Cost-benefit analysis of functional adaptation at home for reducing assistance needs and preventing falls: the case of Barcelona

Gender inequalities in the elderly Spanish population budgets: special incidence on pensions and long term care

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- In the 2015 Summer Workshop on The Evaluation of Public Policies for Sustainable Long-term Care (Valencia, 3th July 2015), we presented the study "Economic impact of functional adaptation at home in home assistance and preventing falls".

- A further explanation of the study can be seen at:

  http://www.ub.edu/riskcenter/docs/BIRMSS2015-6.pdf

- The **objective** of the study is to provide an economic assessment of a *public programme* aimed at providing support products and perform works at home for a sample of people over 65 years living in the city of Barcelona in 2013. A cost-benefit analysis of the program has been carried out taking into account not only the expected reduction in care needs, but also the reduction in the expected number of falls/accidents at home.

- The **data** consists in a sample of 454 people aged 65 or older who have limitations to perform daily tasks without support, 55% receive public long-term care benefits, 75% are women and 25% are men. The most frequent age group is 80 to 89 years.

- Two types of actions are considered: a) providing technical support products (82% of cases); b) performing works in the house (18% of cases).

- An **indicator of self-perception of the need of care (IAPD)** is created based on the subjective assessment on their limitations to perform basic activities of daily life. The scores are analysed before and after the intervention and the economic consequences are calculated.

- The **results** of this study are:

  - **By gender:** Men have a higher value of IAPD before and after interventions than women. In both cases, a reduction in the need for care is observed but a larger reduction is observed for women (the percentage of reduction is 33.5% for men and 35.81% for women).

  - **By age:** The reduction in the IAPD indicator is about 36.70% for those in the age group between 65 and 79 years, 38.46% for the group 80 to 84 years, 33.80% for the age group 85 to 89 years, and 31.55% for people aged 90 or more years.

  - Works at home result in a higher reduction (45%) than the provision of technical support products (33%).

  - In **economic terms**, for every euro invested in technical products, the annual savings range between 2.74 and 3.71 euros, taking into account lower requirements for third party support and prevention of different types of falls. The repayment of the investment is less than 5 months. In the case of works at home, the yield ranges from 5 to 6.35 euros, with a maximum repayment term of 1 year.

- The cost-benefit analysis conducted confirms the efficiency of preventive policies. Governments should increase budget allocations aimed at this type of action taking into account the high yields and the expected effect on the quality of life and long-term care needs.

- Furthermore, in the following study (a more recent work) we see that the public benefits given by the government in concept of long-term care are clearly insufficient to improve the life quality of old people with some degree of dependence.

- High life expectancy 65 (85) $\rightarrow$ people live longer but not in good health conditions

- Δ life expectancy $\rightarrow \Delta$ exposure to suffer contingency of dependence

- People with some degree of dependence $\rightarrow$ face costs related to LTC

- Remarkable facts

  1. Change family composition (Goldscheider *et al.*, 2015,…)

  2. Δ probability of being dependent with age (Bolancé *et al.*, 2013,...)

- LTC costs increase with age (De la Maisonneuve & Oliveira, 2015; Ayuso *et al.*, 2011; Bolancé *et al.*, 2013).

- Public expenditure on LTC in Spain is on average lower than the OECD's average (0.7% GDP 2013 vs 1.7 %) (OECD, 2015a).

- Women

  1. Higher life expectancy
  2. Higher prevalence in dependence
  3. Receive lower retirement pensions

Objective

Quantifying illiquidity risk of a person during his/her retirement with the aim of demonstrating that he/she can have problems to face with LTC costs. We also have interest in demonstrating differences by gender: elderly women are more financially vulnerable than men.

Illiquidity risk: Probability that an individual will not be able to afford basic living expenses and LTC costs given a public retirement pension and a public dependence coverage (depending on the grade of severity).
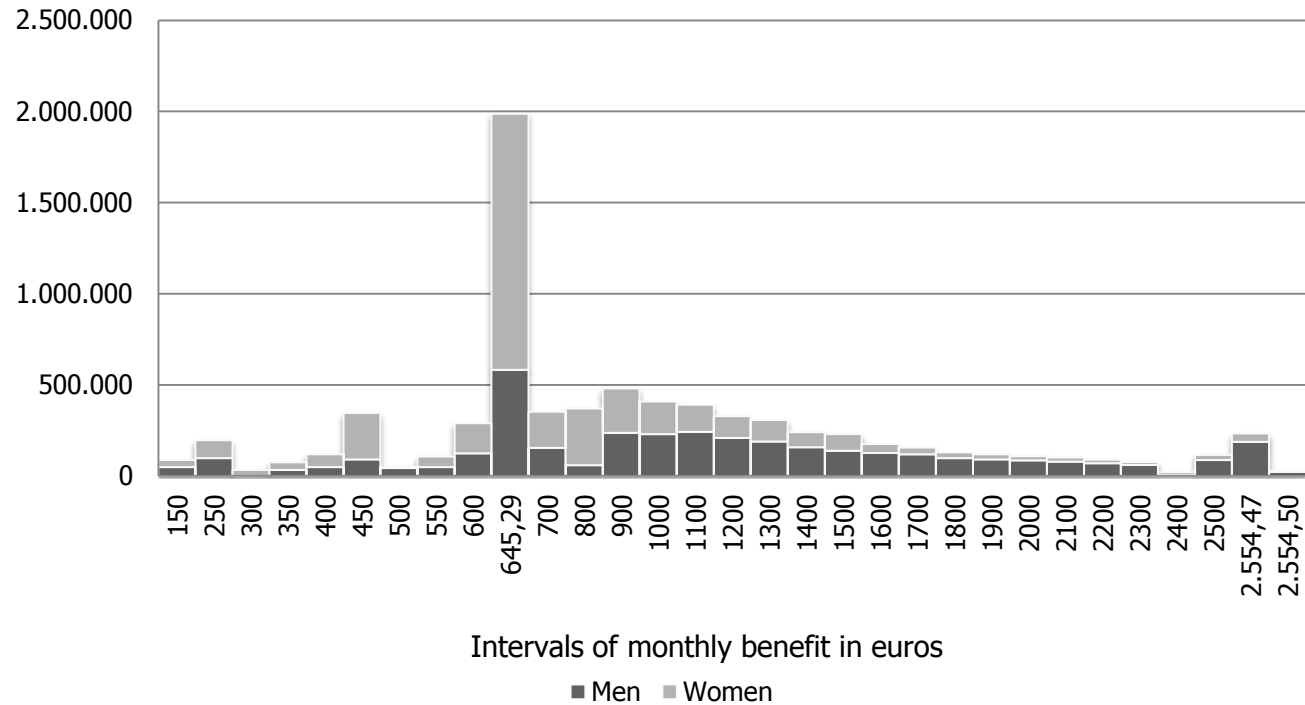
Figure 1: Distribution of pensioners of the Social Security System, by intervals of total monthly pension amount by gender.
Source: Aurhors' compilation from the Statistics of the Spanish Social Security 2014. No constant interval range (ranges of 50 and 100 euros).

Table 1: LONG-TERM CARE (LTC) BENEFITS BY LEVEL OF SEVERITY, EXPRESSED IN BENEFITS PER MONTH, IN SPAIN.	
Severity level	Monthly benefits
Grade I	300.00€
Grade II	426.12€
Grade III	715.07€

Spanish Law of Dependence (RD 1051/2013)

Table 2: INDIVIDUAL LONG-TERM CARE EXPECTED COST (LTC) BASED ON DEPENDENCE SEVERITY LEVEL.		
Severity level	LTC services	Individual annual cost, 2014
Degree I	3 hours per day home assistance	15,111.00
Degree II	Day care centre and 1 hour per day home assistance	13,424.32
Degree III	Residence	18,084.85

Source: Authors' compilation from Spanish Ministry of Health.
The cost of 1 hour per day home assistance is 13.8€ (31/12/2013); the annual cost of a day care centre is 8,387.32€ (31/12/2012); the annual cost of a residence is 18,084.85€ (31/12/2012).
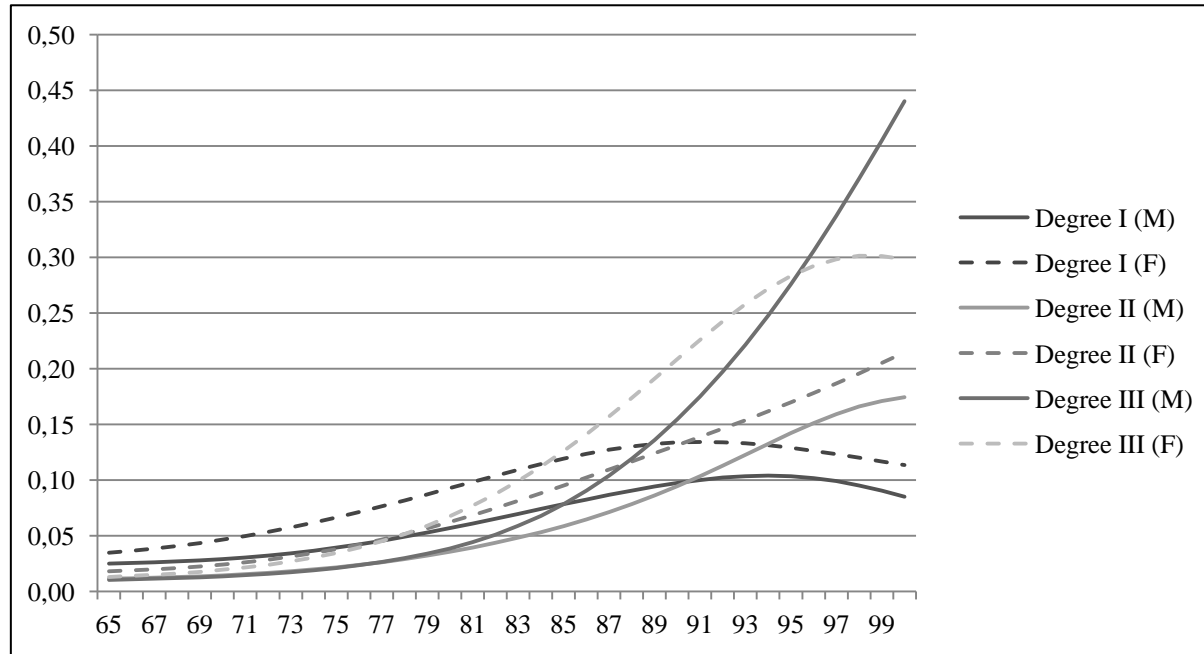
Figure 2: Prevalence dependence rate in Spain by gender, age and degree of severity.
Source: Bolacé *et al*. (2013).

Items to have into account to quantify the illiquidity risk of a person since the moment s/he enter into retirement:

1. Public benefit entitlements (pensions and LTC subsidies)
2. Yields of real and financial assets (mainly housing)
3. Basic consumption expenses (IPREM)
4. Long-term care costs

Simulation, (many combinations):

1. Public pensions
2. Benefits by dependence according to the severity degree
3. Basic living expenses
4. Copayment based on the level of severity, by age and gender

Simulation result: distribution of the net result of income and expenses. Using the proportion of cases with a negative net result, we obtain (by age and gender) the estimation of the probability, given a public retirement pension and a public dependence coverage (depending on the grade of severity), that a person can afford basic living expenses and LTC costs.

$$N_x = P_x - G + I_h - C_h; x = 65, \dots, 100; h = a, b, c \qquad (1)$$

- h: levels of dependence $h = \{a, b, c\}$, which depends on the intensity of LTC needed
- N_x: net amount available to a person aged x
- P_x: public pension received by the individual aged x
- G: basic living expenses (constant)
- I_h: public benefit due to dependency, linked to the level of severity h
- C_h: the cost of LTC depending on h

Data:

- Spanish population aged over 64 by age and gender (INE, 2014).

- Estimated prevalence rates by age x and degree of severity h, t_x^h (Bolancé *et al.*, 2013).

Simulation steps:

1. An individual is chosen from the Spanish population pyramid aged over 64 by sex, and we obtain an age x.

2. Using the prevalence rates to the age obtained in Step 1, we simulate a level of dependence for the individual chosen in the previous step.

3. A level of pension is simulated following the statistical distribution of amounts shown in Figure 1, depending on the sex which we are simulating.

4. We assess the net amount following expression (1) and the process is iterated.

Result: when the amount of net is less than zero, we consider that the individual aged x does not have enough liquidity due to the income perceived by pension and the dependence benefit are not enough to cover neither basic living expenses nor LTC costs.

Figure 2: ESTIMATION OF THE NET N(X) DENSITY FUNCTION BY SEX, AGES 65, 75, 85 AND 95, SPAIN 2014		
Age	**Males**	**Females**
65		
75		
85		
95		
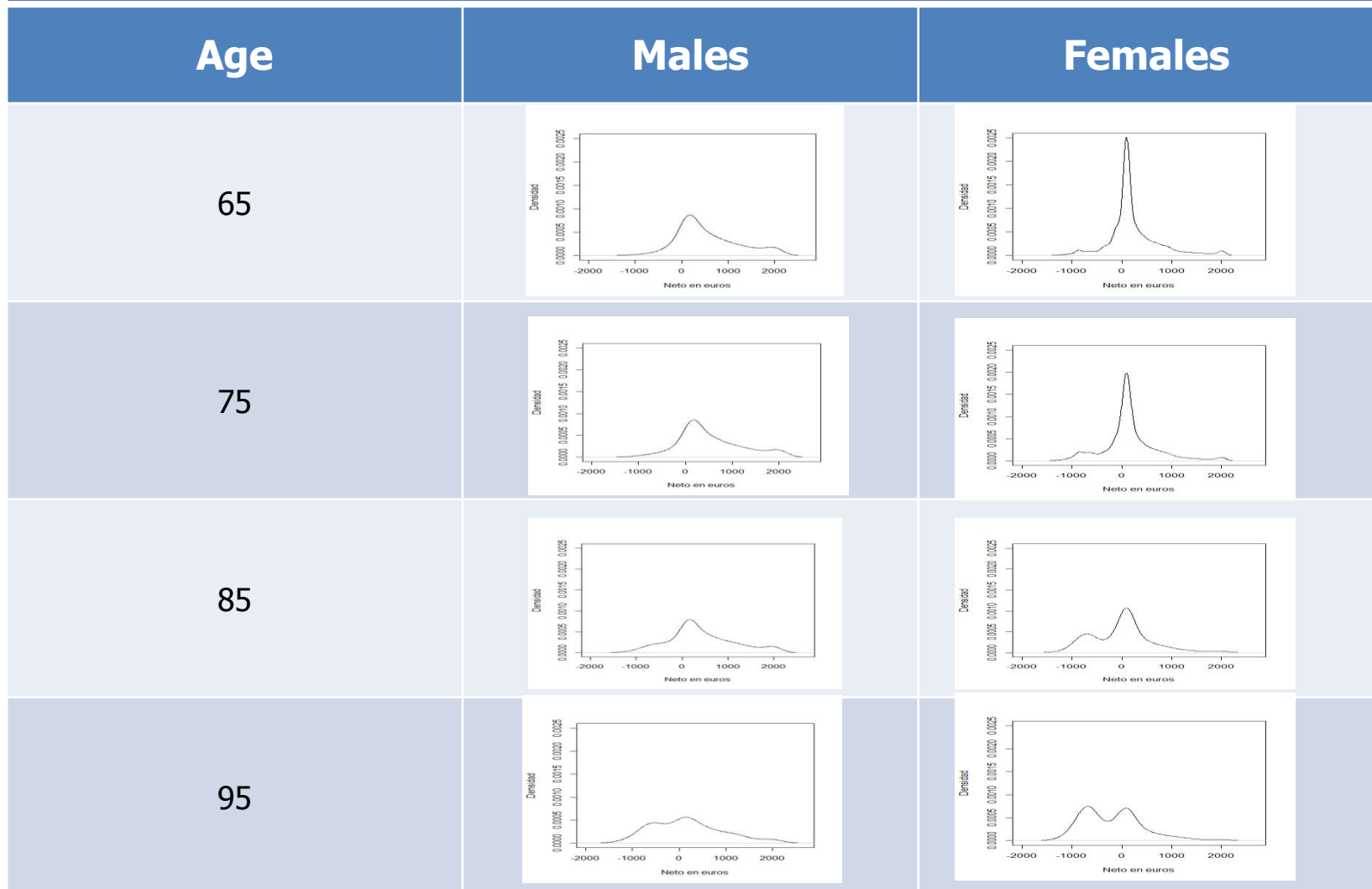
- At 65 years, for women, positive values of the net disposable income after paying for living expenses and LTC, $N_i(x)$, close to zero are highly probable; for men, although they get higher probabilities in these values than in others, we observe a positive skew.

- Despite the fact that at the age of 75 years is when women present a density function with an increment of probability for the net negative values, it is at 85 years when women begin to have a high probability of obtaining a net equal to zero or negative (lack of liquidity) in the case of suffering a dependence contingency.

- At high ages (95 years), the probability of having a negative net increases for both genders, which is always more pronounced in the female case.

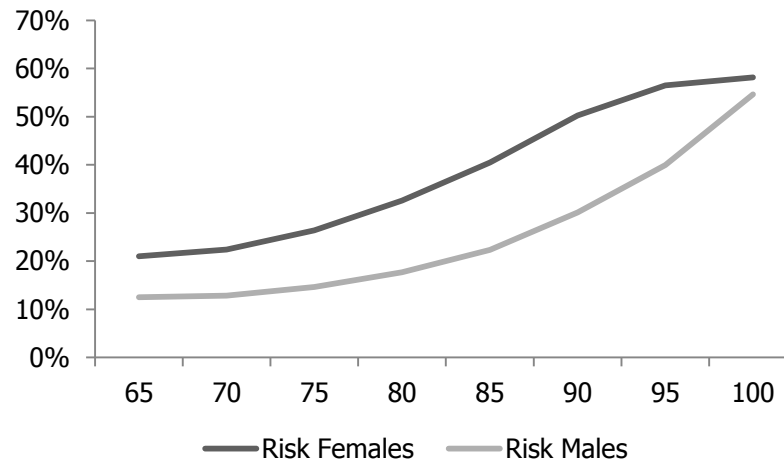| Table 3: ILLIQUIDITY RISK BY AGE AND SEX, SPANISH POPULATION AGED OVER 64 (2014)		
Age	**Male Risk**	**Female Risk**
65	12,5%	21,0%
70	12,8%	22,4%
75	14,6%	26,4%
80	17,7%	32,6%
85	22,4%	40,5%
90	30,1%	50,3%
95	39,9%	56,5%
100	54,7%	58,1%

Source: Authors' compilation

Figure 3: Evolution of the illiquidy risk for the elderly, by sex
(Spain, 2014)
Source: Authors' compilation

- Illiquidity risk is not only determined by the amount of benefits which the individual receives, but also by age and gender.

- Illiquidity risk increase with **age** due to the state of dependence (WHO, 2015). This implies an increase of LTC expenses (Scheil-Adlung, 2012).

- Disposable income has a negative correlation with age (Colombo *et al.*, 2011). In Spain, individuals with some degree of dependence and low income spend on average 12% more on LTC than people with higher income (SHARE, 2014).

- By **gender**, women have higher illiquidity risk than men due to:

  1. Higher life expectancy also with dependence→ higher costs

  2. Less income by pension (inequalities labour market) (OECDb, 2015)

  3. Solitude (Scheil-Adlung & Bojan, 2012)

- Results show an insufficiency of the public coverage for facing costs related to LTC.

- Spanish elderly people have a high investment in real estate. There is little availability of sufficient cash to afford the costs associated with dependence.

- Specific studies carry out for some particular territorial areas such as the case of Barcelona, show that the benefits in preventing entry (or increase) in dependence, can substantially reduce the costs of LTC (in particular, support received from third parties).

- The investment in technical aids and home adaptation of dependent people result in high rates of economic returns (for every euro invested in technical products, the annual savings range between 2.74 and 3.71 euros, taking into account lower requirements of third-party support and prevention of different types of falls; in the case of works at home, the yield ranges from 5 to 6.35 euros). Furthermore, the repayment of the investment is less than 1 year in any case.

- Governments should encourage investment in preventing the inception of dependence, taking into account their lower costs and the risk of illiquidity in the older population.

- In addition, these measures increase the autonomy of older people, and contribute to active ageing.

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Thank you for your attention

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