisation period of the loan over time results in an increase in the monthly mortgage payment. However, this alteration has no impact on cooperatives where only services are managed, as they do not require mortgage loans. Decreasing the loan’s amortisation period to five years translates to an approximate halving of self-sufficiency levels, given the cooperative’s diminished rental income.

According to Figure 8, in 4-bedroom dwellings with three rooms rented out (C_{a3}) self-sufficiency is only achieved at $p = 0.1$, compared to $p = 0.3$ for $t = 10$. When renting out two

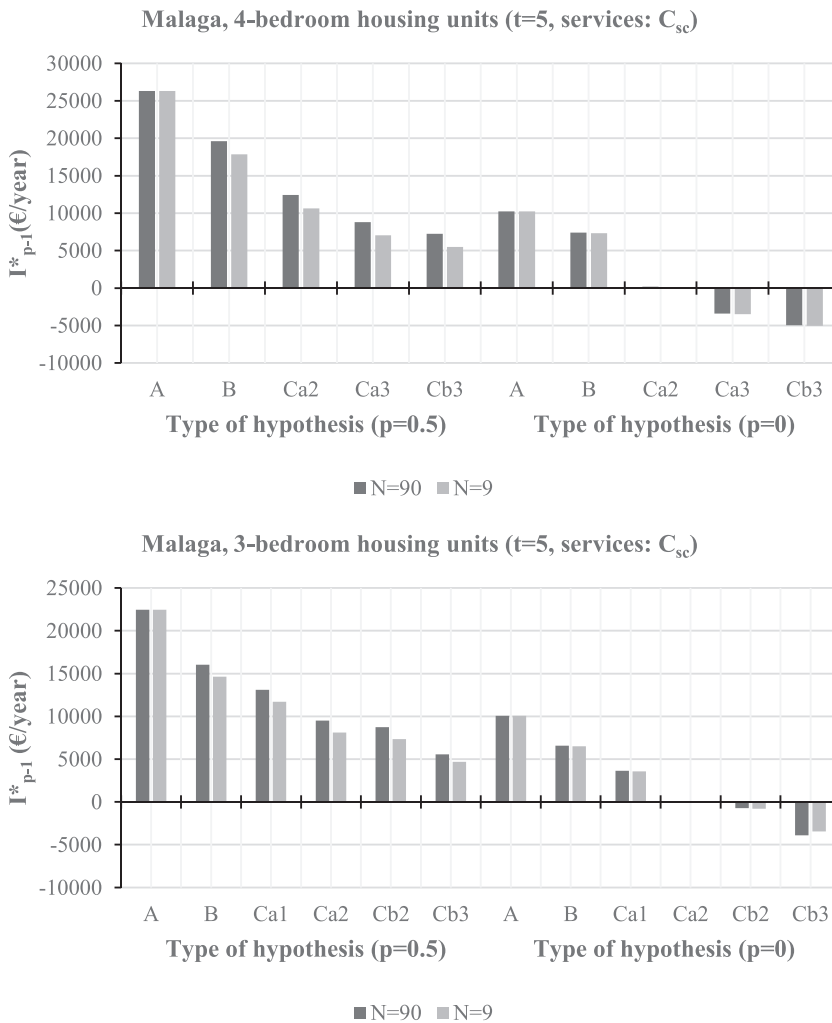


FIGURE 8 Annual individual contribution per member or dwelling (I^*_{p-1}) according to degree of remodelling (p), type of hypothesis, and number of dwellings (N) for the Malaga case study encompassing household help services over a 5-year period (negative values are income).

bedrooms (C_{a2}), retrofit costs are doubled for $p = 0.5$. In the house-sharing option, the self-sufficiency of a 4-bedroom dwelling in Malaga decreases from $p = 0.4$ to $p = 0.2$, and that of a three-bedroom dwelling from $p = 0.3$ to $p = 0.2$. Meanwhile, in Seville, self-sufficiency is reduced from $p = 0.2$ to $p = 0.1$ for 4 bedrooms and from $p = 0.2$ to $p = 0.1$ for three bedrooms (Figure 9). Consequently, the results suggest that self-sufficiency situations for shorter amortisation periods are attained at lower degrees of intervention ($p = 0.1-0.2$).

4.3.4 | The Impact of a Manager and Dependency Support Services

The impact of additional costs, especially those associated with hiring a manager from outside the cooperative, results in a cost increase that is no particularly noticeable from $N = 45$ (Figure 10). In

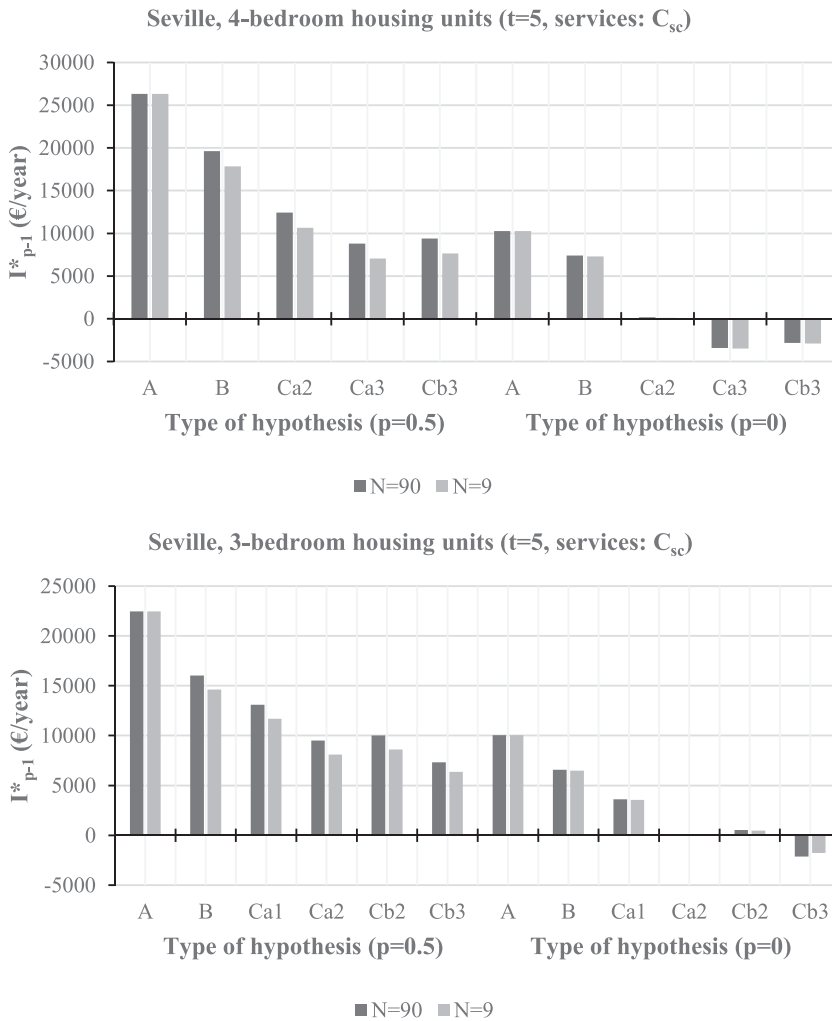


FIGURE 9 Annual individual contribution per member or dwelling (I^*_{p-1}) according to degree of remodelling (p), type of hypothesis, and number of dwellings (N) for the Seville case study encompassing household help services over a 5-year period (negative values are income).

any case, OPCN maintains self-sufficiency for $p = 0.3$ in Malaga and $p = 0.2$ in Seville, with very low contributions for OPCNs with $N < 45$.

On the other hand, the impact of dependency highlights that the OPNC model is not self-sufficient (Figure 11). Nevertheless, the structure of the OPNC allows for a significant reduction in costs in situations of high dependency. In hypothesis Cb3, the implementation of a 24-h live-in caregivers service entails annual costs per member ranging from €4000/year in Málaga to €6200/year in Seville, for a scenario with $N = 9$ and $p = 0$. In the case of $p = 0.5$, the costs range between €11,200/year in Málaga and €13,300/year in Seville. Despite this, these figures remain considerably lower than the estimated costs without the OPNC, where they would reach €36,300/year for $p = 0$. It is worth noting that in Spain, the Law on the Promotion of Personal Autonomy and Care for Dependent Persons (Boletín Oficial del Estado [BOE], 2006) includes financial support that can amount to €700/month to cover the cost of caregivers (€8400/year). This subsidy would enable OPNC members to meet the costs associated with dependency without

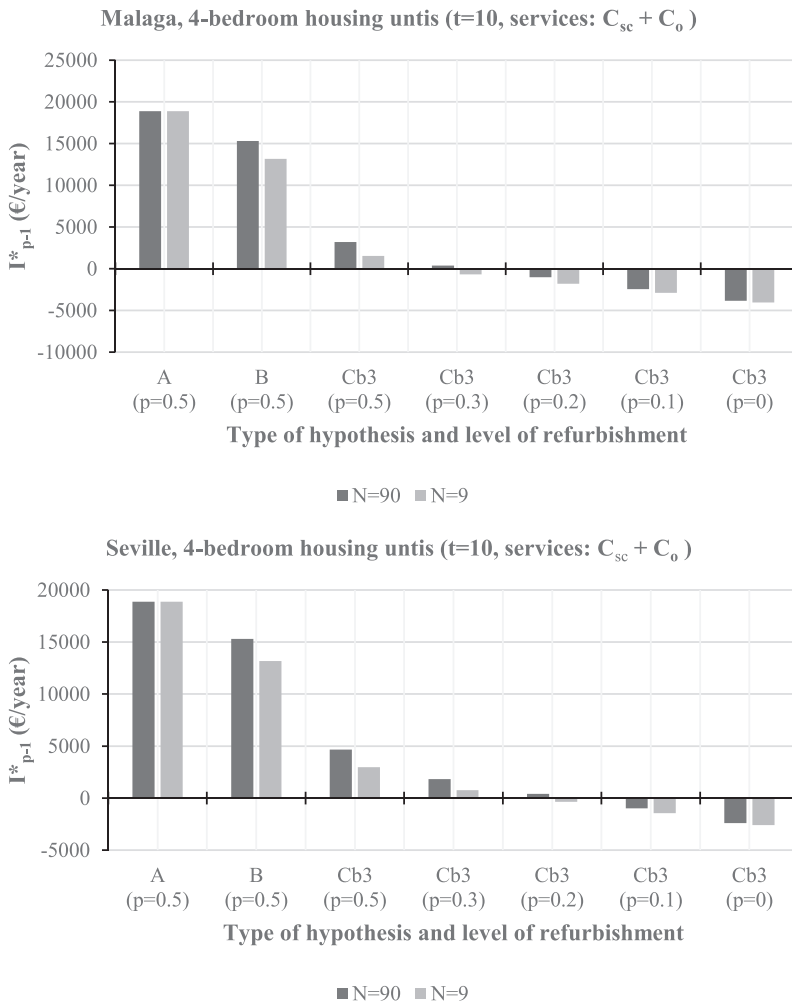


FIGURE 10 Effect of the costs of an external manager (C_0) on annual individual contribution per member or dwelling (I^*_{p-1}) according to the different hypothesis and number of partners (N) for the Malaga and Seville case study (negative values are income).

having to rely on their own resources, whereas in hypothesis A, it would represent only partial support.

On the other hand, Table 7 provides a summary of the service provisions based on the progression of the physical dependency of the members. If the remodelling is amortised, whether over $t = 10$ or $t = 5$, and if the members choose to continue, they could exclusively gain profits. This scenario might result in an increase in assistance services or create savings for instances when members being displaying signs of dependency.

5 | Discussion

The comparative economic study of the four OPNC scenarios analysed—non-cooperative (hypothesis A), no home sharing (hypothesis B), renting rooms (hypothesis C_a), and the one

TABLE 7 OPNC levels in relation to the dependency of the members.

Hypotheses	Active ageing (low potential risk of loneliness)	Ageing with moderate dependency (moderate potential risk of loneliness)	Ageing with severe dependency (greater potential risk of loneliness)
B (without grouping or renting out rooms)	Member in individual housing unit with rental	-	-
C _a	Member in individual housing unit with rental	Member in individual housing unit with rental	-
C _b (grouping to rent out housing units)	Grouped member Housing retrofitting Cleaning support services	Grouped member Cleaning support service Specialist support service	Grouped member Punctual adaptations Cleaning support service Specialist support service Maximum period considered

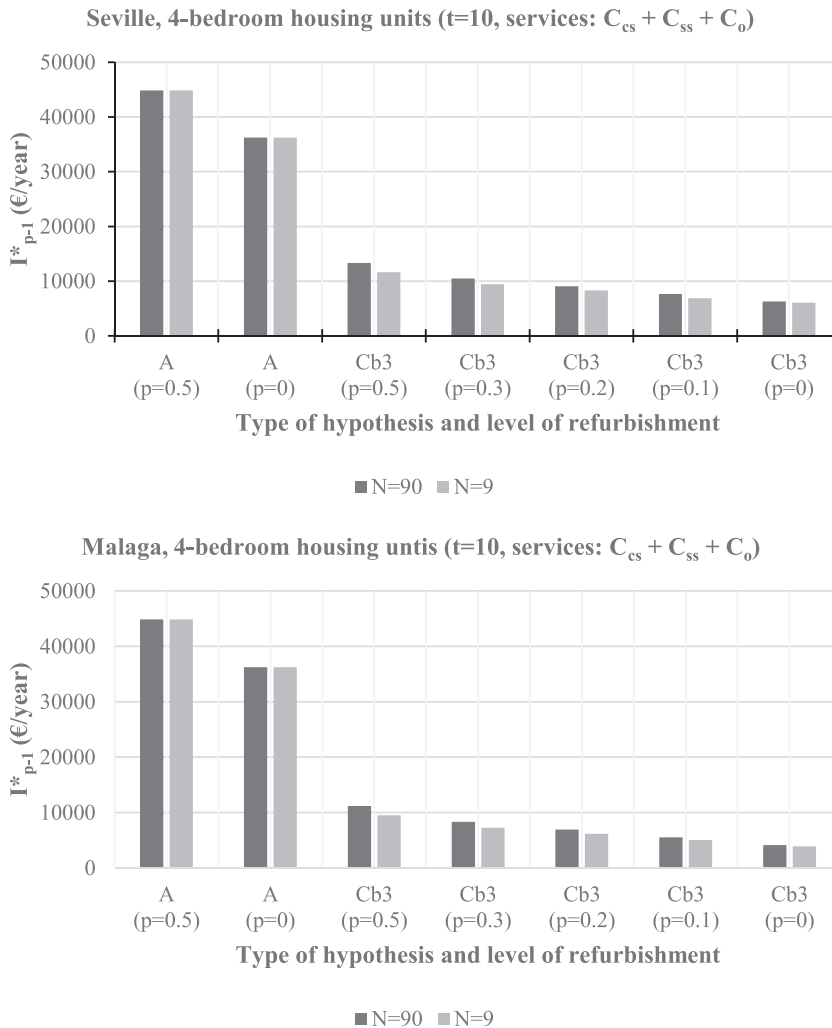


FIGURE 11 Effect of the costs of 24-hour live-in caregivers service (C_{ss}) on annual individual contribution per member or dwelling (I^*_{p-1}) according to the different hypothesis and number of partners (N) for the Malaga and Seville case study.

initially developed by Rosa-Jiménez and Nebot (2021) (hypothesis C_b) of home sharing and renting—encompasses most of the alternatives for active ageing in place for older people. The in-depth examination of various degrees of remodelling ($p = 0$ to $p = 0.5$), prompted by requests identified in the focus groups, enhances precision in understanding existing housing situations. Despite the positive evaluation of option C_b in the focus group results among older individuals, those residing in neighbourhoods with lower purchasing power expressed significant reservations regarding the economic viability of the model. In this context, the findings demonstrate that the viability and economic self-sufficiency of option C_b , proposed by Rosa-Jiménez and Nebot (2021), persist, even without financial contributions from its members or a small number of members.

Other influential factors include the size of the dwellings offered by partners and their locations. In the former case, the model's development in four-bedroom dwellings appears to be potentially the most favourable. However, in the analysed case studies, these account for only

TABLE 8 Average value for annual individual contribution per member or dwelling (I^*_{p-1}) in thousands of euros, according to the degree of remodelling (p), hypotheses and average rental prices ($N = 90$, $t = 10$, services: $C_{sc} + C_o$).

Hypotheses	p	Neighbourhoods with intermediate average housing rental prices. (Malaga study case)		Neighbourhoods with low average housing rental prices. (Seville study case)	
		Four-bedroom	Three-bedroom	Four-bedroom	Three-bedroom
C_{a2}	0.0	< 1	< 1	< 1	< 1
	0.1	< 2	< 2	< 2	< 2
C_{a3}	0.0	ss	*	ss	*
	0.1	ss	*	ss	*
	0.2	ss	*	ss	*
	0.3	< 1	*	< 1	*
	0.4	< 2	*	< 2	*
	0.5	< 3	*	< 3	*
C_{b2}	0.0	*	ss	*	< 1
	0.1	*	< 1	*	< 2
	0.2	*	< 2	*	< 3
	0.3	*	< 3	*	< 4
	0.4	*	< 4	*	< 5
	0.5	*	< 5	*	< 6
C_{b3}	0.0	ss	ss	ss	ss
	0.1	ss	ss	ss	ss
	0.2	ss	ss	ss	< 0.5
	0.3	ss	ss	< 1	< 1.5
	0.4	< 1	< 1	< 2	< 2
	0.5	< 2	< 2	< 4	< 3

Abbreviations: ss = self-sufficient; * = situation not considered.

8.69–15.32% of the housing stock, contrasting with the more prevalent 60.87–64.86% (Table 2) of three-bedroom dwellings. Nevertheless, the model demonstrates self-sufficient in three-bedroom dwellings located in neighbourhoods with lower average rents and less competitive rental market. This is contingent on choosing the C_b hypothesis of home sharing, albeit implying lower degrees of remodelling. Table 8 provides a summary of degree of remodelling and study hypotheses with cluster levels that are potentially self-sufficient. It is evident that, under conditions of economic self-sufficiency, the clustering scenario allows for higher refurbishment rates when housing sharing (C_b) is chosen, especially with a higher number of partners sharing the dwelling.

5.1 | Advantages of the NCPO in Housing and Social Policies

The findings affirm that the OPNC serves as a potential model that facilitates ‘positive ageing’ (Wiesel, 2012) and enhances access to the rental market (to families or people who are not part of the cooperative) within the same neighbourhood. From the perspective of the social rates of return for the city, mainstreaming this cooperative model would allow a focus on two crucial aspects

points of significant interest for cities affected by gentrification and touristification processes, where the resident population is displaced, and residential rents surge (Jover and Díaz-Parra, 2020). A notable distinction from other cooperative models lies in the potential for self-sufficiency, serving as a stimulus for population sectors with limited resources seeking a co-living model centred on house sharing. This represents a formula that can assist social public policies in financing active ageing with minimal assistance services and reduced social costs.

The OPNC, in any of its three hypotheses, exhibits flexibility in terms of the number of members and uses various existing housing units distributed across different blocks within a neighbourhood, allowing for a diverse range of types and locations to be offered. The model is founded on a theoretical premise wherein all partners and their respective dwellings are assumed to be in identical conditions. In practice, this implies that the closer the resemblance between the characteristics of the dwellings and the members, the more effectively the model operates. However, reality is much more complex, heterogeneous and diverse. Thus, in the actual application of the model, the results of I^*_{p-1} will vary for each partner. If a self-sufficient model is adopted, $I^*_{p-1} = 0$ for partners whose dwellings need the highest degree of renovation; whereas for those whose dwellings require a lower degree or none at all, then $I^*_{p-1} > 0$. These members may opt to access more personalised services or save it for future dependency.

Furthermore, in contrast to the co-housing trend that involves creating new communities from scratch, the OPNC mitigates the decapitalisation of active older people in existing neighbourhoods, owing to four advantages:

- (i) Speed of implementation: Unlike co-housing, the OPNC eliminates the need to purchase land or construct/remodel entire buildings, thereby avoiding the extended timelines associated with such processes (Sanguinetti, 2015). The OPNC can be promptly implemented with minimal initial investment, and the members retain ownership of the dwellings. With fewer risks involved, it is significantly easier to remodel existing housing right from the planning stage (Scanlon & Arrigoitia, 2015). Additionally, members do not need to find alternative accommodation during remodelling, as they can temporarily use the housing units designated for rental.
- (ii) Cost reduction: In comparison to senior co-housing, the OPNC proves to be the most cost-effective and straightforward, as it involves retrofitting existing housing rather than designing and constructing new developments. This eliminates the costs associated with land acquisition, building, and demolition; expenses that co-housing projects typically must consider (Scanlon & Arrigoitia, 2015). The OPNC confines construction costs exclusively to remodelling the housing unit of each member (C_{hrc}).
- (iii) Viability with a small number of members: The model remains cost-effective even with a limited number of members. This scalability is a crucial advantage, allowing the model to be implemented on a neighbourhood-wide scale. A majority can opt for level B, another smaller percentage for C_a , and a very small group for C_b .
- (iv) Potential model for addressing the dependency of older people: The model's potential in addressing dependency is noteworthy. It offers a viable and cost-effective alternative to traditional nursing homes, even in scenarios of moderate to high dependency, with significant economic savings. Our data show that, even in cases of high dependency, annual costs remain well below those associated with conventional residential care. Moreover, the model promotes ageing in place and social cohesion by enabling older adults to remain within their lifelong communities—an aspect often lost in institutional settings.

TABLE 9 Rental prices of housing (€/month) potentially offered by the OPNC.

Rental prices	Malaga		Seville	
	Four-bedroom	Three-bedroom	Four-bedroom	Three-bedroom
OPNC	990	770	720	560
Market samples*	900–1500	850–1300	There are no offers	600–725
Social rent	400	300	400	300
Public subsidy	590	470	320	260

Note: *Fotocasa (2022).

5.2 | Recommendations for the model implementation

While the case study primarily focuses on Spain, it is important to note that this model has broader applicability within the framework of the European Union. The European Union actively promotes the use of the social economy and emphasizes active ageing (OECD and European Commission, 2024). According to the European Statistical Office (EUROSTAT, 2022), 30 to 45% of the European population resides in under-occupied housing, possessing more rooms than strictly necessary. Notably, Germany, Italy, and Portugal, in addition to Spain, are significant contributors to this statistic.

The OPNC model presents a substantial benefit to policymakers and public administration entities involved in housing and ageing, serving as a social enterprise that facilitates the implementation of comprehensive policies for older people. Specifically, the OPNC serves as a tool for integrating housing retrofitting grants with policies aimed at providing services for older people. Additionally, it accommodates grants to establish a social and regulated rental housing market, encompassing both room and entire house rental options.

As a collective entity, the OPNC has the potential to act as a intermediary, facilitating interactions with public authorities and easing the management of public grants that would otherwise require individual processing. This streamlined approach enhances efficiency, despite logically involving larger grant amounts. Furthermore, the OPNC, functioning as a social manager, can contribute to enhancing public rental policies by introducing a significant pool of already renovated dwellings for rent at controlled prices into the market. Recommendations for policymakers considering the implementation of this model include:

1. Geared towards cities with an existing rental market or those in need of activating social renting, the model's success is contingent upon the rental of vacant housing units. This approach becomes more viable in cities characterized by high demand and limited supply. For instance, Spain requires 1.5 million affordable rental housing units (Trilla & Bosch, 2018). However, the supply of rental housing may not be substantial, as it relies on older individuals opting for house sharing.

Social renting necessitates public financing since the cooperative's income alone is insufficient to implement this type of housing supply. It is also illogical for an OPNC to apply for it, as profits must be allocated to create a financial support fund for the members' future dependency. Table 9 outlines the public subsidy that Housing Public Administrations should provide to the OPNC to enable the offering of social rental housing to the market.

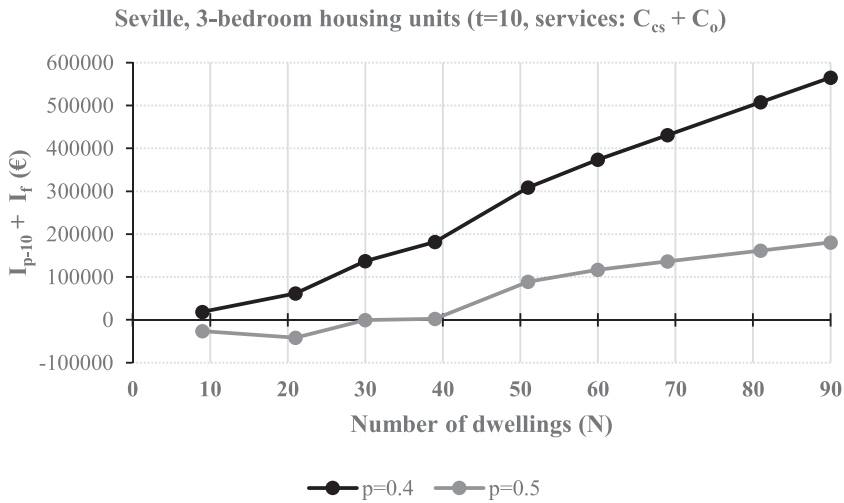


FIGURE 12 Total contribution of the OPCN's partners for 10-year amortisation period (I_{p-10}) including federal funds (I_f) according to degree of remodelling (p), hypothesis C_b3 , and number of dwellings (N) for the Seville case study (positive values mean incomes).

2. Model to be implemented in the national housing plan. Although the economic study has been conducted without federal funds ($I_f = 0$), Table 8 illustrates that not all levels of renovation are self-sufficient and would necessitate public funds to achieve higher levels of renovation ($p = 0.5$). The integration of this model into the housing plan could yield two significant advantages. First, the budget to be financed is lower compared to new construction programs, as OPCN renovates existing housing with a maximum of $p = 0.5$ and does not mandate land acquisition. Second, OPCN's revenue assists in reducing the amount of state funding. As per Table 8, there are instances where OPCN's self-sufficiency is achieved with minimal renovation levels, particularly evident in the three-bedroom case study in Seville. Figure 12 demonstrates how, in such unfavourable circumstances, funding from the current State Plan for Access to Housing 2022–2025 (BOE, 2022) for the improvement of housing accessibility and cohousing model programs eliminates the need for members to make financial contributions. Given that the plan covers 50% of the costs of construction, positive values in the graph denote amounts overfinanced when seeking an equilibrium situation $I_{p-10} = 0$, akin to the scenario observed in cooperatives with $N = 30-40$ and $p = 0.5$. Therefore, state financing aligned with this equilibrium would require a lower financial subsidy.
3. The OPNC relies on financing through a loan or mortgage that should be subsidised by the state. This proves advantageous for members as they retain ownership of the dwelling, eliminating the need for 'reverse mortgages' (Costa-Font et al., 2009; Wiesel, 2012). Viability is ensured by the current absence of a rental market, where rental supply is offered at prices below market rates during periods of high demand. Additionally, members are not required to contribute economic resources in self-sufficiency situations, safeguarding their savings in case of contingencies such as rate increases or market shortages. Mortgage terms are relatively short (five to 10 years), making it easily affordable by younger older people (65 to 75 years old). If the OPNC is maintained for older people (over 75), and considering that the refurbishment of the dwellings has already been completed, they should instead benefit from services, avoiding

the need for a mortgage. For those who choose situations without self-sufficiency and where members have to pay a lower fee, opting for an individual mortgage is more advisable. In this scenario, the role of the OPNC is to offer favourable interest conditions.

5.3 | Future Research

However, the OPNC represents an ideal and theoretical model, where there are some uncertainties to be addressed in future research. While the article underscores the self-sufficiency of the model, its economic viability continues to hinge on the willingness of members to engage in a home share, thus relying on cultural and social subjective factors. The dispersion of housing units within the cooperative can impact the efficiency of certain community services (leisure, social, and cultural activation). Consequently, it is recommended to have dedicated premises—either owned or municipal—as a meeting point for the OPNC. Conversely, the model's viability is contingent on housing rental prices in level C_b , and a potential drop in prices due to increased supply may pose a threat to its self-sufficiency. Therefore, retrofit levels of $p = 0.2$ or $p = 0.3$ are recommended, given that constant option of renting rooms.

It is crucial to note that the calculations obtained are approximations, as they do not account for potential tax burdens in each territory, as well as other cooperative-generated costs such as moving expenses and setup costs. Further research should involve fieldwork to validate the theoretical model, particularly focusing on legal aspects related to ownership and inheritance in the event of an older person's death. Additionally, investigating mortgage issues, such as banks' willingness to approve loans for this type of model, is essential. In conclusion, more extensive studies are warranted to explore the impact of this model in cities with smaller populations or its implications for the rural world.

6 | Conclusion

In conclusion, the OPNC is an economically viable model for facilitating 'positive ageing' and improving access to the rental market within neighbourhoods. The OPNC stands out for its potential self-sufficiency, making it appealing for population sectors with limited resources seeking co-living arrangements. This represents an opportunity for social public policies to finance active ageing with reduced assistance services, social, and refurbishment costs.

The flexibility of the OPNC, accommodating various numbers of members and utilizing existing housing units across different blocks within a neighbourhood, offers a diverse range of options. However, the theoretical premise of identical conditions for partners and dwellings may not fully align with the complexities of reality. The variation in renovation needs among partners necessitates a tailored approach, where some may require more extensive services while others may not.

Moreover, the OPNC distinguishes itself from co-housing trends by mitigating the decapitalization of active older people in existing neighbourhoods. It has advantages including rapid implementation, cost-effectiveness, viability with a small number of members, and potential for addressing dependency among older individuals. These advantages position the OPNC as a pragmatic solution for revitalizing communities while catering to the needs of an ageing population.

REFERENCES

- Abramsson, M., & Andersson, E. (2016). Changing preferences with ageing—housing choices and housing plans of older people. *Housing, Theory and Society*, 33(2), 217–241. <https://doi.org/10.1080/14036096.2015.1104385>
- Addae-Dapaah, K., & Leong, K. M. (1996). Housing finance for the ageing singapore population: The potential of the home equity conversion scheme. *Habitat International*, 20(1), 109–120. [https://doi.org/10.1016/0197-3975\(95\)00046-1](https://doi.org/10.1016/0197-3975(95)00046-1)
- Addae-Dapaah, K., & Wong, G. K. M. (2001). Housing and the elderly—financial and quality of life implications of ageing in place. *Journal of Housing and the Built Environment*, 16(2), 153–178. <https://doi.org/10.1023/A:1017960600667>
- Alares. (2022). *Limpieza a domicilio*. Accessed on November 2022. Retrieved from https://alares-store.es/es/limpieza-de-casas.html?gclid=EAIaIQobChMipJir97Kz-wIVrYxoCR3ObgqHEAAYASAAEgKrxPD_BwE#/42-laboral_o_festivo-horario_laboral_lunes_sabado_hasta_las_14h
- Aluni.net. (2022). *Alquiler habitaciones estudiantes*. Accessed on December 2022. Retrieved from <https://www.aluni.net/es/alquiler-habitacion-estudiantes/sevilla?fechaLlegada=2023-01-01&fechaSalida=2023-06-30&sexo=1>
- Ayuntamiento de Málaga. (2021). *Padrón de habitantes por distrito y sección censal 2021*. Accessed on March 2025. Retrieved from <https://datosabiertos.malaga.eu/dataset/padron-de-habitantes-por-distrito-y-seccion-censal-2021>
- Ayuntamiento de Sevilla. (2021). *Demography*. Accessed on November 2022. Retrieved from <https://portalestadistico.com/municipioencifras/default.aspx?pn=sevilla&pc=RHM25&idp=68&idpl=100038&idioma=>
- Bakx, P., Wouterse, B., van Doorslaer, E., & Wong, A. (2020). Better off at home? effects of nursing home eligibility on costs, hospitalizations and survival. *Journal of Health Economics*, 73: 102354, <https://doi.org/10.1016/j.jhealeco.2020.102354>
- Böckerman, P., Johansson, E., & Saarni, S. I. (2012). Institutionalisation and subjective wellbeing for old-age individuals: Is life really miserable in care homes?. *Ageing and Society*, 32(7), 1176–1192. <https://doi.org/10.1017/S0144686X1100081X>
- Boletín Oficial del Estado [BOE]. (2006). Ley 39/2006, de 14 de diciembre, de Promoción de la Autonomía Personal y Atención a las personas en situación de dependencia. *Boletín Oficial Del Estado*, 299. <https://www.boe.es/buscar/act.php?id=BOE-A-2006-21990>
- Boletín Oficial del Estado [BOE]. (2022). Real Decreto 42/2022, de 18 de enero, por el que se regula el Bono Alquiler Joven y el Plan Estatal para el acceso a la vivienda 2022–2025. *Boletín Oficial Del Estado*, 16. <https://www.boe.es/eli/es/rd/2022/01/18/42>
- Consejo Andaluz de Colegios Oficiales de Arquitectos [CACOA]. (2007). *Baremos Orientativos de Honorarios*. CACOA.
- Chatterton, P. (2013). Towards an agenda for post-carbon cities: Lessons from lilac, the uk's first ecological, affordable cohousing community. *International Journal of Urban and Regional Research*, 37(5), 1654–1674. <https://doi.org/10.1111/1468-2427.12009>
- Cheung, K. T. (2005). *Development and testing of a method for forecasting prices of multi-storey buildings during the early design stage: The Storey enclosure method revisited*. PhD thesis, Queensland University of Technology. <https://eprints.qut.edu.au/16046/>
- Choi, J. S. (2004). Evaluation of community planning and life of senior cohousing projects in Northern European Countries. *European Planning Studies*, 12(8), 1189–1216. <https://doi.org/10.1080/0965431042000289296>
- Colegio Oficial de Arquitectos de Málaga [COAM]. (2022). *Valores medios estimativos de la construcción 2022*. Accessed on June 2023. Retrieved from <http://coamalaga.es/wp-content/uploads/2022/01/VALORES-MEDIOS-ESTIMATIVOS-DE-LA-CONSTRUCCIÓN-2022.pdf>
- Costa-Font, J., Elvira, D., & Mascarilla-Miró, O. (2009). Ageing in place? Exploring elderly people's housing preferences in Spain. *Urban Studies*, 46(2), 295–316. <https://doi.org/10.1177/0042098008099356>
- Cuidum. (2022). *Opciones de cuidados*. Accessed on November 2023. Retrieved from <https://www.cuidum.com/cuidados-larga-duracion/>
- Davey, J. (2006). Ageing in place: The views of older homeowners on maintenance, renovation and adaptation. *Social Policy Journal of New Zealand*, 27, 128–141.

- Del Valle Ramos, C., & Almoguera Sallent, P. (2020). Envejecimiento Demográfico y (des)población en las Ciudades Medias Interiores de Andalucía (2008-2018). *Cuadernos Geográficos*, 59(2), 263–286. <https://doi.org/10.30827/cuadgeo.v59i2.10604>
- Dick, B. (2003). Structured focus groups. *ALAR: Action Learning and Action Research Journal*, 8(1), 34–51. <https://search.informit.org/doi/10.3316/informit.714452258692511>
- Easton, T., Milte, R., Crotty, M., & Ratcliffe, J. (2017). Where's the evidence? A systematic review of economic analyses of residential aged care infrastructure. *BMC Health Services Research*, 17(1), 226. <https://doi.org/10.1186/s12913-017-2165-8>
- Engelhardt, G. V., & Greenhalgh-Stanley, N. (2010). Home health care and the housing and living arrangements of the elderly. *Journal of Urban Economics*, 67(2), 226–238. <https://doi.org/10.1016/j.jue.2009.09.007>
- Fotocasa. (2022). *Precio por m2 de las viviendas en Bailén-Miraflores, Málaga Capital*. Accessed on November 2023. Retrieved from <https://www.fotocasa.es/indice-precio-vivienda/malaga-capital/bailen-miraflores>
- García Conde, C., & Rodríguez Rodríguez, P. (2021). Hogar y Café: Programa de Viviendas Compartidas Entre Personas Mayores. in *MORAR 60 Mais: Revolucionando a moradia em face da longevidade* (pp. 92–111). Editora A4.
- Glass, A. P., & Skinner, J. (2013). Retirement communities: We know what they are ... or do we? *Journal of Housing for the Elderly*, 27(1–2), 61–88. <https://doi.org/10.1080/02763893.2012.754815>
- Glass, A. P., & Vander Plaats, R. S. (2013). A conceptual model for aging better together intentionally. *Journal of Aging Studies*, 27(4), 428–442. <https://doi.org/10.1016/j.jaging.2013.10.001>
- González Valderrama, F. (2007). *Mediciones y presupuestos: Y otros A4 del proyecto según el CTE*. Reverte.
- Hou, S. I., & Cao, X. (2021). Promising aging in community models in the U.S.: Village, naturally occurring retirement community (NORC), cohousing, and university-based retirement community (UBRC). *Gerontology and Geriatric Medicine*, 7, <https://doi.org/10.1177/23337214211015451>
- Instituto Nacional de Estadística [INE]. (2022). *Indicadores de renta media y mediana*. Accessed on June 2023. Retrieved from <https://www.ine.es/jaxiT3/Tabla.htm?t=31106>
- Jover, J., & Díaz-Parra, I. (2020). Gentrification, transnational gentrification and touristification in Seville, Spain. *Urban Studies*, 57(15), 3044–3059. <https://doi.org/10.1177/0042098019857585>
- Klimaviciute, J., Perelman, S., Pestieau, P., & Schoenmaeckers, J. (2017). Caring for dependent parents: Altruism, exchange or family norm?. *Journal of Population Economics*, 30(3), 835–873. <https://doi.org/10.1007/s00148-017-0635-2>
- Kuznets, S. (1930). Static and dynamic economics. *The American Economic Review*, 20(3), 426–441.
- Lansley, P., McCreddie, C., Tinker, A., Flanagan, S., Goodacre, K., & Turner-Smith, A. (2004). Adapting the homes of older people: A case study of costs and savings. *Building Research and Information*, 32(6), 468–483. <https://doi.org/10.1080/0961321042000269429>
- Lee, H. J. (2011). Rediscovering a path to aging in place: Development of housing cooperatives for rural elderly. *Architectural Research*, 13(3), 31–40. <https://doi.org/10.5659/aikar.2011.13.3.31>
- Lewis-Beck, M. S., Bryman, A., & Liao, T. F. (2004). Focus group. in *The Sage Encyclopedia of Social Science Research Methods*, Sage Publications.
- López Doblas, J. (2018). Formas de convivencia de las personas mayores. *Revista Espanola de Investigaciones Sociologicas*, 161, 23–40. <https://doi.org/10.5477/cis/reis.161.23>
- Martinez, L., Mirza, R. M., Austen, A., Hsieh, J., Klinger, C. A., Kuah, M., Liu, A., McDonald, L., Mohsin, R., Pang, C., Rajewski, J., Salomons, T., & Sheikh, I. (2020). More than just a room: A scoping review of the impact of homesharing for older adults. *Innovation in Aging*, 4(2), 1–12. <https://doi.org/10.1093/geroni/igaa011>
- Meléndez, J. C., Llopis, J., Marti-Hoyos, I., Bueno, C., Satorres, E., & Delhom, I. (2025). Determinantes de la Soledad no Deseada en Los Adultos Mayores: Un análisis de Factores Psicológicos y Sociodemográficos [Determinants of Unwanted Loneliness in Older Adults: An Analysis of Psychological and Sociodemographic Factors]. *Revista Española de Geriatria y Gerontologia*, 60(5), 101670, <https://doi.org/10.1016/J.REGG.2025.101670>
- Myers, G. (1998). Displaying opinions: Topics and disagreement in focus groups. *Language in Society*, 27(1), 85–111. <https://doi.org/10.1017/s0047404500019734>
- Null, R. (2014). *Universal design: Principles and models*. CRC Press.
- OECD & European Commission. (2024). *Health at a glance: Europe 2024*. OECD Publishing. <https://doi.org/10.1787/b3704e14-en>

- Oh, C. O. (2008). A study for developing housing alternatives for the elderly focused on group home and shared housing for aging in place-focused on the elderly lived in detached housing, Busan. *Journal of the Korean Housing Association*, 19(3), 59–70.
- Olsberg, D., & Winters, M. (2005). *Ageing in place: Intergenerational and intrafamilial housing transfers and shifts in later life*. Australian Housing and Urban Research Institute Limited. <https://www.ahuri.edu.au/research/final-reports/88>
- Pestieau, P., & Ponthiere, G. (2012). The public economics of increasing longevity. *Review of Public Economics*, 200(1/2012), 41–74.
- Pinquart, M., & Sörensen, S. (2003). Differences between caregivers and noncaregivers in psychological health and physical health: A meta-analysis. *Psychology and Aging*, 18(2), 250–267. <https://doi.org/10.1037/0882-7974.18.2.250>
- Power, E. R. (2017). Housing, home ownership and the governance of ageing. *The Geographical Journal*, 183(3), 233–246.
- Rosa-Jiménez, C., & Nebot, N. (2021). Economic viability of neighborhood cooperatives for active aging. Malaga as a case study. *Architecture, City and Environment*, 15(45), 1–13. <https://doi.org/10.5821/ace.15.45.10368>
- Sanguinetti, A. (2015). Diversifying cohousing: The retrofit model. *Journal of Architectural and Planning Research*, 32(1), 68–90.
- Scanlon, K., & Arrigoitia, M. F. (2015). Development of new cohousing: Lessons from a london scheme for the over-50s. *Urban Research and Practice*, 8(1), 106–121. <https://doi.org/10.1080/17535069.2015.1011430>
- Schreter, C. A. (1986). Advantages and disadvantages of shared housing. *Journal of Housing for the Elderly*, 3(3–4), 121–138. https://doi.org/10.1300/J081V03N03_08
- Schulz, R., & Sherwood, P. R. (2008). Physical and mental health effects of family caregiving. *American Journal of Nursing*, 108(9 Supplementary), 23–27. <https://doi.org/10.1037/0033-2909.129.6.946>
- Sixsmith, J., Fang, M. L., Woolrych, R., Canham, S. L., Battersby, L., & Sixsmith, A. (2017). Ageing well in the right place: Partnership working with older people. *Working With Older People*, 21(1), 40–48. <https://doi.org/10.1108/WWOP-01-2017-0001>
- Trilla, C., & Bosch, J. (2018). El Parque Público y Protegido de Viviendas en España: Un Análisis Desde el Contexto Europeo. in *Fundación Alternativas (Vol. 197)*, Fundación Alternativas.
- Van Den Berg, B., Brouwer, W. B. F., & Koopmanschap, M. A. (2004). Economic valuation of informal care: An overview of methods and applications. in *European Journal of Health Economics*, 5(1), 36–45. <https://doi.org/10.1007/s10198-003-0189-y>
- Vidal, L., Gil, J., & Martínez, M. A. (2024). Accommodating ‘generation rent’: Unsettling dominant discourses on rental housing reform in Catalonia and Spain. *Urban Studies*, 61(11), 2060–2079. <https://doi.org/10.1177/00420980241228438>
- Vitaliano, P. P., Zhang, J., & Scanlan, J. M. (2003). Is caregiving hazardous to one’s physical health? A meta-analysis. in *Psychological Bulletin*, 129(6), 946–972. <https://doi.org/10.1037/0033-2909.129.6.946>
- Vitt, L. A., & Siegenthaler, J. K. (Eds.). (1996). *Encyclopedia of financial gerontology*. Greenwood Press.
- Wang, W., & Durst, N. J. (2022). Planning for active aging: Exploring housing preferences of elderly populations in the United States. *Journal of Housing and the Built Environment*, 38, 795–809. <https://doi.org/10.1007/s10901-022-09962-0>
- Wiesel, I. (2012). Can ageing improve neighbourhoods? Revisiting neighbourhood life-cycle theory. *Housing Theory Society*, 29(2), 145–156. <https://doi.org/10.1080/14036096.2011.641258>
- World Health Organization. (2007). *Age-friendly cities project methodology-Vancouver protocol*. https://extranet.who.int/agefriendlyworld/wp-content/uploads/2014/07/AFC_Vancouver-protocol.pdf
- World Health Organization. (2021). Social isolation and loneliness among older people: Advocacy brief. in *Decade of healthy ageing*.

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Annex 1. Values of I_t according to S_c . Source: (CACOA, 2007).

S_c	H	I_t
0–200	0.133	0.1724
201–400	0.120	0.1555
401–600	0.109	0.1413
601–800	0.102	0.1322
801–1000	0.099	0.1283
1001–2500	0.091	0.1179
2501–5000	0.083	0.1076
5001–10000	0.075	0.0972

Annex 2 Unit values estimated to calculate C_{hr} in a four-bed dwelling.

Remodelling intervention for four-bed house	€/U	Degree of intervention (p)							
		0.5		0.3		0.2		0.1	
		U	Cost (€)	U	Cost (€)	U	Cost (€)	U	Cost (€)
Re-partitioning inside the housing units	300	67	20,100	10	3,000	0	–	0	–
Expanding door and corridor widths	300	8	2,400	8	2,400	8	2,400	8	2,400
Fitting bannisters in the corridor	70	15	1,050	15	1,050	0	–	0	–
Adapting the kitchen Height control of workshops and furniture.	9,000	1	9,000	1	9,000	1	9,000	0	–
Adapting bathrooms changing bath to walk-in shower.	2,000	2	4,000	2	4,000	1	2,000	1	2,000
Bars and handles in shower	50	2	100	2	100	1	50	1	50
Shutter control	500	6	3,000	6	3,000	5	2,500	6	3,000
Fitting appropriate knobs on doors, windows and shutters.	200	14	2,800	14	2,800	5	1,000	5	1,000
Sundry	–	1	120	1	192	1	78	1	64
Total			42,570		25,350		16,950		8,450

Annex 3 Unit values estimated to calculate C_{hr} in a three-bed dwelling.

Remodelling intervention for three-bed house	€/U	Degree of intervention (p),							
		0.5		0.3		0.2		0.1	
		U	Cost (€)	U	Cost (€)	U	Cost (€)	U	Cost (€)
Re-partitioning inside the housing units	300	41	12,300	0	–	0	–	0	–
Expanding door and corridor widths	300	6	1,800	6	1,800	0	–	0	–
Fitting bannisters in the corridor	70	10	700	10	700	10	700	10	700
Adapting the kitchen height control of workshops and furniture.	9,000	1	9,000	1	9,000	1	9,000	0	–
Adapting bathrooms changing bath to walk-in shower.	2,000	2	4,000	1	2,000	1	2,000	1	2,000
Bars and handles in shower	50	2	100	2	100	1	50		50
Shutter control	500	5	2,500	5	2,500	1	500	5	2,500
Fitting appropriate knobs on doors, windows and shutters.	200	11	2,200	11	2,200	4	800	6	1,200
Total			2,600		18,300		13,050		6,450