Departament d'Economia Aplicada
Universitat Autònoma de Barcelona

WORKING PAPER 26-02

Trends in Health Inequalities among Spanish Retirees

Cristina Bellés-Obrero
Manuel Flores
Pilar García-Gómez
Sergi Jiménez-Martín
Judit Vall-Castelló

Departament d'Economia Aplicada
Edifici B
Universitat Autònoma de Barcelona
08193 Bellaterra, Barcelona, Spain.
d.econ.aplicada@uab.cat
www.uab.cat/en/applied-economics
@ecapuab.bsky.social

UAB
Universitat Autònoma de Barcelona

Trends in Health Inequalities among Spanish Retirees[ϰ]

Cristina Bellés-Obrero[1], Manuel Flores[2], Pilar García-Gómez[3], Sergi Jiménez-Martín[4], and Judit Vall-Castelló[5]

Abstract

Spain, with one of the highest life expectancies globally and a rapidly ageing population, faces growing challenges in sustaining its pension, healthcare, and long-term care systems. This study examines trends in health inequalities among retired Spaniards from 2004 to 2022, using eight waves of the Survey of Health, Ageing and Retirement in Europe (SHARE). We analyse five health outcomes—limitations in daily and instrumental activities, number of chronic conditions, a composite health deficiency index, mental health (EURO-D scale), and cognitive performance—and use linear regression to assess income-related gradients, adjusted for age and sex. We also compute a *catch-up time* measure—the number of years a poorer individual would need to reach the same level of health as a richer individual—and concentration indices of bad health. We then examine how these inequalities change over time, allowing us to explore the potential influence of pension reforms within the context of Spain's Beveridge-style healthcare system and tax-funded long-term care provision. Our results show no clear evidence that health inequality has increased from 2004 to 2022. These findings contribute to understanding how income disparities interact with social protection systems in ageing societies and inform the design of equitable health, long-term care, and pension policies.

Keywords: Social Security, Inequality, pension reforms, health, Spain.

JEL classifications: H55, D31

[ϰ] This paper used data from SHARE Waves 1-9. The SHARE data collection has been funded by the European Commission, DG RTD through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N°21 1909, SHARE-LEAP: GA N°227822, SHARE M4: GA N°261982, DASISH: GA N°283646) and Horizon 2020 (SHARE-DEV3: GA N°676536, SHARE-COHESION: GA N°870628, SERISS: GA N°654221, SSHOC: GA N°823782, SHARE-COVID19: GA N°101015924) and by DG Employment, Social Affairs & Inclusion through VS 2015/0195, VS 2016/0135, VS 2018/0285, VS 2019/0332, VS 2020/0313, SHARE-EUCOV: GA N°101052589 and EUCOVII: GA N°101102412. Sergi Jiménez-Martín thanks financial help from Agencia Estatal de Investigación Project # PID2023-147602OB-I00

[1] Institut d'Anàlisi Economica (IAE-CSIC), BSE and IEB. cristina.belles@iae.csic.es
[2] Universitat Autònoma de Barcelona (Department of Applied Economics). manuel.flores@uab.cat
[3] Erasmus University (Erasmus School of Economics). garciagomez@ese.eur.nl
[4] Universitat Pompeu Fabra (Department of Economics), BSE and FEDEA. sergi.jimenez@upf.edu
[5] University of Barcelona (Department of Economics), IEB and CRES (UPF). judit.vall@ub.edu

1. Introduction

This paper investigates whether health inequalities among the retired population in Spain have changed over the past two decades and explores the extent to which these changes may be linked to institutional reforms in the health, pension and long-term care systems.

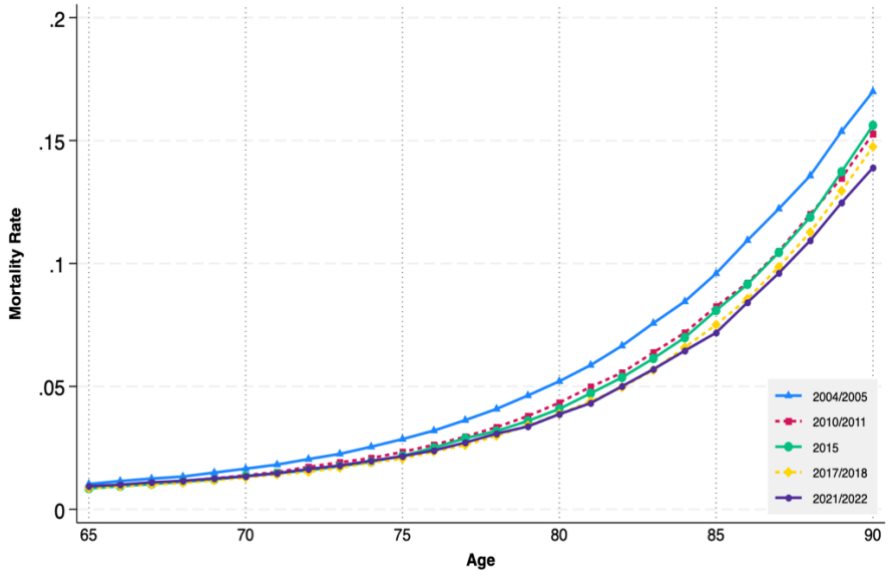
The demographic context for the Spanish case is quite challenging. Population ageing is reshaping the demographic landscape across Europe, with Spain experiencing particularly rapid shifts in the needs of its older population. This is so because Spain is one of the countries with the highest life expectancy in the world—especially for women—ranking among the top five globally. The proportion of the elderly population is large and steadily increasing. Using data from HMD (2025), Figure 1 shows that at a given age between 65 and 90, mortality has fallen steadily over time[6], with the largest improvements above age 80. For instance, the mortality rate at age 80 fell from 5.2% in 2004/05 to 3.8% in 2021/22. These survival gains expand the mass of very old individuals and, conditional on age, alter the composition of survivors, features that have direct implications for measured health inequalities. While these trends reflect significant progress in healthcare and living standards, they also pose substantial challenges to the sustainability of Welfare States, particularly in terms of pension systems, healthcare provision, and long-term care (LTC) infrastructure. These challenges are expected to persist as the percentage of Spaniards over the age of 65 is projected to increase from 19.9% today to 23.8% by 2030 and 30.3% by 2060. Notably, by 2060, over 27% of the population aged 65 and above is projected to be 85 years or older, an increase of 10 percentage points from 2021.

Spain operates under a Beveridge-style universal healthcare system, which provides tax-funded access to medical services regardless of employment status or income. This structure may act as a buffer against widening health inequalities across income groups, in contrast to Bismarck-style systems—where access is more closely tied to employment and income—which can exacerbate disparities. Since 2007, Spain has also implemented a formal, universal, tax-funded LTC system under the *Ley de Dependencia* (Dependency Act, Act 39/2006). This framework, regulated regionally, currently serves around 12% of the population aged 65 and older, of whom 17.8% have some form of mental health

[6] Figure 1 plots age-specific mortality rates in several specific years during the period 2004 to 2022, which coincide with waves 1, 4, 6, 7 and 9 of SHARE.

condition. However, specialized LTC services for neurodegenerative diseases remain insufficient (Costa-Font et al., 2025).

Figure 1: Age-specific mortality rates in Spain, 2004-2022



Notes: The figure plots Spain's age-specific mortality rates (per 100 individuals) from the Human Mortality Database for the years 2004/05, 2010/11, 2015, 2018/19, and 2021/22.

Pension income remains the primary source of financial support for individuals aged 65 and older in Spain, making pension system reforms a potentially powerful lever for influencing health outcomes and inequalities in later life. Recent pension reforms have increased social security wealth by ten percent for men and eight percent for women. However, these gains have been unequally distributed among the income distribution; the richest quartile has experienced an increase close to twenty percent, while the change is close to zero for the poorest income quartile (Bellés-Obrero et al, 2024).

Recent reforms in long-term care and pensions have potentially influenced the health and income distribution of the Spanish older population. In addition, these effects are expected to be different for different income groups shaping the evolution of health inequalities. Therefore, this paper investigates trends in health inequalities among the older population using data from eight waves of the Survey of Health, Ageing and Retirement in Europe (SHARE), spanning 2004 to 2022. By situating our empirical analysis within this broader demographic, institutional, and epidemiological context, the

paper aims to contribute to understanding the interplay between income, health, and social policy in an ageing society.

We define "health inequalities" as the gradient of several common health measures with respect to household income, and study how this gradient has changed over time. In particular, we consider five key health measures: (1) Functional health, based on the number of functional limitations; (2) Diagnosed health, based on the number of conditions that a doctor has ever told a respondent; (3) Comprehensive health, based on a health deficiency index with 44 items; (4) Mental health, based on the Euro-D depression scale; (5) Cognitive health, based on three cognition tests (immediate and delayed word recall, counting backwards in increments of seven).

Income is measured in deciles of the equivalized household income from all sources. We depict our findings as "health-income gradients", plotting each health measures against income deciles and examining whether the slope of this gradient has become steeper during this period of institutional reforms in Spain. A similar analysis is performed on two additional measures of health inequality: a *catch-up time* measure—the number of years a poorer individual would need to reach the same level of health as a richer individual—and concentration indices of bad health. This approach allows us to determine not only whether inequalities have widened or narrowed, but also potential mechanisms—such as pension reforms—that may have contributed to these changes.

Our results show no clear evidence that health inequality increased among Spanish retirees between 2004 and 2022, suggesting that the tax-funded, Beveridge-style universal healthcare system may act as a buffer against income disparities. While functional and comprehensive health indices remained essentially flat, the measure based on diagnosed health showed an unambiguous decline, indicating greater inequality for that specific outcome. These findings should be interpreted with caution due to data noise and a sample size insufficient to stratify results by other potentially important dimensions, such as education or employment history, which may mask underlying heterogeneities.

The rest of the document goes as follows. Section 2 describes the institutional background and Section 3 the data. Section 4 to 6 develop various aspects of our empirical analyses and Section 7 concludes.

2. Institutional Background

Over the past four decades, Spain has developed a comprehensive welfare architecture comprising a contributory public pension system, a universal healthcare system, and a needs-based long-term care (LTC) program. Each pillar has undergone substantial reforms aimed at improving sustainability, equity, and adequacy, with significant implications for retired populations.

2.1. Pension system

Spain's public pension system is a contributory, pay-as-you-go scheme. Eligibility requires a minimum of 15 years of contributions, with full pension entitlement reached at 38 years and 3 months in 2025 (rising to 38 years and 6 months by 2027). The statutory retirement age is gradually increasing from 65 to 67, with early retirement options subject to actuarial reductions. Partial retirement and incentives for delayed retirement have been introduced to promote flexibility (Ministerio de Inclusión, Seguridad Social y Migraciones, 2025).

Pension benefits are calculated using the average of the highest 25 years of contributions and a replacement rate that reaches 100% with 37 years and 9 months. Minimum and maximum pension thresholds are set annually, and non-contributory pensions provide support for low-income individuals. Gender gap supplements have also been introduced (OECD, 2023).

Major reforms since 1985 (see figures A1 and A2 for a timeline description of the reforms), like the ones introduced in 1997 and 2002 (See Bellet et al, 2024) have progressively extended the contribution base, delayed retirement age, and introduced mechanisms to influence retirement behavior. The 2011 and 2013 reforms added a **Sustainability Factor** and a **Pension Revaluation Index**, linking benefits to life expectancy and system finances. However, these were repealed in the 2021 and 2023 reforms, which restored inflation-indexed updates and introduced an **Intergenerational Equity Mechanism** that increases contributions without reducing benefits (Gobierno de España, 2023). Figures A1 to A3 in the Appendix present a summary of the main reforms in the pension system in Spain since 1985. See Bellés et al (2024) for further details.

2.2. Long-term care system

Spain's LTC system was formalized with the **2006 Dependency Law**, establishing a universal, needs-based entitlement to care services. Eligibility is determined through standardized assessments of functional capacity, classifying individuals into three dependency grades. Support is provided via in-kind services (e.g., home care, residential care) or cash allowances, including payments for informal caregivers (Ley 39/2006).

The system is co-financed by the central government, autonomous communities, and user co-payments, resulting in significant **territorial inequality**. While some regions prioritize service provision, others rely more on monetary compensation (Imserso, 2022).

Initial expansion between 2007 and 2011 was followed by austerity-driven cutbacks in 2012 (see Figure A3 for a timeline of major events). Since 2015, coverage has gradually improved, with moderate dependency formally included and caregivers gaining access to social security contributions (see Figure 3 for a more detailed description of the successive reforms in the long-term care system in Spain). Despite increased expenditure and coverage, challenges persist due to governance complexity and reliance on informal care (Rodríguez Cabrero et al. 2020).

Among the most pressing health concerns for Spain's ageing population is the rising prevalence of neurodegenerative disorders, especially dementia, and the associated long-term care needs. Estimates suggest that between 734,000 and 937,000 individuals in Spain suffer a neurogenerative disorder, being Alzheimer's disease the most common. Due to under-diagnosis and social stigma, the true burden is likely higher. A recent study (Vega Alonso et al., 2018) found that 18.5% of Spaniards aged 65+ exhibit cognitive impairment, with prevalence increasing sharply with age and varying by gender, education, and marital status. While Spain has adopted the Spanish Strategy on Neurodegenerative Diseases (2016) and developed a Comprehensive Plan for Alzheimer's and Other Dementias (2019–2023), the long-term effectiveness of these initiatives remains to be fully assessed. Given the high economic burden associated with these conditions, the lack of a comprehensive European-level plan further compounds the challenge.

2.3. Healthcare system

Spain's **National Health System (SNS)** is a universal, tax-funded system characterized by centralized financing and decentralized administration across its 17 autonomous

communities. Healthcare is free at the point of use, except for outpatient pharmaceuticals, which are subject to income-based co-payments. Public providers dominate primary and hospital care, while private entities operate under public contracts in selected services. Public spending accounts for approximately 70% of total health expenditure (OECD Health Statistics, 2023).

The SNS was established by the **1986 General Health Law**, transitioning from a Bismarckian employment-based model to a Beveridge-style universal system funded through general taxation. This reform enshrined healthcare as a right, grounded in principles of equity, universality, and public provision (Bernal Delgado et al, 2024).

A major structural shift occurred through the **decentralization of healthcare responsibilities**, beginning in the 1980s and culminating in full regional control by 2002. Autonomous communities now manage service delivery, planning, and budgeting, while the central government oversees regulation and financing. This decentralization improved responsiveness but introduced regional disparities in access, waiting times, and outcomes (Lopez Casasnovas et al, 2005).

During the **Eurozone debt crisis**, the **Royal Decree-Law 16/2012** reversed some universalist features, reintroducing insurance-based entitlement, excluding undocumented migrants, and expanding pharmaceutical co-payments[7]. These measures were partially rolled back in **2018**, restoring **residency-based universal access** and revising co-payment ceilings to protect low-income and vulnerable groups, particularly pensioners and individuals with chronic conditions (Real Decreto Ley 7/2018).

3. Data and sample

This study uses data from the biennial longitudinal Survey of Health, Ageing and Retirement in Europe (SHARE; Börsch-Supan et al. 2013) . SHARE collects extensive microdata on socioeconomic status, social and family networks, and health for individuals aged 50 and older living in several European countries. The richness in health measures,

[7] See Juanmarti et al (2021) show that restricted access to the healthcare system for undocumented immigrants led to increased mortality for this population group while Jiménez-Rubio and Vall Castelló (2020) show how this reform reduced healthcare utilization. Bellés-Obrero et al. (2024) find that access restrictions led to an immediate 12% decrease in IPV reporting and protection order applications among foreign women.

including both subjective and objective measures, that can be linked to other household characteristics and income variables are key to the aim of this study.

We combine data from Wave 1 (2004) through Wave 9 (2021/22), the most recent available wave. We exclude Wave 3 (2008), as it focused on retrospective life histories ("SHARELIFE") and did not collect comparable health data. Furthermore, our measure of cognitive health is only available from Wave 4 (2011).

We select individuals aged between 65 and 79 years who are either working or retired with previous employment. We include (former) private or public sector employees and self-employed. We exclude respondents with missing information on the health indicators of interest (see below) or on household income. Our sample includes 3,358 individuals that correspond to 8,551 person-wave observations.

3.1. Variable description

Income

We are interested in measuring the health differences across income groups. We use equivalent household income as, compared to personal income, it better captures living standards, economies of scale in consumption, and avoids bias from gender and life-cycle differences. We adjust household size using the OECD equivalence scale, which assigns a weight of 1 to the first adult and 0.5 to each additional household member. We use the most complete household income measure in SHARE. In particular, use imputed total household income provided by SHARE, which aggregates all income sources. For each wave, we divide the sample in income deciles based on the distribution of all respondents in the same wave.

Income changes are partly driven by deteriorating health or retirement transitions. We want to use a measure of income that avoids, as much as possible, income changes through these channels. Therefore, we use the income decile that corresponds to the first wave in which an individual enters our sample, with two exceptions due to data availability. First, the measure of income is different in Wave 1 (before-tax) compared to the others (after-tax). Individuals are better aware of their after-tax than their before-tax income, and therefore the income measurement in later waves is more reliable. For those individuals that participated in both Waves 1 and 2, we compute their average household income across these waves and assign them to the income decile that corresponds to the pooled distribution of Waves 1 and 2 respondents. If Wave 1 is the

only available observation, we assign income groups using Wave 1 data alone. Second, Wave 7 includes a retrospective module (SHARELIFE) administered only to those respondents that entered after Wave 3. Therefore, the effective sample size in Wave 7 is small, and participation is non-random (biased toward younger, later-entering respondents). We then use the income decile from Wave 8 or Wave 9, if Wave 8 is unavailable, for individuals first observed in Wave 7.

Health

We exploit the richness of health information on SHARE and construct five variables that capture five different dimensions of health. We define our variables such as all the scores are increasing in good health. In that sense we have measures of "health capacities". Our measures are as follows:

(1) *Functional health* is based on 20 self-reported limitations in functional health that are consistently available in all SHARE waves. It includes i) mobility limitations (e.g. walking, sitting, climbing stairs, and other (fine) motor tasks); ii) limitations in activities of daily living (ADLs) (basic self-care tasks such as bathing, dressing, and eating); and iii) limitations in instrumental activities of daily living (IADLs) (Lawton and Brody, 1969) (activities related to independent living, such as preparing a hot meal and shopping). Appendix Table A1 includes the detailed list of included limitations. The functional health measure equals 20 minus the number of reported limitations.

(2) *Diagnosed health* based on 11 doctor-diagnosed conditions collected in all SHARE waves (Appendix Table A2). Respondents are asked whether a doctor has ever diagnosed them with each condition when they are first included in SHARE, while they are asked about both new diagnoses and current status in subsequent waves. We define a condition indicator equal to one if a respondent ever reports the condition, regardless of whether it is ongoing. Our health capacity measure based on diagnosed health is then 11 minus the number of conditions. By construction, this measure can only decrease over time, as individuals cannot recover from these health conditions.

(3) *Comprehensive health* is based on the health-deficiency index specified in Börsch-Supan et al. (2021), and like Abeliansky and Strulik (2019). It aggregates a wide range of self-reported health deficits—chronic conditions, functional limitations, and daily activity difficulties—coded as present or absent. The index is the proportion of

observed deficits relative to the number of non-missing items. We transform it into a capacity measure by subtracting the number of observed deficits from the maximum possible (44).

(4) *Mental health* is measured using the Euro-D scale, a standardized instrument that captures depressive symptoms (Prince et al.,1999). The instrument is constructed from the sum of 12 binary (yes=1 and no=0) items related to mood and behavior, such as sadness, pessimism, sleep disturbance, and lack of interest. The original instrument increases with more depressive symptoms. We transform it to a mental health capacity measure that increases with better mental health subtracting the Euro-D index from 12.

(5) *Cognitive health* is based on three cognitive function tests included in SHARE: (i) immediate word recall (the number of words a respondent can recall from a list of ten words), (ii) delayed word recall (recall of the same words after about five minutes), and (iii) the serial 7s subtraction task (subtract seven from 100, and then four times keep subtracting seven from the result). This is similar to the Langa-Weir cognition score (Langa et al. 2010, Crimmins et al. 2011), but excluding the backwards counting test (counting backwards from 20), only available in SHARE Waves 8 and 9. To address the disproportionately high weight of memory tasks, we assign double weight to the serial 7s component and take the sum of all correct recalls and subtraction tasks. This adjustment aims to provide a more balanced measure of cognitive performance. The total score ranges from 0 to 30, with higher scores indicating better cognitive functioning.

3.2. Descriptive statistics

Table 1 presents summary statistics of the different health variables across three income groups for all the years pooled. As expected, we find a clear gradient not only across economic conditions, like educational attainment, home ownership, and equivalized household wealth. There are also clear differences across income terciles for all health variables, where the health capacity is higher for the richer income groups for all the measures. Last, we see that the highest income tercile is also on average younger, and with a lower share of females compared to the other two income terciles.

Table 1: Summary statistics

	Total	Income Tercile 1	Income Tercile 2	Income Tercile 3
Demographics				
% Women	52.8	56.1	55.1	47.3
Age	71.7	72.0	71.8	71.4
% Married	75.4	71.7	73.8	81.4
Household size	2.3	2.5	2.2	2.1
% Owns their home	92.7	90.3	93.2	94.6
Number of children	2.5	2.9	2.5	2.4
% with high educational attainment	8.0	4.3	4.4	15.6
% with low educational attainment	84.8	92	89.4	72.9
Income & Wealth				
Equivalized household income (in €)	12,684	6,422	11,076	20,510
Equivalized household wealth (in €)	162,397	121,413	150,986	214,611
Retirement age	60.8	60.3	60.8	61.1
Health				
Functional health	17.0	16.3	17.1	17.5
Diagnosed health	8.94	8.87	8.93	9.02
Comprehensive health	.81	.78	.81	.83
Mental health	9.1	8.7	9.0	9.5
Cognitive health	14.1	13.2	13.8	15.3
# Individuals	3,358			
# Observations	8,551			

Source: Own calculations, based on SHARE release 9.0.0. Weights applied. Notes: We use household equivalized income, dividing total household income by 1 for the first person in the household, plus 0.5 for every additional household member. We adjust for purchasing power parity. Respondents remain in the same income group over time, based on their position in the wave in which they entered SHARE.

4. The income-health gradient by income decile

We first construct health-income gradients by plotting the five health measures against the income deciles and investigate whether the slopes of these gradients become steeper during the period of institutional reforms in Spain.

Figure 2 displays the change of functional health over time and by income decile for women (left panel) and men (right panel). We first plot the mean functional health for every decile and every wave, and 95 percent confidence intervals (upper part of Figure 2). Next, we plot the predicted values from a linear regression per wave with functional health as the dependent variable and income decile (continuous) as the only explanatory variable (bottom part of Figure 2). We plot only five waves (Wave 1 in 2004, Wave 4 in 2011, Wave 6 in 2015, Wave 8 in 2019/20, and Wave 9 in 2021/22) to limit clutter.[8]

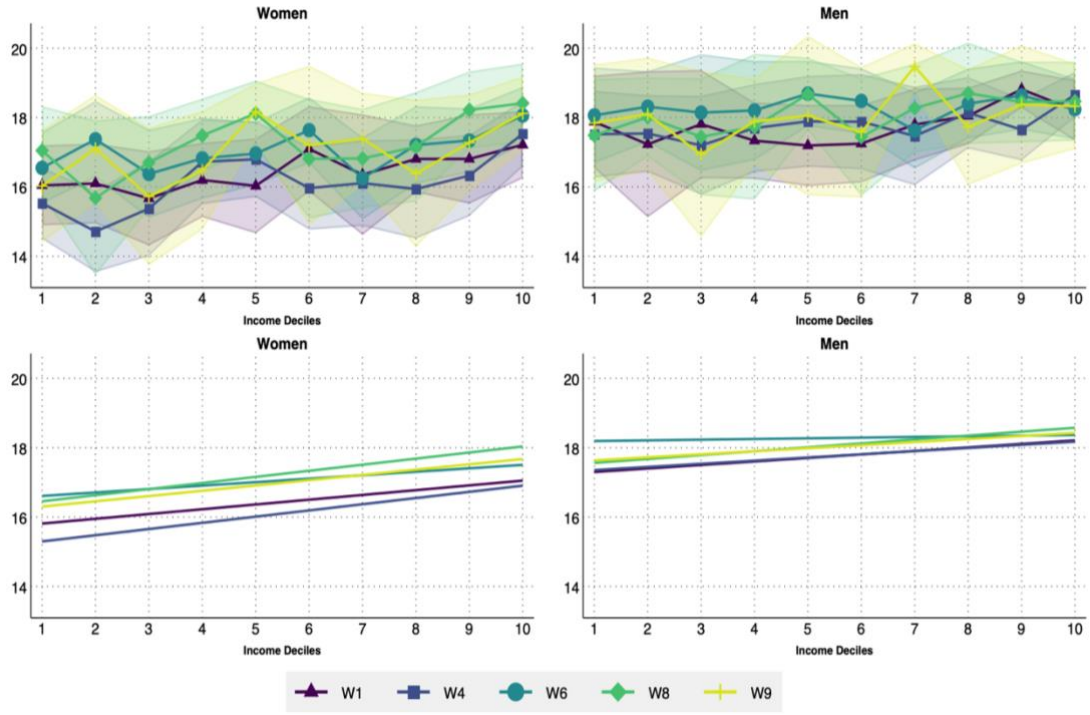
[8] We also produced figures in which we filtered out age and sex effects from our health variables. The results, which are very similar to those presented here, are available from the authors upon request.

For all deciles, functional health has improved during the 16 years between Wave 1 and Wave 8 but then worsened after the Covid pandemic (see Wave 9). This is most clearly visible for women, as the differences for men are smaller.

Accordingly, for women, the predicted regression line for Wave 8 in 2019/20 is above the regression line for Wave 1 in 2004. In addition, we see an almost parallel shift to better health for all income deciles, especially between Waves 1 and 8. The parallel shift suggests that health differences across income deciles have remained constant over time.

For men, the regression lines for each wave are extremely close, and any differences are hardly visible. In order to compare the income-health gradients over time, we normalize each slope by the mean of the health variable in wave 9. This ensures that changes in the gradient reflect changes in inequality — not changes in the average level of the health outcome. By anchoring the denominator to a fixed wave, we prevent shifts in population health from distorting the interpretation of the slope. The normalized gradient can thus be interpreted as the percent change in the health variable (relative to wave 9) associated with one decile increase in income. These normalized slopes remain rather constant over time (see Figure 7), suggesting health inequalities have not changed during this period.

Figure 2: Functional health based on the number of functional limitations

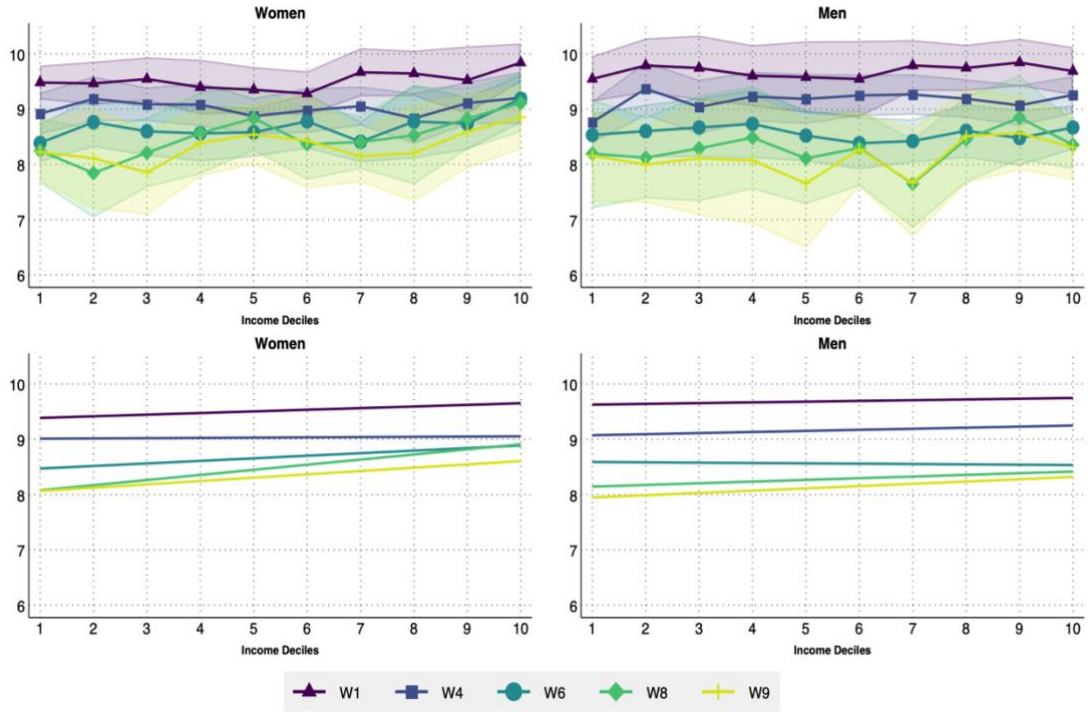


Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

Notes: In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on income deciles and call this the *health gradient*.

Figure 3 displays the health capacity measure based on diagnosed health, related to the number of conditions that a doctor has told the respondent. The observed patterns contrast with the ones for functional health, as the mean is larger in Wave 1 in 2004 compared to the other years, suggesting a drop in health over time. However, at least part of this declined in health may be driven by the construction of this measure, since it does not allow for individuals to recover from these health conditions. A one-time condition will trigger the measure to be one for the rest of the respondents' lives. In addition, the estimated slopes of the health-gradient based on diagnosed health appear rather flat for both women and men (see bottom panels and Figure 7). Two opposite mechanisms may explain the lack of health differences across the income distribution. First, a positive message would be a relatively similar propensity of experiencing these health problems. On the other hand, these slopes may mask a lower probability of being diagnosed by lower income groups due to lower health care utilization, as previous evidence suggests there are sizeable inequities in health care use, and to specialist care in particular, of the older population in Spain (Tavares and Zantomio, 2017)).

Figure 3: Diagnosed health based on number of conditions told by doctor



Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

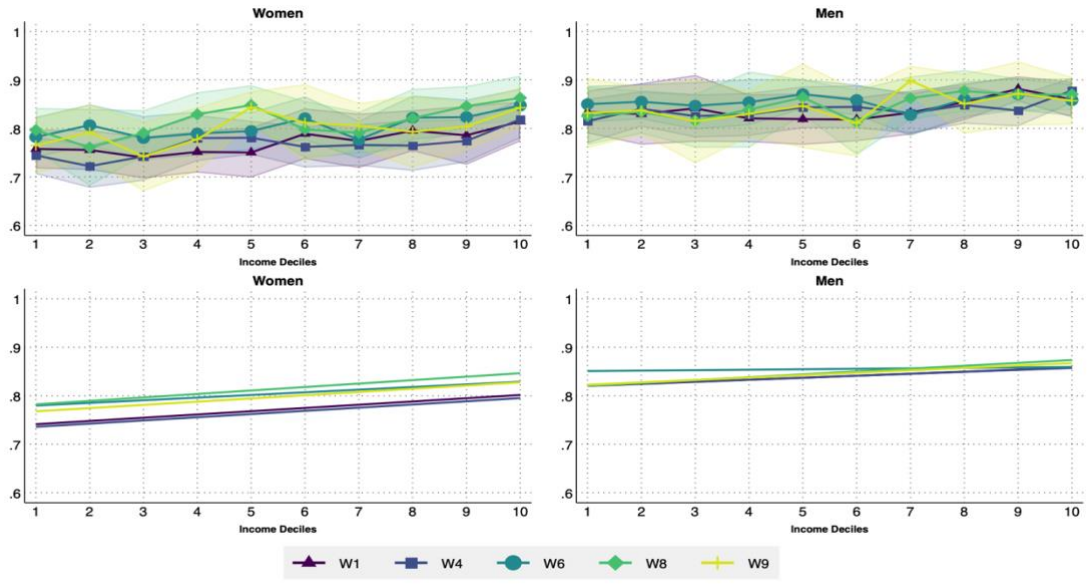
Notes: In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on income deciles and call this the *health gradient*.

The pattern of comprehensive health (Figure 4) and mental health (Figure 5) is similar to that of Functional health. We observe an improvement in the 16 years between Wave 1 and Wave 8, but a worsening after the Covid pandemic in Wave 9 for women. In addition, we find that the worsening in mental health after Covid is more pronounced for women, while the improvement in mental health for men seems larger compared to women.

We also observe a relative constant gradient of comprehensive health across income groups over time for both men and women (Figures 4 and 7). On the other hand, for women, the gradient seems to get steeper between waves 1 and 8, (Figures 5 and 7).

Last, Figure 6 depicts the patterns for cognitive health. For women, the bottom panels suggest an improvement in cognitive functioning between Wave 4 (the first wave with this measure) and later waves, and for both women and men, there gradient has become slightly steeper over time (see also Figure 7).

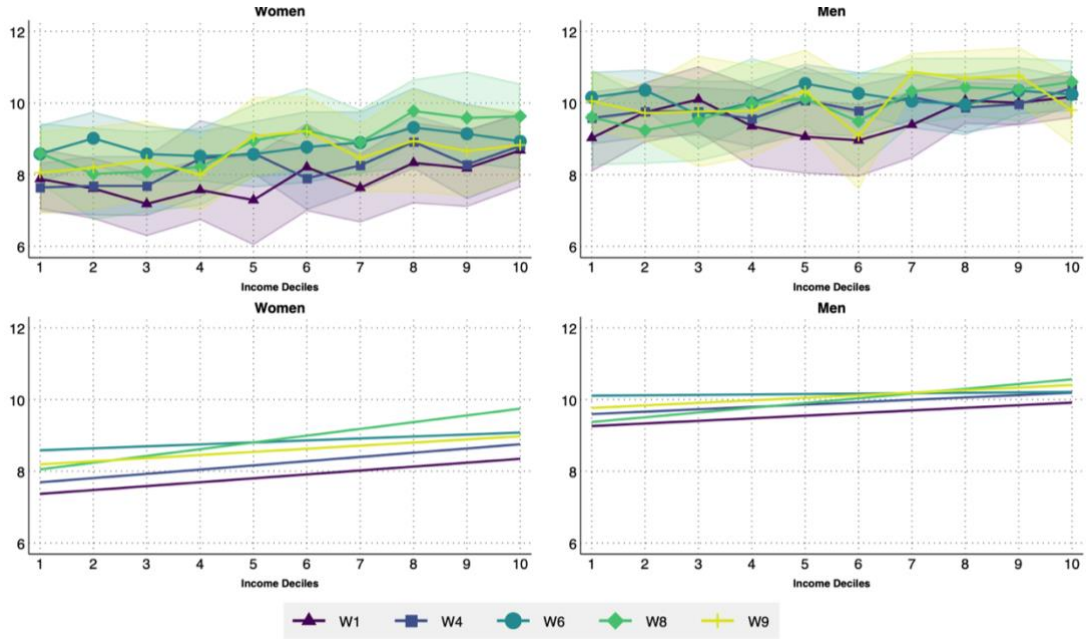
Figure 4: Comprehensive health based on the health-deficiency index



Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

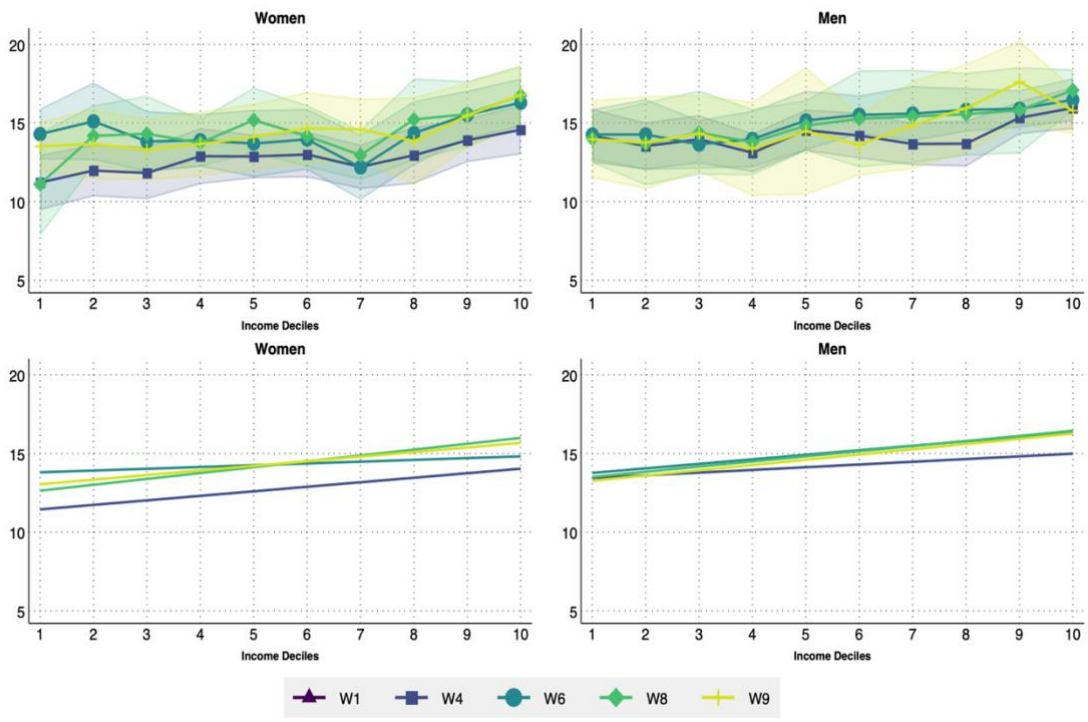
Notes: In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on income deciles and call this the *health gradient*.

Figure 5: Mental health based on Euro-D scale



Source: Own calculations, based on SHARE release 9.0.0. Weights applied. Notes: In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on income deciles and call this the *health gradient*.

Figure 6: Cognitive health based on word recall and numeracy

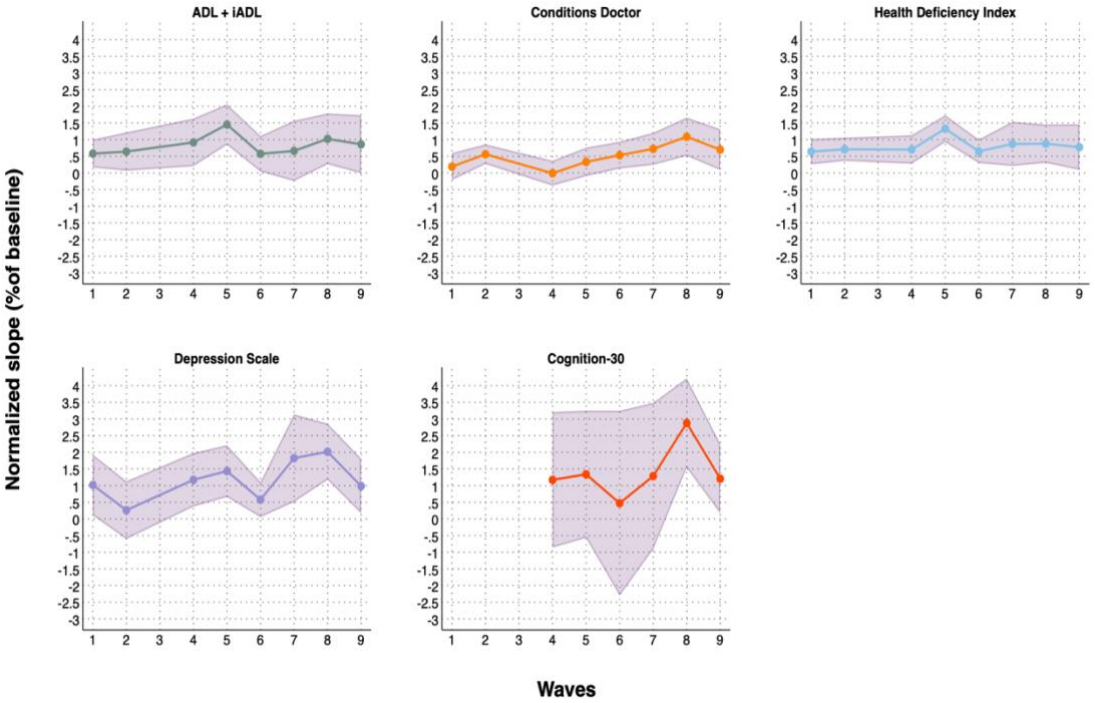


Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

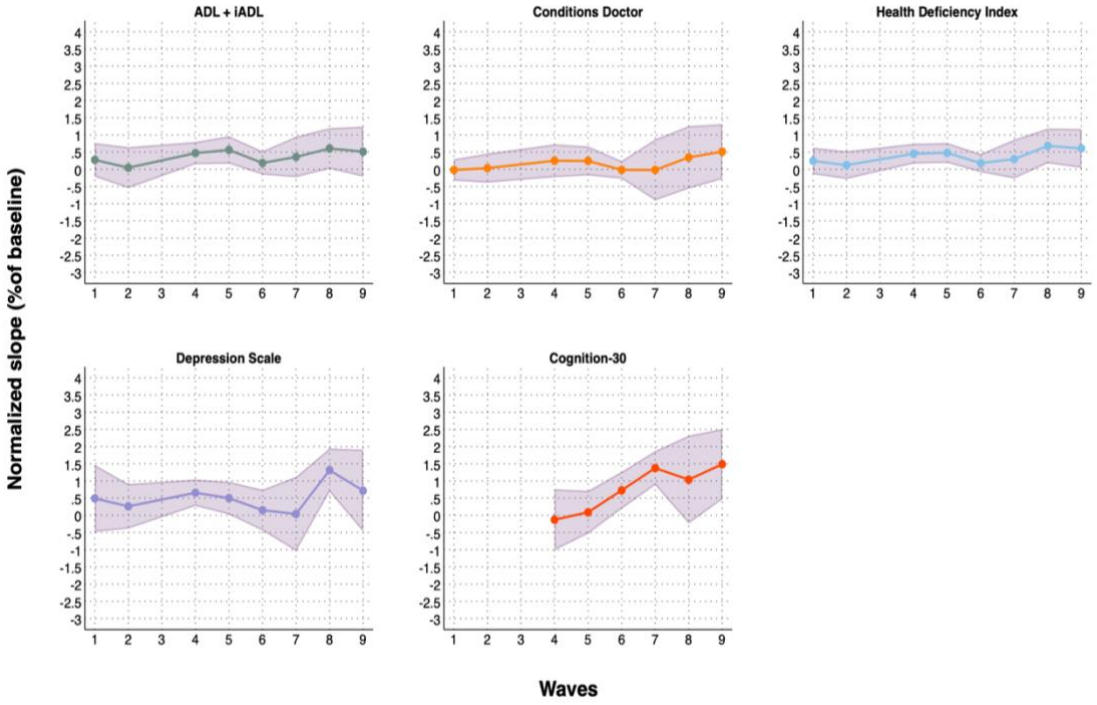
Notes: In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on income deciles and call this the *health gradient*.

Figure 7: Steepness of health-income gradients by wave

Panel A. Women



Panel B. Men



Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

Notes: We depict the slopes over waves, which we retrieved from a linear regression of the health status on income deciles. The slopes are normalized by dividing them by the mean of the health outcome in Wave 9.

5. Number of years needed for poorer individuals to catch up with the health of richer individuals

The previous section shows there have not been significant changes in health inequality among the older population over the past two decades in Spain. At the same time, the results show there are still substantial health inequalities by income group for all five measures. For functional health and comprehensive health, the health differences across income deciles were observed to remain relatively constant over time. Conversely, the gradient for diagnosed health appeared notably flat for both sexes. Meanwhile, the gradients for mental health (for women) and cognitive health (for both men and women) showed a tendency to become slightly steeper over time.

In this section, we compare the differences across income groups with differences between age groups to construct an intuitive metric that can be compared across the different health measures.

Panel A in Figure 8 plots the share of individuals by age in the baseline wave (Wave 1, 2004) in very good health, based on functional health. We define very good health as having a functional score in the top 34 percent of the distribution of all men and women aged 65-89 in Wave 1. The share of our population in very good functional health declines almost linearly by age, from almost 70% at age 65 to less than 20% at age 89. Panel B in Figure 8 plots trends in the share of the population with very good functional health for the second, the fifth and the ninth income decile. We see that the share of individuals with very good functional health in Wave 5 (2013) is about 10 percentage points higher for the ninth income decile (63%) compared to the fifth decile (53%). We can compare these differences between income deciles to differences between ages in Panel A. Therefore, the differences between the ninth and the fifth decile corresponds to about 3.5 years (difference between ages 72.5 and 69) longer in very good health. We refer to this metric as the *catch-up time*: the number of years that a poorer individual would need to catch up to the same level of health as a richer individual.

We repeat this exercise for the differences between the second and the fifth decile, and the second and the ninth decile for all five health measures. Figures 8 to b12 show how health declines for all measures as age increases. Similarly, and in line with evidence in the previous section, we see that the share of the population in very good health is larger

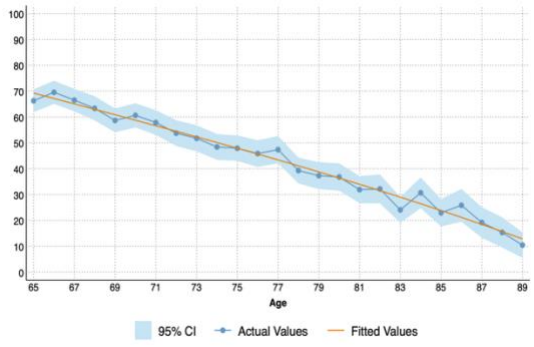
among the richer deciles, especially for mental (Figure 11) and cognitive (Figure 12) health.

Table 2 shows the estimated catch-up years for all these comparisons, the five health measures for years 2004 (Wave 1), 2011 (Wave 4), and 2021/22 (Wave 9). We report the catch-up years for two different thresholds: i) very good health, as defined above, i.e. health capacity above the top 34 percent of the distribution in wave 1; ii) "good" health, defined as health capacity larger than the top 66 percent of the distribution in wave 1. Note that cognitive health is not available for the first wave in 2004.

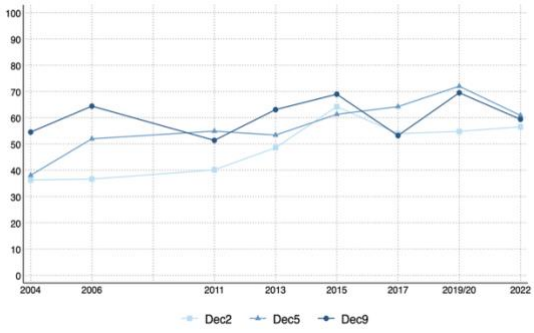
As expected, most of these differences are positive, and some are strikingly large. In 2004, start of the observation period, the number of catch-up years for the second and fifth deciles compared to the ninth decile is larger than six years, except for the measure based on diagnosed health. These differences reduce when we focus on good health, except for mental health. The evolution over time of the catch-up years is not the same for all measures. Table 3 shows the change between 2004 and 2021/22. First, note that the sign is, in general, the same for the "very good health" and "good health" measures. Second, we tend to see a decrease in the number of catch-up years for all measures between the second and the ninth decile, and the fifth and ninth decile. On the contrary, the number of catch-up years seems to increase between the second and the fifth decile. This suggests that middle incomes have benefited from the largest gains in health over time.

Figure 8: Share in very good Functional health

Panel A. Share with very good health by age in wave 1



Panel B. Share with very good health by income and year



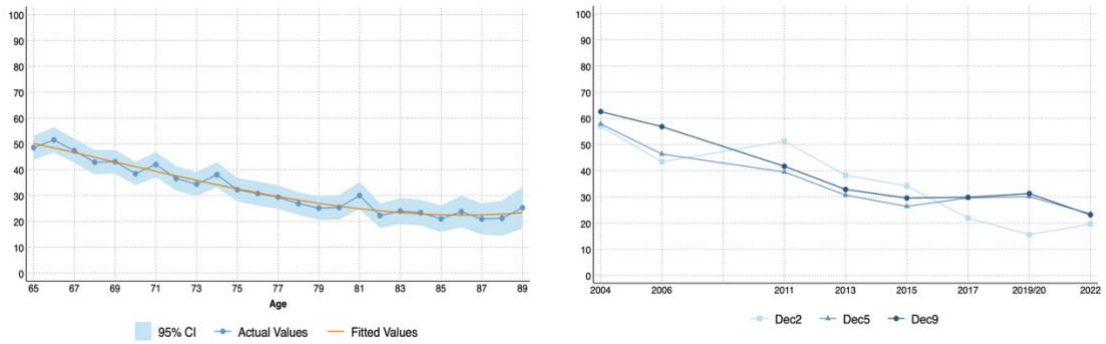
Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

Notes: The left panel shows the share of individuals in very good health (defined as the top 34% of the distribution) in 2004, by age. The right panel shows the share of respondents who are in very good health by three income groups over the years.

Figure 9: Share in very good Diagnosed health

Panel A. Share with very good health by age in wave 1

Panel B. Share with very good health by income and year



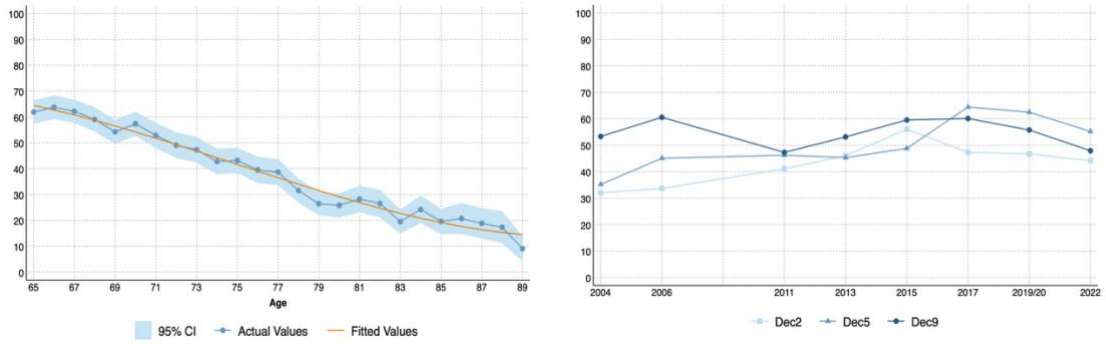
Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

Notes: The left panel shows the share of individuals in very good health (defined as the top 34% of the distribution) in 2004, by age. The right panel shows the share of respondents who are in very good health by three income groups over the years.

Figure 10: Share in very good Comprehensive health

Panel A. Share with very good health by age in wave 1

Panel B. Share with very good health by income and year

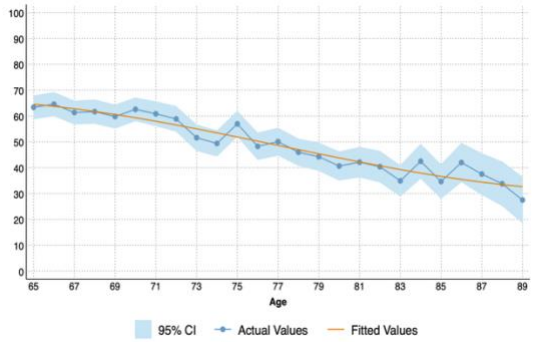


Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

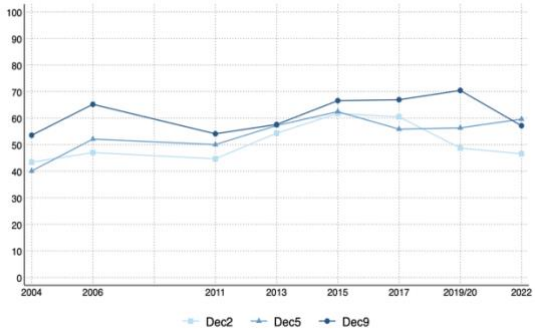
Notes: The left panel shows the share of individuals in very good health (defined as the top 34% of the distribution) in 2004, by age. The right panel shows the share of respondents who are in very good health by three income groups over the years.

Figure 11: Share in very good Mental health

Panel A. Share with very good health by age in wave 1



Panel B. Share with very good health by income and year

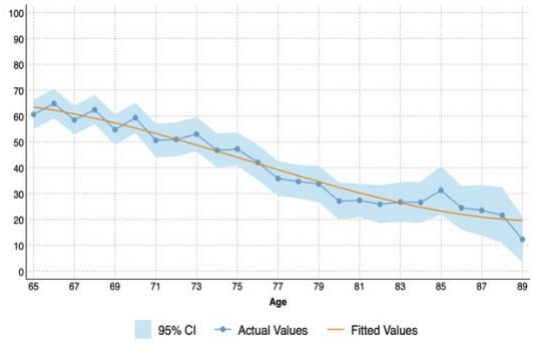


Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

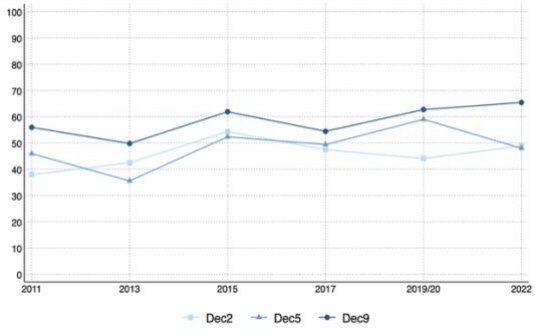
Notes: The left panel shows the share of individuals in very good health (defined as the top 34% of the distribution) in 2004, by age. The right panel shows the share of respondents who are in very good health by three income groups over the years.

Figure 12: Share in very good Cognitive health

Panel A. Share with very good health by age in wave 4



Panel B. Share with very good health by income and year



Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

Notes: The left panel shows the share of individuals in very good health (defined as the top 34% of the distribution) in 2011, by age. The right panel shows the share of respondents who are in very good health by three income groups over the years.

Table 2: Catch-up years

a) % in very good health (>66 percentile in Wave 1)

	2004			2011			2021/22		
	2nd to 5th	2nd to 9th	5th to 9th	2nd to 5th	2nd to 9th	5th to 9th	2nd to 5th	2nd to 9th	5th to 9th
Functional health	0,8	8,1	7,3	6,6	5,0	-1,6	2,0	1,3	-0,7
Diagnosed health	0,0	0,0	0,0	-5,9	-4,7	1,2	0,0	0,0	0,0
Comprehensive health	1,3	8,4	7,2	2,0	2,4	0,4	4,5	1,5	-3,0
Mental Health	-2,2	6,3	8,5	3,3	5,8	2,5	8,5	6,7	-1,8
Cognitive health	-	-	-	3,4	7,9	4,5	-0,4	7,9	8,3

b) % in good health (>34 percentile in Wave 1)

	2004			2011			2021/22		
	2nd to 5th	2nd to 9th	5th to 9th	2nd to 5th	2nd to 9th	5th to 9th	2nd to 5th	2nd to 9th	5th to 9th
Functional health	-0,4	4,9	5,3	7,6	5,6	-2,0	3,5	-2,0	-5,4
Diagnosed health	0,0	0,0	0,0	-1,8	-0,8	1,0	0,0	14,8	14,8
Comprehensive health	-2,8	3,2	6,0	3,7	4,3	0,6	8,3	5,9	-2,4
Mental Health	-12,9	10,3	23,2	13,0	7,4	-5,5	-2,0	5,1	7,1
Cognitive health	-	-	-	4,2	5,7	1,5	-0,2	8,9	9,0

Source: Own calculations, based on SHARE release 9.0.0. Weights applied.

Notes: This table displays the catch-up years for the second, fifth-, and ninth-income deciles in 2004, 2011, and 2021/22, respectively. It can be read as follows: For respondents in 2004, the difference in functional health between the second and the fifth income deciles would amount to 0,8 years of aging. For cognitive health, we have information on the health status only from 2011 onward.

Table 3: Change in catch-up years from 2004 to 2021/22

	Very good health			Good health		
	2nd to 5th	2nd to 9th	5th to 9th	2nd to 5th	2nd to 9th	5th to 9th
Functional health	1,3	-6,7	-8,0	3,8	-6,9	-10,7
Diagnosed health	0,0	0,0	0,0	0,0	14,8	14,8
Comprehensive health	3,2	-6,9	-10,1	11,1	2,7	-8,4
Mental Health	10,7	0,4	-10,3	10,9	-5,2	-16,1
Average	3,8	-3,3	-7,1	6,5	1,4	-5,1

Source: Own calculations, based on SHARE release 9.0.0. Weights applied. Notes: This table summarizes how catch-up years changed between 2004 and 2021/22 for very good health (being in the top 34% distribution relative to the Wave 1 distribution) and good health (being in the top 67% distribution). Cognitive health is missing in this table as it can be measured only from 2011onward.

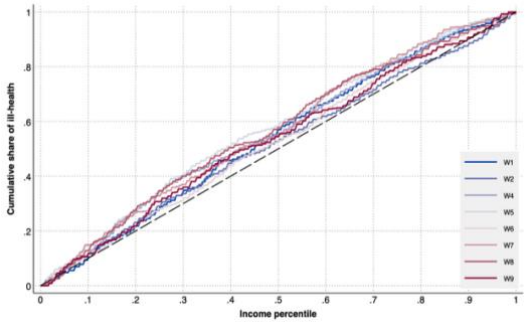
6. Concentration indices

A common tool to visualize income related health inequality is the concentration curve, a variant of the Lorenz curve. It plots the cumulative share of the population ranked by income (x-axis) against the cumulative share of the health variable (y-axis). It shows how health is distributed across all income levels. In this section, we redefine health as bad health, defined as being in the bottom 25% of the health distribution in a wave. The concentration curves in Figure 13 plot the cumulative share of individuals in bad health against the income percentile for all waves. In a scenario with no health inequalities, the cumulative distribution of health would fall on the 45-degree line. As bad health is more concentrated among the poorest individuals, we see that the concentration curves are always to the left of the 45-degree line. The further away from the 45-degree line, the

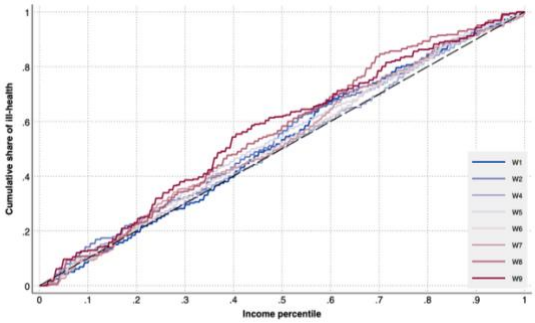
larger the income-related health inequalities. A visual inspection of the curves yields no discernible changes between waves for functional health and comprehensive health. For diagnosed health, the patterns suggest an increase across all waves, as well as between Waves 1 and 8 for mental and cognitive health, followed by a decrease in Wave 9.

Figure 13: Concentration curves

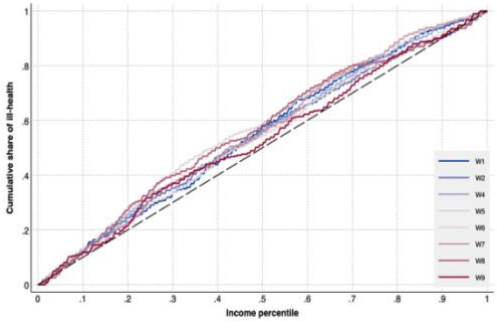
Panel A. Functional health



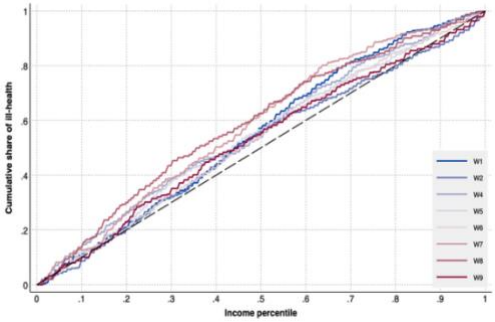
Panel B. Diagnosed health



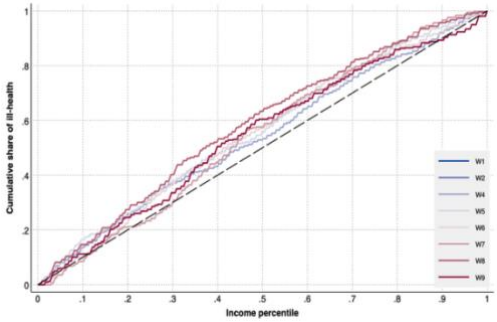
Panel C. Comprehensive health



Panel D. Mental health



Panel E. Cognitive health



Source: Own calculations, based on SHARE release 9.0.0. Weights applied. Notes: These graphs show the concentration curves, which plot the cumulative share of individuals with bad health against the percentiles of income. No inequality is represented by the 45-degree line. The further the concentration curve is to the left of the 45-degree line, the more inequality is present.

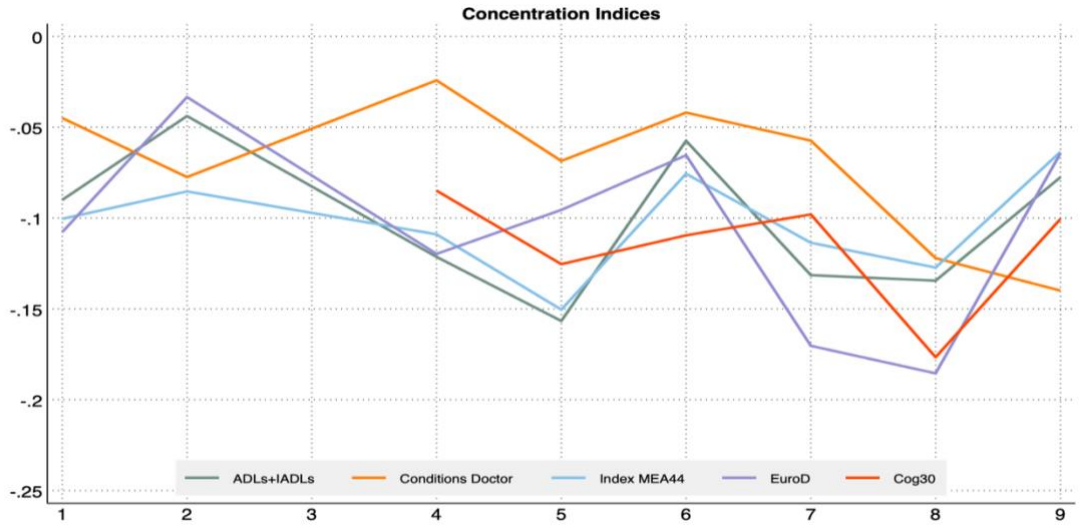
To summarize income-related health inequalities in a single measure, we use the concentration index (CI). Like the Gini coefficient, the *CI* summarizes the degree and direction of income-related health inequality. It is defined as

$$CI = \frac{1}{n}\sum_{i=1}^{n}\frac{h_i}{\bar{h}}(2R_i - 1)$$

where h_i is the health status of individual i and R_i the income percentile of individual i. A negative CI corresponds to a situation where bad health is disproportionally distributed at the bottom of the income distribution. The absence of health inequalities corresponds to a CI equal to zero. The further the CI from 0, the larger the observed health inequalities.

We plot the trends in the CI for all five measures in Figure 13. displays the development of the concentration indices from wave to wave for the five health measures. We find that the CI is negative (at least -0.05) for all health measures. At the same time, we see only minor changes over time and not necessarily hint at reduced health inequalities. In this respect, only the CI for diagnosed health (calculated from the number of conditions told by a doctor) seems to meaningfully change over time, and especially in the later years, from -0.05 in waves 1-7, followed by a large drop to almost -0.15 in Wave 9, suggesting a relatively large increase in health inequality. The CI for cognitive and mental health show a worsening in health inequalities until Wave 8, but end at similar levels in Wave 9. Last, trends in the CI for functional and comprehensive health suggest that income-related health inequalities for these two measures have remained unchanged.

Figure 13: Concentration indices for five health variables over waves



Source: Own calculations, based on SHARE release 9.0.0. Weights applied. Notes: This graph shows the concentration indices over years by health outcome. Lower values indicate more inequality.

7. Conclusions

This study aimed to investigate to what extent income-related health inequalities have changed over time among the older Spanish population, and whether these changes could be related to any of the policy reform over the same period. We measure (trends in) income-related health inequalities for five different health measures following three different approaches. First, we compute the income-health gradient from the slope of a linear regression model of health as a function of income deciles. Second, we estimate the "catch-up time," representing the number of years that individuals in lower income deciles would need to achieve the same health capacity level as those in richer deciles. Third, we plot concentration curves and compute concentration indices.

The main conclusions from our analysis are consistent across the different methods. We do not find any clear evidence indicating either an increase or a decrease in income-related health inequality among retired Spaniards between 2004 and 2022, across five different dimensions of health capacity capturing very different components of health. This observed stability is contextualized within Spain's **Beveridge-style universal healthcare system**, which is tax-funded and provides access to medical services regardless of income or employment status. This system may act as a **potential buffer** against widening health disparities across income groups. In addition, reforms in different

systems may have potentially pushed health inequalities in different directions. For example, a more comprehensive public long-term care system is expected to benefit relatively more those in the bottom distribution, as higher incomes could afford private long-term care. This can have potentially positive health effects on the health of those in need of health care, but also their relatives providing informal care. This setting could compensate for the uneven distribution of social security wealth from the past pension reforms, as measured by Belles-Obrero et al (2024).

The interpretation of the results is subject to two main caveats. First, the data is noisy, exhibiting irregular patterns and frequent fluctuations in the inequality measures. Second, the sample size (approximately 3,350 individuals) is insufficiently large to allow for further stratification by education or employment history. This limitation suggests that the analysis might be masking specific heterogeneities, potentially obscuring the true impact of institutional reforms, such as pension changes, on particularly vulnerable segments of the retired population.

References

Abeliansky, A. L., & Strulik, H. (2019). Long-run improvements in human health: Steady but unequal. *The Journal of the Economics of Ageing*, 14, 100189. https://doi.org/10.1016/j.jeoa.2019.01.003.

Börsch-Supan, A., Ferrari, I., & Salerno, L. (2021). Long-run health trends in Europe. *The Journal of the Economics of Ageing*, 18, 100303. https://doi.org/10.1016/j.jeoa.2020.100303.

Bellés-Obrero, C., Rice, C., & Vall Castelló, J. (2024). *Hit where it hurts: Healthcare access and intimate partner violence* (IEB Working Paper No. 2024/6). Institut d'Economia de Barcelona.

Cristina Bellés-Obrero & Manuel Flores & Pilar García-Gómez & Sergi Jiménez-Martín & Judit Vall-Castelló, 2024. "**Social Security Reforms and Inequality among Older Workers in Spain**," Studies on the Spanish Economy eee2024-33, FEDEA.

Bernal-Delgado, E., Angulo-Pueyo, E., Ridao-López, M., Urbanos-Garrido, R. M., Oliva-Moreno, J., García-Abiétar, D., & Hernández-Quevedo, C. (2024). *Spain: Health system review 2024*. *Health Systems in Transition, 26*(3), 1–187.

Bernal-Delgado, E., Angulo-Pueyo, E., Ridao-López, M., Urbanos-Garrido, R. M., Oliva-Moreno, J., García-Abiétar, D., & Hernández-Quevedo, C. (2024). *Spain: Health system review*. European Observatory on Health Systems and Policies. https://eurohealthobservatory.who.int/publications/i/spain-health-system-review-2024

Costa-Font, J., S. Jimenez-Martin, Juan Oliva, C. Vilaplana and A. Viola (2025). *Long Term Care and Cognitive Impairment in Spain*. (Studies on the Spanish Economy eee2025–03). Fedea.

Costa-Font, J., Jiménez-Martin, S., Prieto, C. V., & Viola, A. (2022). *Long-term care in Spain* (Studies on the Spanish Economy eee2022–23). FEDEA.

Crimmins, E. M., Kim, J. K., Langa, K. M., & Weir, D. R. (2011). Assessment of cognition using surveys and neuropsychological assessment: the Health and Retirement Study and the Aging, Demographics, and Memory Study. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 66(suppl_1), i162-i171. https://doi.org/10.1093/geronb/gbr048

Gobierno de España. (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. https://www.boe.es/eli/es/l/2006/12/14/39

Gobierno de España. (2018). *Real Decreto-ley 7/2018, de 27 de julio, sobre el acceso universal al Sistema Nacional de Salud*. Boletín Oficial del Estado. https://www.boe.es/eli/es/rdl/2018/07/27/7

Gobierno de España. (2023). *Real Decreto-ley 2/2023, de 16 de marzo, de medidas urgentes para la ampliación de derechos de los pensionistas, la reducción de la brecha de género y el establecimiento de un nuevo marco de sostenibilidad del sistema público de pensiones*. Boletín Oficial del Estado. https://www.boe.es/eli/es/rdl/2023/03/16/2

HMD. Human Mortality Database. Max Planck Institute for Demographic Research (Germany), University of California, Berkeley (USA), and French Institute for

Demographic Studies (France). Available at www.mortality.org (data downloaded on [July 2025], DOI: 10.4054/HMD.Countries.[version code]).

Jiménez Rubio, D., & Vall Castelló, J. (2020). Limiting health-care access to undocumented immigrants: A wise option? *Health Economics, 29*(8), 878–890. https://doi.org/10.1002/hec.4112

Juanmartí, A., López Casasnovas, G., & Vall Castelló, J. (2021). The deadly effects of losing health insurance. *European Economic Review, 131*, 103626. https://doi.org/10.1016/j.euroecorev.2020.103626

Langa, K. M., Kabeto, M., & Weir, D. (2010). Report on race and cognitive impairment using HRS in 2010 Alzheimer's disease facts and figures.

Lawton, M. P., & Brody, E. M. (1969). Assessment of older people: self-maintaining and instrumental activities of daily living. *The Gerontologist*. https://doi.org/10.1093/geront/9.3_part_1.179.

López-Casasnovas, G., Costa-Font, J., & Planas-Miret, I. (2005). Diversity and regional inequalities in the Spanish 'system of health care services'. *Health Economics, 14*(S1), S221–S235. https://doi.org/10.1002/hec.938

Ministerio de Inclusión, Seguridad Social y Migraciones. (2025). *Guía laboral 2025*. https://laboralpensiones.com/guia-laboral-del-ministerio-de-trabajo-2025/

OECD. (2023). *Pensions at a glance 2023: OECD and G20 indicators*. OECD Publishing. https://doi.org/10.1787/678055dd-en

Prince, M. J., Beekman, A. T. F., Deeg, D. J. H., Fuhrur, R., Jonker, C., Kivela, S. L., ... & Copeland, J. R. M. (1999). Depression symptoms in late life assessed using the EURO-D scale: the effects of age, gender and marital status in 14 European centres. *British Journal of Psychiatry*, 174, 330-339. https://doi.org/10.1192/bjp.174.4.330.

Rodríguez Cabrero, G., & Marbán Gallego, V. (2012). Long-term care in Spain: Between family care tradition and the public recognition of social risk. In G. Ranci & C. Pavolini (Eds.), *Reforms in long-term care policies in Europe* (pp. 201–219). Springer. https://doi.org/10.1007/978-1-4614-4502-9_10

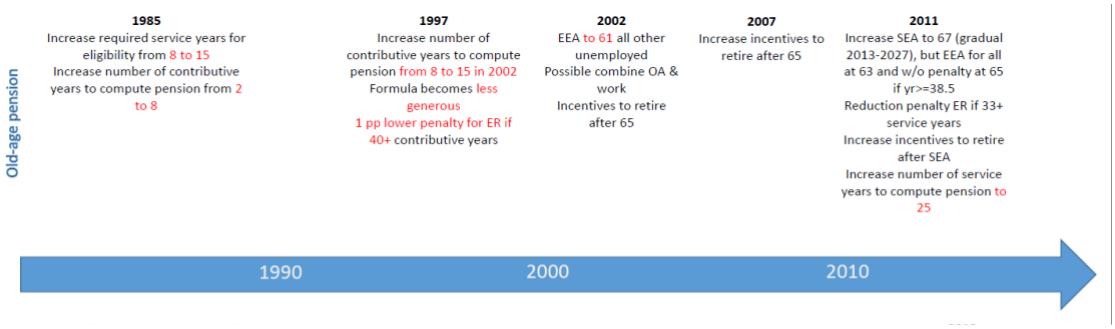
Tavares L.P and Zantomio F. (201),Inequity in healthcare use among older people after 2008: The case of southern European countries, Health Policy, 121(10), 1063-1071. https://doi.org/10.1016/j.healthpol.2017.08.011.

Vega Alonso, T., Miralles Espí, M., Mangas Reina, J. M., Castrillejo Pérez, D., Rivas Pérez, A. I., Gil Costa, M., López Maside, A., Arrieta Antón, E., Lozano Alonso, J. E., & Fragua Gil, M. (2018). Prevalence of cognitive impairment in Spain: The Gómez de Caso study in health sentinel networks. *Neurología (English Edition), 33*(8), 491–498. https://doi.org/10.1016/j.nrleng.2016.11.015

Appendix

Tables and Figures

Figure A1. Timing and main characteristics of the old-age pension reforms in the period 1985-2011

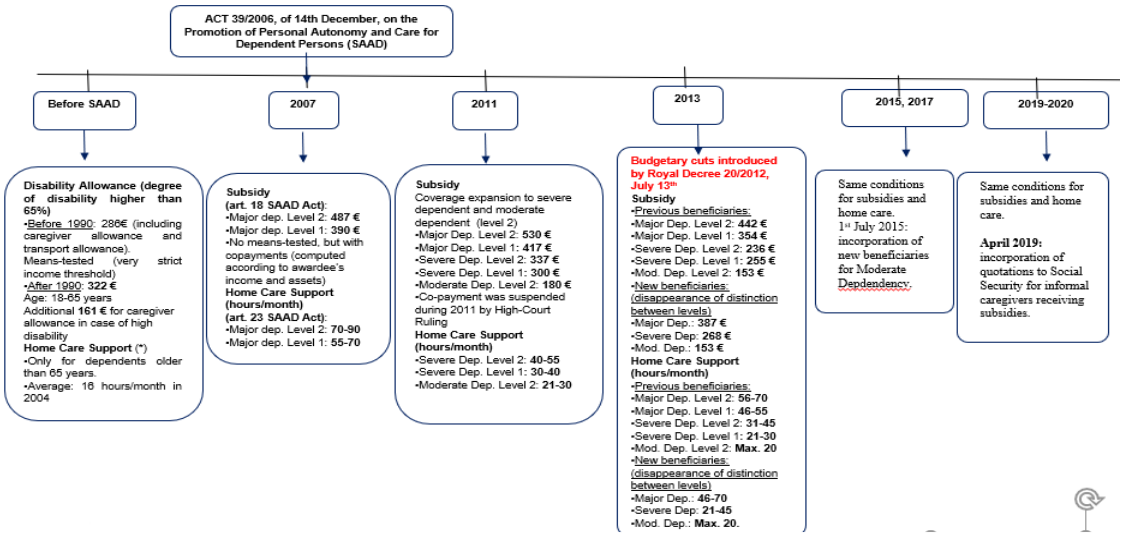


Source: Own elaboration based on Garcia-Gómez et al (2024).

Figure A2. Timing and main characteristics of the old-age pension reforms in the period 2012-2023.

Source: Own elaboration based on Garcia-Gómez et al (2024).

Figure A3. Timing and main characteristics of the LCT system reforms in the period 2006-2019.



Source: Font-Costa et al. (2022).

Table A1: List of functional health

ph048d1	Walking 100 meters	ph049d1	Dressing, including putting on shoes and socks
ph048d2	Sitting for about two hours	ph049d2	Walking across a room
ph048d3	Getting up from a chair after sitting for longer periods	ph049d3	Bathing or showering
ph048d4	Climbing several flights of stairs without resting	ph049d4	Eating, such as cutting up your food
ph048d5	Climbing one flight of stairs without resting	ph049d5	Getting in or out of bed
ph048d6	Stooping, kneeling, or crouching	ph049d6	Using the toilet, including getting up or down
ph048d7	Reaching or extending your arms above shoulder level	ph049d7	Using a map to figure out how to get around in a strange place
ph048d8	Pulling or pushing large objects like a living room chair	ph049d8	Preparing a hot meal
ph048d9	Lifting or carrying weights over 10 pounds/5 kilos, like a heavy bag of groceries	ph049d9	Shopping for groceries
ph048d10	Picking up a small coin from a table	ph049d10	Making telephone calls

Table A2: List of comprehensive health

ph006d1	A heart attack including myocardial infarction or coronary thrombosis or any other heart problem including congestive heart failure	ph006d10	Cancer or malignant tumour, including leukaemia or lymphoma, but excluding minor skin cancers
ph006d2	High blood pressure or hypertension	ph006d11	Stomach or duodenal ulcer, peptic ulcer
ph006d3	High blood cholesterol	ph006d12	Parkinson disease
ph006d4	A stroke or cerebral vascular disease	ph006d13	Cataracts
ph006d5	Diabetes or high blood sugar	ph006d14	Hip fracture or femoral fracture
ph006d6	Chronic lung disease such as chronic bronchitis or emphysema		