Trends in health inequalities among Belgian retirees

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Abstract :

This paper investigates the trend in health inequalities among Belgian retirees between 2005 and 2022. The study is motivated by the need to examine whether pension reforms during this period, which primarily involved raising the statutory eligibility age and reducing system generosity, disproportionately affected poorer individuals compared to richer ones and thereby contributed to widening health inequalities. Using data from SHARE, we assess health disparities across five distinct health measures and apply three complementary approaches to quantify socio-economic health differences. Our results provide no evidence of a significant increase in health inequalities over this period.

Keywords : Health inequalities, retirement, socio-economic status, morbidity gradient, pension reform, elderly, Belgium

JEL codes : I30, J14, J26

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1. Introduction

Over the past four decades, pension systems across Europe have undergone profound reforms in response to demographic ageing and fiscal pressures. Belgium is no exception. Since the 1980s, successive reforms have changed benefit generosity and gradually raised the statutory retirement age. These changes were designed to contain rising pension costs and to support financial sustainability of the system. Yet, they may also have unintended distributional consequences. Reductions in benefit generosity may limit retirees' ability to cover healthcare costs and invest in goods that support healthy living. At the same time, postponing retirement keeps individuals longer in occupations that can be physically demanding or otherwise detrimental to health. These mechanisms are unlikely to affect all groups equally, those with lower incomes typically being more exposed. This raises concerns of widening health disparities in older age.

A large body of literature documents strong socio-economic status (SES) gradients in health. Higher-SES individuals live longer on average (OECD/European Commission, 2020; Murtin, 2017; Eggerickx et al., 2018), experience fewer years of disability, and report better health outcomes compared to their lower-SES counterparts (Van Oyen, 2010). Lefebvre et al. (2018) point out a triple penalty for the lower SES individuals as they have shorter lives, higher risks of dependency, and longer durations in dependency. In Belgium, disparities are particularly visible for mental health (Sciensano, 2022). These inequalities emerge through multiple mechanisms. Lower-SES individuals face greater financial barriers to healthcare (Baeten et al., 2019) and a disproportionate burden of out-of-pocket costs. The main reason for self-reported unmet needs for medical examination and care is the cost of services (Baeten et al., 2019). Differences in health literacy and education may also shape behaviors and navigation of healthcare systems (Berete et al., 2024). Furthermore, individual face unequal exposure to physically demanding or stressful jobs (Christiansen and Nielsen, 2009) or cumulative disadvantages starting in childhood depending on family socio-economic circumstances (Cohen et al., 2010; Landös et al., 2019).

Pension reforms that alter financial security and working-life duration therefore intersect directly with these established health inequalities. Changes in pension systems may have important implications for health inequality in later life. Since the 1980s, Belgium has undertaken a series of pension reforms characterized by reductions in benefit generosity and gradual increases in the statutory retirement age. These reforms raise two important concerns. First, less generous benefits may constrain retirees' financial resources, potentially limiting their ability to afford healthcare or other health-enhancing goods and services. Second, later retirement

implies that many individuals spend more years exposed to demanding work environments, with likely negative consequences for health. Both mechanisms are expected to disproportionately affect individuals at the lower end of the income distribution.

The central question of this paper is therefore whether Belgian pension reforms have contributed to widening health inequalities among retirees. To address this, we use data from the Survey of Health, Ageing and Retirement in Europe (SHARE) covering the period 2005–2022. We examine five complementary measures of health outcomes and apply three distinct approaches to measuring health inequality, namely the evolution of the morbidity gradient, the concentration index and the difference in Health-Equivalent Age. This paper thus contributes to the understanding of how pension systems intersect with health disparities in the older populations. Our findings do not support the concern that pension reforms exacerbated disparities, as we find no systematic pattern or statistically significant evidence of increasing health inequality over this period.

The structure of the paper is as follows. Section 2 presents the current Belgian old-age pension system and introduces the Belgian pension reforms implemented over the past two decades, highlighting their potential role in shaping health inequality. Section 3 presents the data and the sample used for the analysis. In Section 4, 5 and 6 we present the results of our three different approaches. Section 7 concludes.

2. Institutional features

2.1. The current Belgian Old-Age pension system

The Belgian old-age pension (OAP) is the main public social security system, covering private-sector employees as well as contractual staff in the public sector. It is financed primarily through employer and employee contributions, supplemented by earmarked taxes and transfers from the federal budget, and functions on a pay-as-you-go basis. Pension benefits are earnings-related, but the system incorporates a number of redistributive elements that make it more progressive than it appears at first sight.

In principle, a full pension requires a 45-year career for both men and women. The annual pension benefit corresponds to 60 percent of the average gross wage earned over the best 45 career years. Several mechanisms, however, modify this proportional rule. Periods spent on replacement incomes, such as unemployment, disability or career breaks, are assimilated into

the pension record and credited at the last real wage, even though no contributions are paid. In addition, in households where one spouse is financially dependent and has accumulated few pension rights, the replacement rate may be raised to 75 percent, subject to a means test. Pensionable earnings are also bounded by indexed floors and ceilings, which are periodically adjusted to account for inflation or wage growth, though in practice this indexation has been incomplete. The introduction of statutory minimum pensions, indexed to consumer prices and adjusted for career length, has further enhanced redistribution. Since minimum benefits have often increased faster than average pensions, the system has gradually taken on characteristics of a partial flat-rate scheme.

Indexation rules constitute another important feature. Both past earnings and pensions in payment are adjusted using the so-called health index, which increases more slowly than the consumer price index. As a result, pensions tend to lag behind real wage growth and provide only partial protection against inflation. To mitigate this effect, pensions in payment are generally increased by two percent every five years. Nevertheless, longer careers are penalized since past earnings are revalued less generously, while retirees experience an erosion of purchasing power over time.

Since the beginning of 2025, the statutory eligibility age (SEA) has been 66 for both sexes. However, early retirement is possible, with eligibility conditions becoming progressively restrictive. Since 2018 the minimum age has been 63 with at least 42 contributory years, although workers with exceptionally long careers may still exit as early as 60. Importantly, Belgian pensions are not actuarially reduced when claimed before the SEA. Full benefits are available once 45 years of contributions have been completed, meaning that early exit only lowers entitlements in the case of incomplete careers.

Working beyond the statutory retirement age can raise benefits, as low-earning years in the pension calculation are replaced by higher-earning ones. Since 2024, a lump-sum pension bonus has been reinstated to further incentivize employment beyond the SEA; however, it will be abolished as of 2026. Employment while drawing a pension is liberalized since 2015, allowing beneficiaries at the SEA or with a full 45-year career to combine work and retirement without restrictions.

In addition to the contributory pension schemes, Belgium provides a non-contributory safety net for older persons through the *Garantie de Revenu aux Personnes Âgées* (GRAPA). This social assistance program targets individuals at or above the SEA whose household resources fall below a legally defined threshold, assessed through a comprehensive means test covering

income, assets, and, to some extent, real estate. The threshold amounts depend on household's status[1]. Eligibility requires residence in Belgium and either Belgian citizenship or an assimilated legal status, but no career conditions are imposed.

2.2.Linking pension reforms to health inequalities

Pension reforms are often designed with financial sustainability or labor force participation in mind, but they may also have unintended consequences for social and health inequalities. Specifically, they can shape how income and wealth is distributed in old age across socio-economic groups (Klinges et al., 2024). Measures that tie pension payouts more strictly to lifetime contributions render the system less progressive, amplifying economic inequalities among the elderly. Conversely, reforms that strengthen minimum pensions and expand redistribution make the system more progressive, helping to narrow economic gaps in old age. Since economic resources are closely linked to health outcomes, this raises the possibility that pension reforms may contribute to patterns of health inequality as well.

Beyond their impact on income and wealth, pension reforms may also exert more direct effects on the elderly's health outcomes. By changing retirement ages, altering eligibility conditions or in general modifying incentives to remain in the labor force, such reforms influence the timing and intensity of people's work trajectories (Fraikin et al., 2025). Postponed retirement prolongs the exposure to physically demanding jobs and occupational strain and stress with potential negative effects on health. At the same time, continued employment can also provide social interaction, cognitive stimulation and daily routines that help maintain physical and mental well-being. This suggests that pension reforms may shape health inequalities through more immediate pathways as well.

Belgium has undergone several pension reforms since the early 2000s, with potential implications for health disparities in old age[2]. Pension reforms in Belgium can be broadly grouped into two categories. On one hand, there are those that modify the generosity of benefits through changes in replacement rates, indexation rules, or minimum pension levels. And on the other hand, we have those that restrict eligibility, primarily by raising the statutory retirement age, tightening early retirement conditions, or increasing required career lengths.

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[1] In 2023, the threshold amounts to €17,520.96 per year for individuals living alone and €11,680.68 for those cohabiting, the latter reflecting assumed economies of scale and resource sharing within households.
[2] For a detailed presentation of reforms in the last decades in Belgium, see Fraikin et al. (2021) and Fraikin et al. (2025).

One of the most significant changes concerns the statutory eligibility age (SEA). For women, the SEA was gradually raised from 60 in 1997 to 65 in 2009, in successive three-year steps, thereby aligning it with the system for men. Further increases have since been introduced for both sexes. The SEA rose to 66 in 2025 and is scheduled to reach 67 in 2030. In parallel, early retirement provisions have been progressively tightened. The minimum age for early exit, as well as the contributory career requirements, have been gradually increased, reflecting a deliberate policy shift towards later retirement and higher labor market participation among older workers.

Reforms have also reshaped the way in which non-employment periods are valued in the pension calculation. Traditionally, spells on replacement incomes such as unemployment or conventional early retirement were assimilated at the last real gross wage. Since 2007, however, a reduced salary ceiling has been applied, further lowered in 2012, thereby diminishing the generosity of credited rights and reinforcing the link between benefits and actual contributions paid. To further strengthen this benefit–contribution nexus, a pension bonus has been introduced on two occasions – once in 2007 and again in 2024 – but in both cases it was or will be subsequently abolished (in 2015 and 2026).

At the same time, policymakers have adopted measures that increased the system's progressivity. Most notably, the introduction of the GRAPA in 2001 created a non-contributory minimum income guarantee for individuals at the SEA or older with insufficient household resources. Since its inception, the GRAPA thresholds have been adjusted more generously than inflation, progressively raising the benefit floor and enhancing the redistributive function of the system.

Taken together, these reforms have simultaneously modified the incentive structure of the pension system by encouraging longer working lives and tightening the link between contributions and benefits while reinforcing its redistributive dimension through minimum income protection. Such changes are likely to have far-reaching and not clearly signed implications not only for employment trajectories at older ages but also for the distribution of health outcomes across socio-economic groups.

3. Data

We use data from the Survey of Health, Aging and Retirement in Europe (SHARE) to analyze the trends in health inequalities among Belgian retirees. It is a cross-national panel dataset that provides approximately 380,000 in-depth interviews with 140,000 people aged 50 or older from 28 European countries and Israel. Implemented every two years since 2004/2005, the questions relate to the health status (objective and subjective) of the respondents and their potential spouse, as well as to the economic and social situation of the household. Belgium participates in SHARE since the very beginning of the survey and therefore all waves are available for our analysis.

3.1. Variables of interest

Socio-economic status

To measure socio-economic status, we use the equivalized[3] disposable household income. We rely on the imputed measure of total household income provided by SHARE, which consolidates all relevant income sources. Consequently, every member of a household is assigned to the same income. This choice rests on the assumption that individual health is more strongly associated with overall disposable household resources than with personal income considered in isolation.

To mitigate potential bias arising from income changes linked to deteriorating health or retirement transitions, we classify individuals into income groups based on the first wave in which they are observed. This procedure ensures that subsequent health shocks do not affect their income classification. This measure serves as the basis to categorize the sample into income deciles and the position in the income distribution is always relative to all individuals of that wave.

Health

To monitor health inequalities over time, we look at five different measures of health. Health is a multidimensional concept that cannot be fully captured by a single measure. By analyzing multiple measures of health, we can see whether the trend in health inequalities is similar or varies significantly across different aspects of health. For each of them we define them as health

[3] The OECD-modified equivalence scale is applied. This scale assigns a weight of 1 to the household head and 0.5 to each additional adult member. We adjust for purchasing power parity.

capacities, such that a higher score reflects better health. This simplifies the graphical analysis when examining the results, making it easier to identify the trends in health inequalities across the different measures:

(a) Functional health: Our measure of functional health is derived from 20 self-reported limitations included in SHARE. These encompass mobility restrictions, limitations with activities of daily living (ADLs), and limitations in instrumental activities of daily living (IADLs). Mobility items cover tasks such as walking, sitting, climbing stairs, and other fine motor activities. ADLs capture essential self-care functions, including bathing, dressing, and eating, while IADLs reflect more complex tasks required for independent living, such as preparing a hot meal or shopping. The complete list of limitations is provided in the Appendix. We construct our health capacity indicator by subtracting the number of limitations reported by the respondent from the total of 20 items consistently available in SHARE.

(b) Diagnosed health: It is measured as the number of chronic diseases that has been diagnosed by a doctor. In SHARE, a list of eleven condition is presented and the respondents have to point out which one has been diagnosed. The complete list of conditions is provided in the Appendix. To construct a number that increases with better health, we subtract the actual number of conditions from eleven.

(c) Comprehensive health: This measure is based on the health deficit index as proposed by Börsch-Supan et al (2021) and based on Abeliansky & Strulik (2019). It summarizes the individual health status by aggregating a set of self-reported health deficits, including chronic conditions, functional limitations, and difficulties with daily activities. Each deficit is coded as present or absent, and the index is calculated as the proportion of observed deficits relative to the total number of non-missing health indicators, hence a value between 0 and 1. To construct a number that increases with better health, we subtract the index from 1.

(d) Mental health: We rely on the Euro-D scale, a standardized instrument for assessing depressive symptoms developed by Prince et al. (1999). The scale is designed to capture features of clinical depression and consists of 12 binary (yes/no) items related to mood and behavior, including sadness, pessimism, sleep problems, and loss of interest. Each affirmative response is scored as one, yielding a total between 0 and 12, where higher values denote greater depressive symptomatology. To construct a number that increases with better health, we subtract this measure from 12.

(e) Cognitive health: It is a cognition score that measures the ability of the respondent to recall words and perform mathematical operations. It is based on three cognitive function tests included in the SHARE survey: immediate word recall (from a list of ten words, it is counted how many words a respondent can recall), delayed word recall (after about five minutes, the respondent is asked again to recall these words), and the serial 7s subtraction task (subtract seven from 100, and then four times keep subtracting seven from the result). The cognition score can only be constructed from wave 4 of SHARE on. The total score ranges from 0 to 30, with higher scores indicating better cognitive functioning.

3.2.Sample

We use SHARE waves 1 to 9, excluding waves 3 that is solely dedicated to collecting retrospective information and is therefore not comparable to the other survey waves. For the purpose of our analysis, we focus on retirees aged between 60 and 79, leading to a sample composed of individuals born between 1925 and 1962[4]. We focus our attention on retirees of all kinds, regardless of whether they worked as wage earners, self-employed, or civil servants. Individuals may appear multiple times in the sample if they meet the age and retirement criteria in different years. We end up with 12,595 observations which corresponds to 5,115 distinct individuals.

Table 1 presents summary statistics of our sample. They are reported by income group, defined as follows: Group 1 comprises individuals from income deciles 1–3, Group 2 comprises deciles 4–7, and Group 3 comprises deciles 8–10. For the different health measures, the range of possible values is reported as well. A higher value indicates better health.

Table 1 : Summary Statistics

	Total	**Income Group 1**	**Income Group 2**	**Income Group 3**
Demographics				
Women (%)	47.31	48.25	47.70	46.03
Married (%)	64.36	55.40	64.91	72.91
Living alone (%)	25.91	35.96	24.68	18.65
Household size	1.84	1.79	1.84	1.89

[4] We select individuals as young as age 60 because in Belgium, an important number of individuals are retired well before the SEA. We also made all the analysis with a restricted sample of individuals aged 65 to 79 and it does not change the results. They are available upon request.

Number of children		2.03	2.08	1.94	2.09
Lower educational attainment[5] (%)		41.19	56.33	38.68	30.96
Higher educational attainment[6] (%)		33.20	18.31	34.12	45.08
Income & Wealth					
Equivalized household income (in 2022 EUR)		39044	23059	32551	60639
Equivalized household wealth (in 2022 EUR)		327507	239026	325466	406638
Health					
Functional health	[0-20]	18.15	17.73	18.17	18.50
Diagnosed health	[0-11]	9.09	8.96	9.11	9.18
Comprehensive health	[0-1]	0.86	0.83	0.86	0.87
Mental health	[0-12]	9.69	9.42	9.70	9.92
Cognitive health	[0-30]	18.89	17.96	19.03	19.46
Number of observations		12595			
Number of individuals		5115			

Source: Authors' calculations based on SHARE data.

The sample is broadly balanced by gender, with women slightly overrepresented in the lower income group. Marital status differs across income groups, as marriage is more common among higher-income respondents, while lower-income individuals are more likely to live alone and in smaller households. The average number of children shows little variation between income groups. Educational attainment varies systematically with income, with lower levels more frequent in the lower income group and higher levels more frequent in the higher income group.

For the economic variables, the equivalized household income difference between the bottom and middle-income groups is about €10,000, while the gap between the middle and upper groups is larger, at around €28,000. Wealth differences follow a similar pattern: the contrast between the bottom and middle groups is approximately €86,000, and between the middle and upper groups about €81,000. Across the five health measures, average values show a clear gradient, with better health observed among individuals in higher income groups.

[5] Lower education indicates having completed only basic schooling, such as pre-primary, primary, or lower secondary education, without progressing to upper secondary or tertiary levels.
[6] Higher educational attainment refers to individuals who have completed tertiary education.

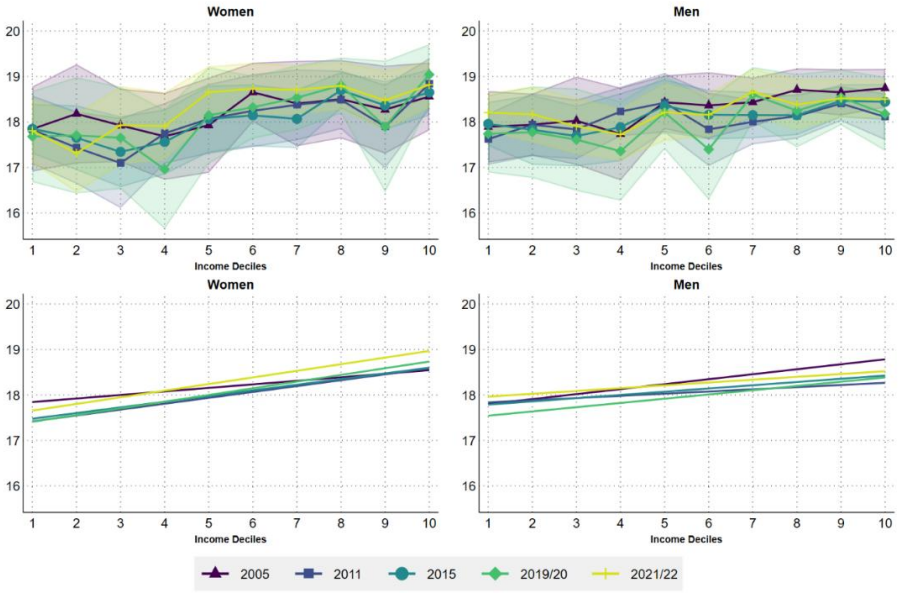
4. The morbidity gradient

In order to assess the trend in health inequalities, we first look at the morbidity gradient that shows the variation in health outcomes across different socio-economic groups. To do so we plot the mean of the five health measures by income decile, and investigate how the gradient has changed over the last 20 years.

Figures 1–5 present the evolution of the different health measures across income deciles over time[7]. For each figure, the left panel corresponds to women and the right panel to men. The upper section displays the raw data together with 95 percent confidence intervals, while the lower section reports the fitted values from a linear regression. To maintain clarity, we focus on five survey waves (Wave 1 in 2005, Wave 4 in 2011, Wave 6 in 2015, Wave 8 in 2019/20, and Wave 9 in 2021/22).

Each figure depicts the change in the health measure associated with a one-unit increase in income decile. As a reminder, for all measures, higher values indicate better health, and a steeper gradient reflects larger socio-economic disparities in health. In the case of functional health (Figure 1), the results show that, among women, health outcomes improved for individuals in higher income deciles but worsened for those in lower deciles, leading to a widening of health inequalities over time. Among men, by contrast, a modest narrowing of disparities is observed, as indicated by a flattening of the gradient.

Figure 1 : Health by income decile – Functional health

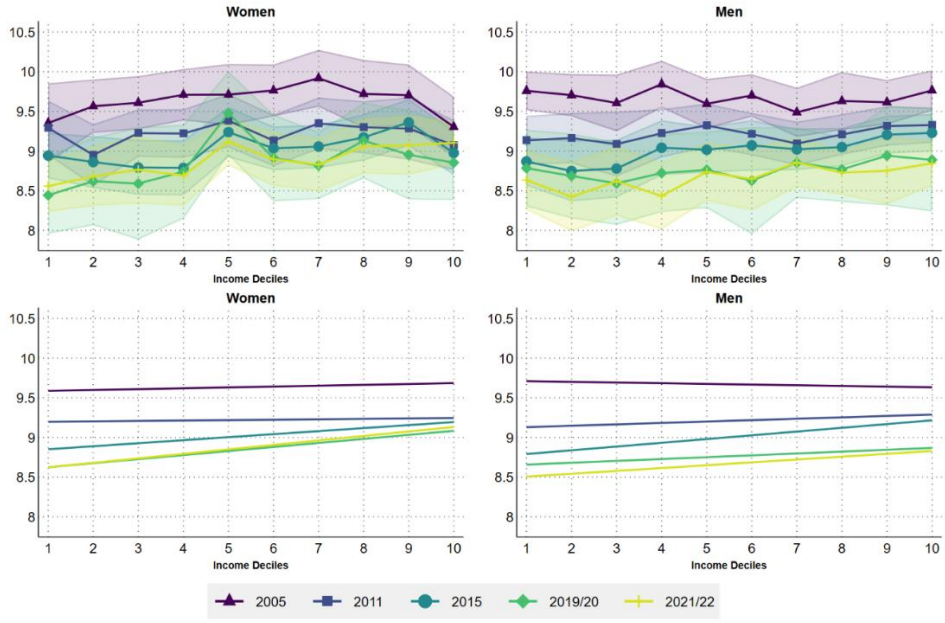


[7] To minimize potential biases arising from demographic heterogeneity across waves, the health variables are normalized, adjusting for differences in age and gender composition.

Source: Authors' calculations based on SHARE data.
Notes: In the upper panel, we plot the mean health status by income decile 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 morbidity gradient.

Diagnosed health presents a different picture in Figure 2. Overall, the gradient is a lot less steep which means that health inequalities are less pronounced in this dimension of health. Over time, health deteriorates for all income deciles but this reduction is larger for the disadvantaged group, meaning that inequalities increased. This is the case for both women and men although this evolution is more pronounced for women.

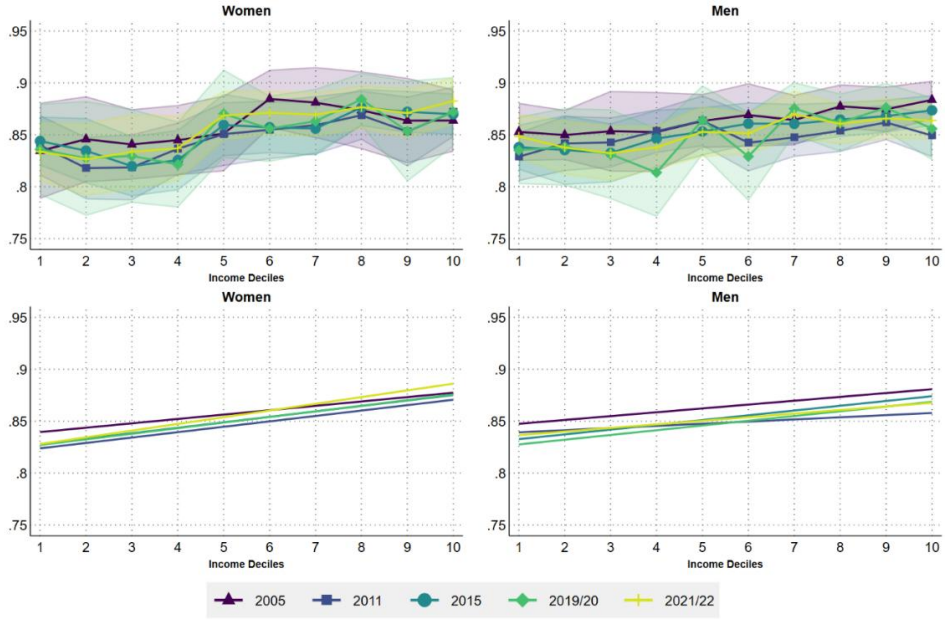
Figure 2 : Health by income decile – Diagnosed health



Source: Authors' calculations based on SHARE data.
Notes: In the upper panel, we plot the mean health status by income decile 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 morbidity gradient.

In Figure 3, comprehensive health shows a similar picture than functional health. Among women, health slightly improved for the affluent and deteriorates for the disadvantaged. Hence, health inequalities increased which can be seen by the steeper gradient. Among men, health inequalities first decreased but came back to the initial level by 2021/22.

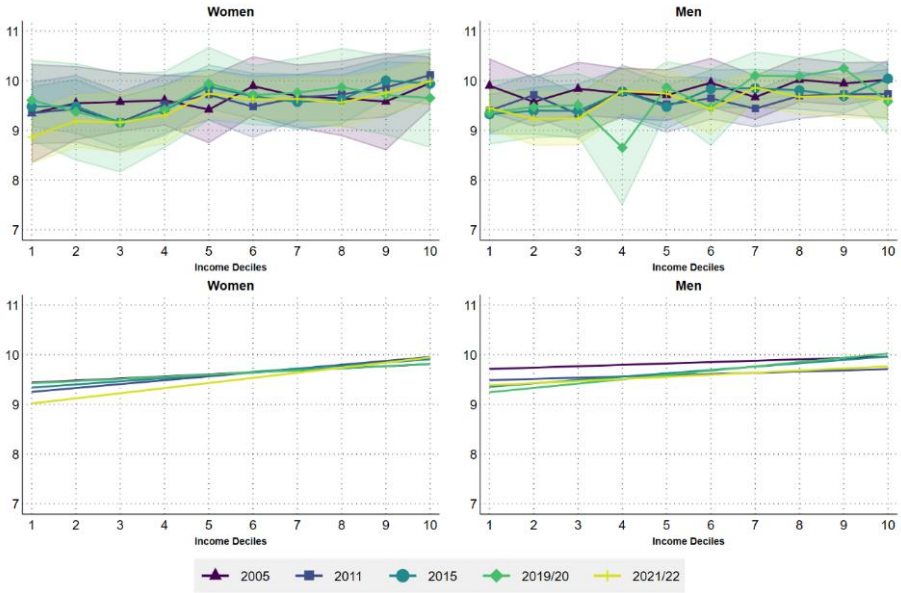
Figure 3 : Health by income decile – Comprehensive health



Source: Authors' calculations based on SHARE data.
Notes: In the upper panel, we plot the mean health status by income decile 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 morbidity gradient.

When looking at mental health, Figure 4 shows a different evolution for men and women. Among women, inequalities first decrease between 2005 and 2019/20, but decrease substantially in 2021/22. This reduction more than offsets the initial change. Among men, the opposite is true and inequalities increase until 2019/20 before going back to their initial level in 2021/22.

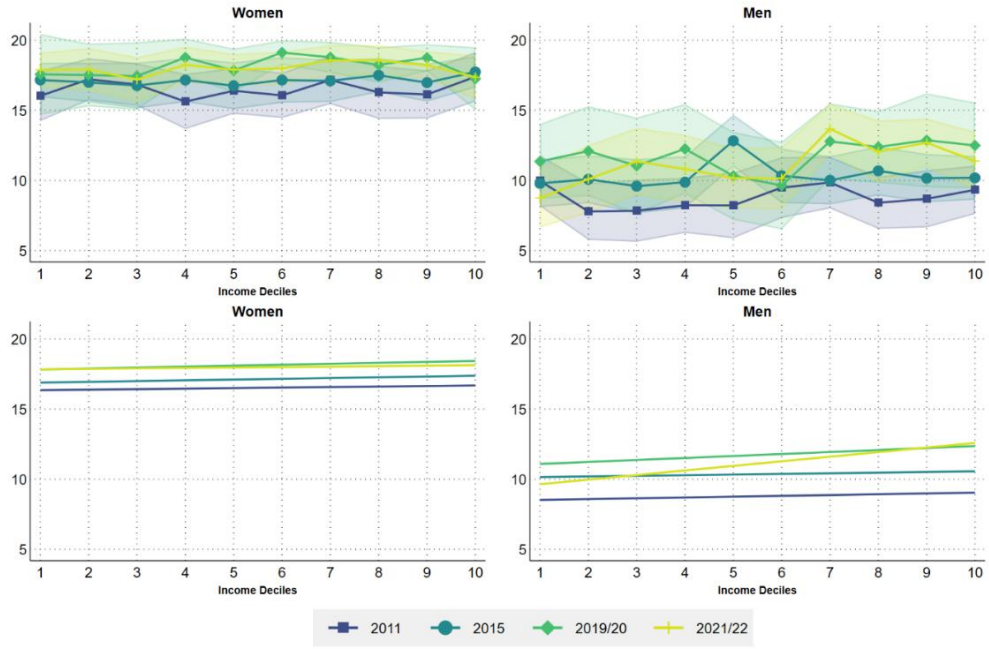
Figure 4 : Health by income decile - Mental health



Source: Authors' calculations based on SHARE data.
Notes: In the upper panel, we plot the mean health status by income decile 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 morbidity gradient.

Finally Figures 5 displays how the distribution of cognitive health by income decile has developed over time. Note that we only have consistent data from 2011 (Wave 4) onwards. Health seems to have improved over time in this dimension for both men and women. In regards to the evolution of health inequalities, this measure is an exception to the other four measures. Among women, no substantial change can be seen over time in the slope. However, for men, we see a gradual increase in the slope, speaking for an increase in inequalities.

Figure 5 : Health by income decile - Cognitive health



Source: Authors' calculations based on SHARE data.
Notes: In the upper panel, we plot the mean health status by income decile 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 morbidity gradient.

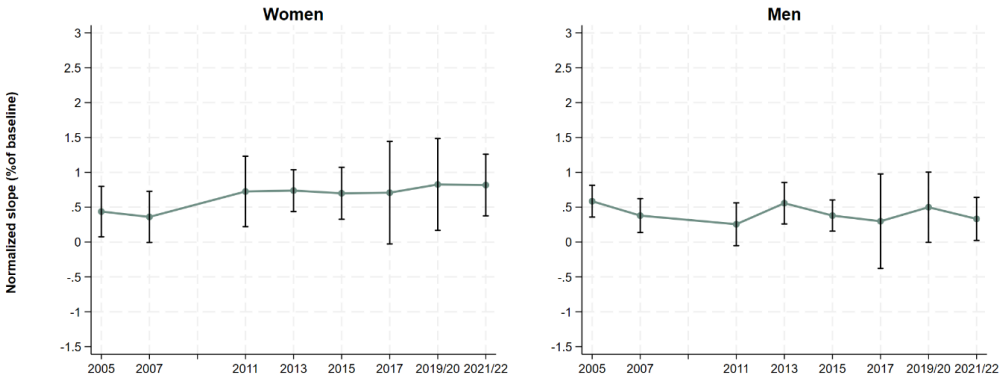
Overall, while Figure 1-5 reveal differing patterns across the various dimensions of health, a clear overall trend emerges among women. Health inequalities have generally widened over time. However, among men, the conclusions are rather ambiguous, with slight decreases, increases or no change at all in health inequalities for the different measures.

From these Figures 1-5, we take the estimated slopes for each health measures and each wave. We normalize the slopes by dividing them by the mean of the health measure in Wave 9 (the last wave of observation). This makes the income-health gradients comparable over time by ensuring that changes in the gradient reflect changes in inequality and not changes in the average level of the health outcome. By anchoring it to a fixed wave, we prevent shifts in population health from distorting the interpretation of the slope. The normalized gradient can be interpreted as the percent change in the health variable (relative to Wave 9) associated with a one unit increase in the income decile.

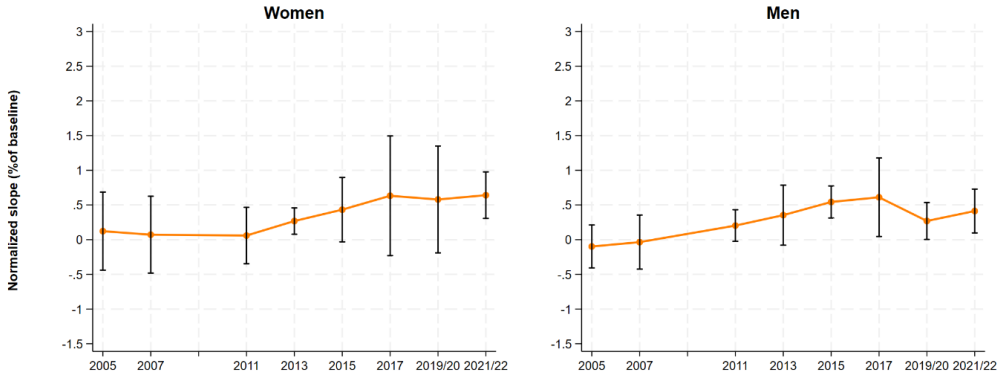
Figure 6 displays the normalized gradients and their confidence intervals over time for women and men, for each of the five health variables. It highlights the increase in the slope for women for most health measures, as observed in the previous figures. However, this increase is not significant in a sense that a flat line would still fit into the range of the 95% confidence intervals. The same applies to men. The analysis of the morbidity gradient reveals thus no significant increase of the slope over time that would indicate an increase in health inequalities, neither among women, nor among men.

Figure 6 : Normalized gradient over time

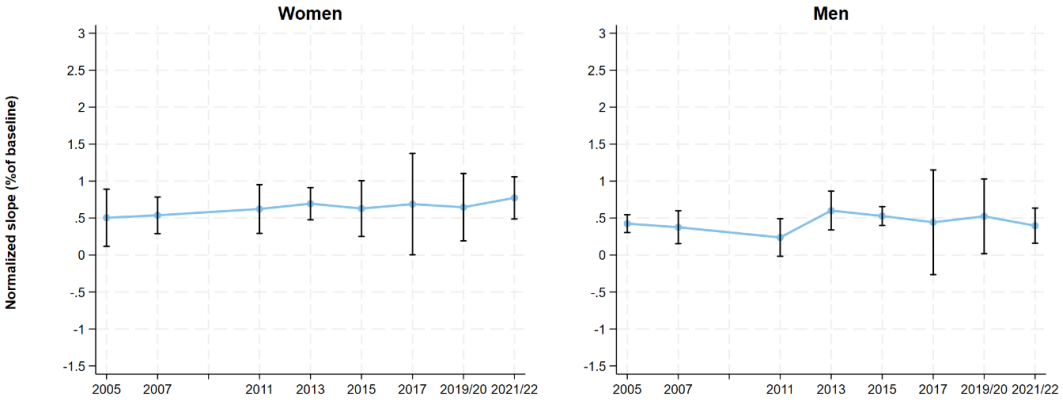
a) Functional health



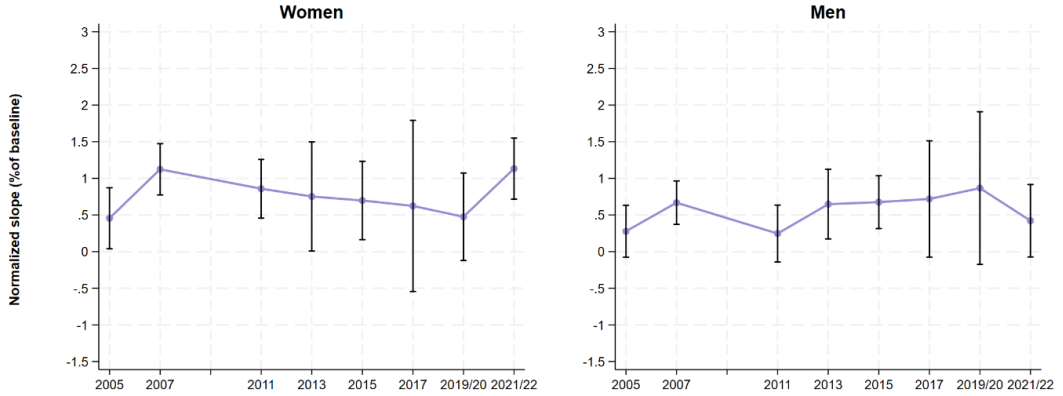
b) Diagnosed health



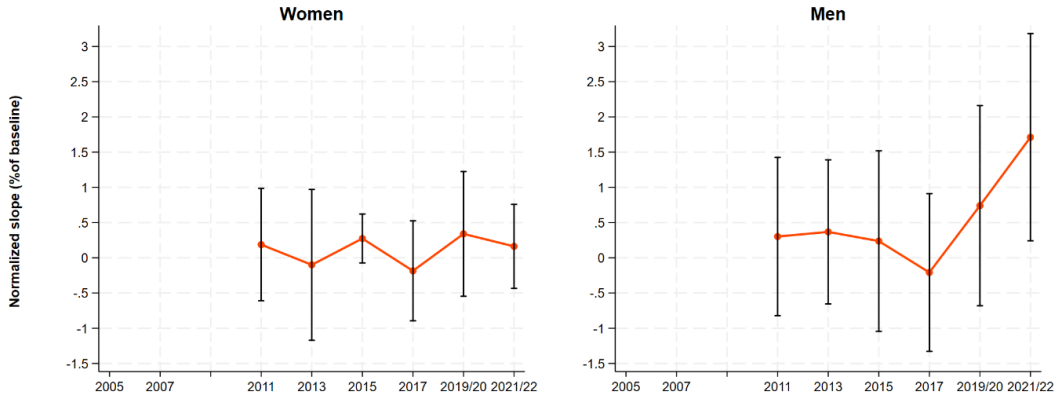
c) Comprehensive health



d) Mental health



e) Cognitive health



Source: Authors' calculations based on SHARE data.
Notes: We depict the slopes and the 95% confidence intervals over the years, which we retrieve 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 2021/22 (Wave 9).

5. Concentration indices

Another way to measure inequality is based on the concentration index. It is derived from the illness concentration curve which shows the cumulative distribution of illness across the population ranked by socioeconomic status. This reveals whether illness is disproportionally concentrated among the poor or the rich. If illness is more concentrated among the poor, the concentration curve lies above the 45° line that represents an equal distribution. If it is more concentrated among the rich, the curve lies below the 45° line. We define ill-health by being in the lowest 25% of the health distribution in a wave and rank people over percentiles of the same income variable used for the morbidity gradient.

Formally, the concentration index, *CI*, is defined as

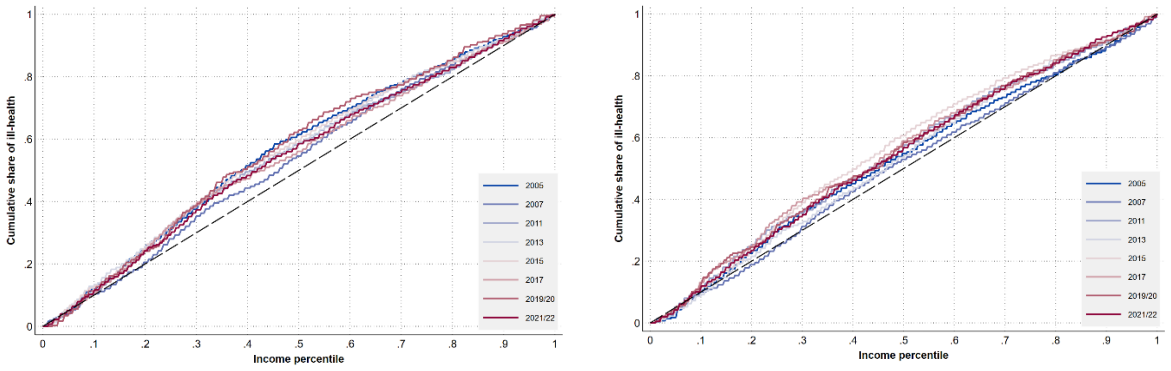
$$CI = \frac{1}{n}\sum_{i=1}^{n}\frac{h_i}{\bar{h}}(2R_i - 1)$$

where h_i and R_i are respectively the health status and the income percentile of individual i. A negative value indicates health inequalities to the detriment of the poor, whereas a positive value indicates health inequalities to the detriment of the rich.

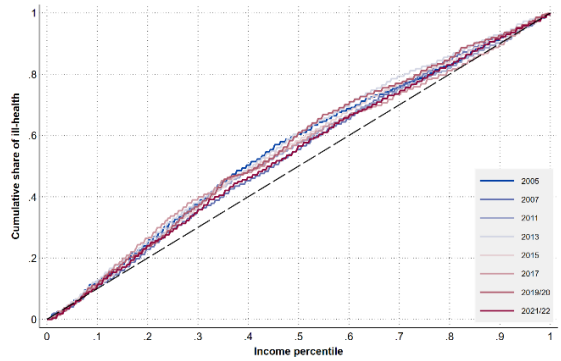
Figure 7 presents the concentration curves for each wave of the SHARE data. A movement of the concentration curve further to the left of the 45° line indicates increasing health inequality. At first sight, a comparison over years suggests no noticeable shifts for diagnosed, comprehensive, or cognitive health. In contrast, functional health and mental health display changes over time, though the trends move in opposite directions.

Figure 7: Concentration curves

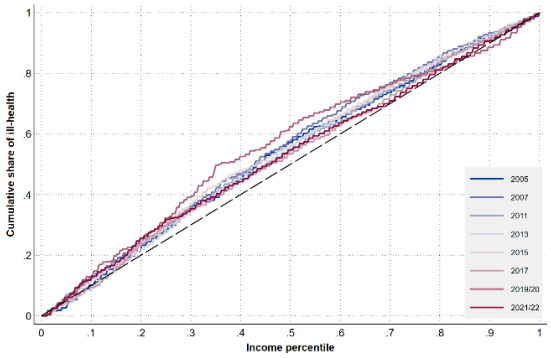
a) Functional health **b) Diagnosed health**



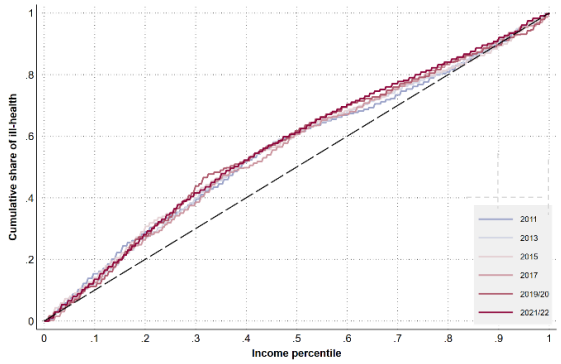
c) Comprehensive health



d) Mental health



e) Cognitive health

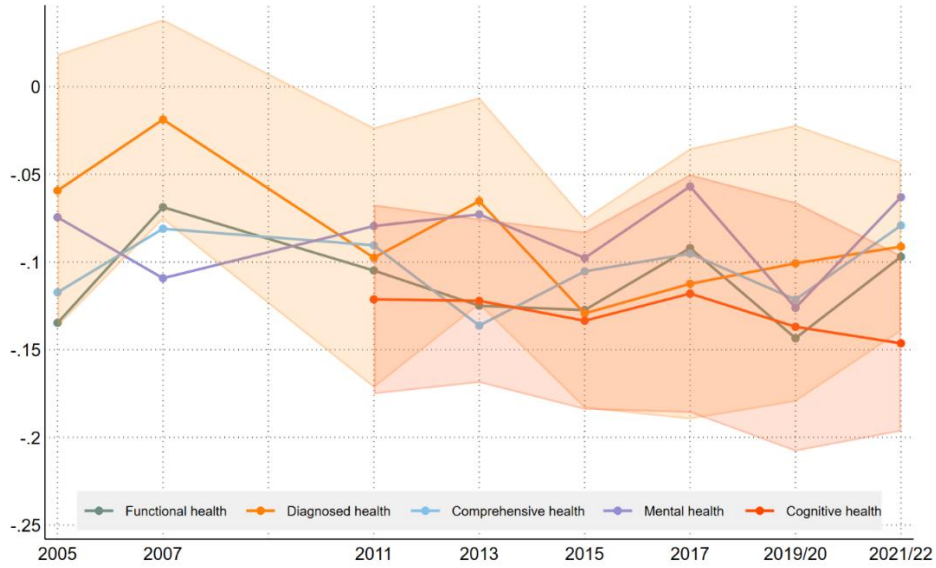


Source: Authors' calculations based on SHARE data.
Note: These graphs display concentration curves, which trace the cumulative proportion of individuals in poor health across income percentiles. The 45-degree line represents perfect equality. The further a curve lies to the left of this line, the greater the degree of inequality it indicates.

Figure 8 displays the evolution of the concentration indices over time for the five health measures[8]. An index value of zero implies perfect equality and a larger inequality to the detriment of the poor implies a more negative value of the concentration index. We see that all indices are negative which tend to confirm that bad health is more concentrated among the less advantaged. Only the concentration index based on diagnosed health and cognitive health show an increase in health inequalities. The indices decrease all along the period. However, the 95-percent confidence intervals are large, and the hypothesis that the change of diagnosed and cognitive health from 2005 to 2021/22 is flat cannot be rejected. All three other health measures are more erratic and do not show a clear trend. Therefore, the findings do not indicate a significant increase in health inequalities.

[8] A detailed table with the concentration indices and the corresponding 95% confidence intervals is presented in the Appendix.

Figure 8 : Concentration indices over time



Source: Authors' calculations based on SHARE data.
Notes : This graph shows the concentration indices over years by health outcome. Lower values indicate more inequality. We depict the 95%-confidence interval only for diagnosed and cognitive health, as those are the variables that appear to have a clear trend over time.

6. Difference in Health-Equivalent Age

Finally, we convert health inequalities into a metric that is more intuitive. The idea is to transform health inequality into differences in health-equivalent age. For this we proceed in different steps. Results are presented in Figure 9 and panel a) that is based on functional health will serve as an example.

(1) We define "very good" functional health as having a health score above the 66th percentile of the overall distribution of men and women aged 60-89 in 2005 (Wave 1). Within our sample, we then identify the individuals that are in very good functional health based on this threshold.

(2) We fit a regression model of the probability to be in very good health on age. This gives us an empirical health-age gradient that will serve as the benchmark. The predictions of this model provide us with probabilities to be in very good health for each age a between 60 and 89 : c_a. The left panel of Figure 9 shows how the share of respondents with very good health declines with age.

(3) Within each wave, we calculate the probability to be in very good health for the different deciles : $p_{d,w}$. The right panel of Figure 9 shows this over time for the 2nd, 5th and 9th decile. In general, the probability to be in very good health is larger for upper deciles.

(4) We compare the probabilities calculated in step 3 with the age specific ones in step 2 to assign a Health-Equivalent Age (*HEA*) to each decile *d* in a specific wave *w* using the following formula[9].

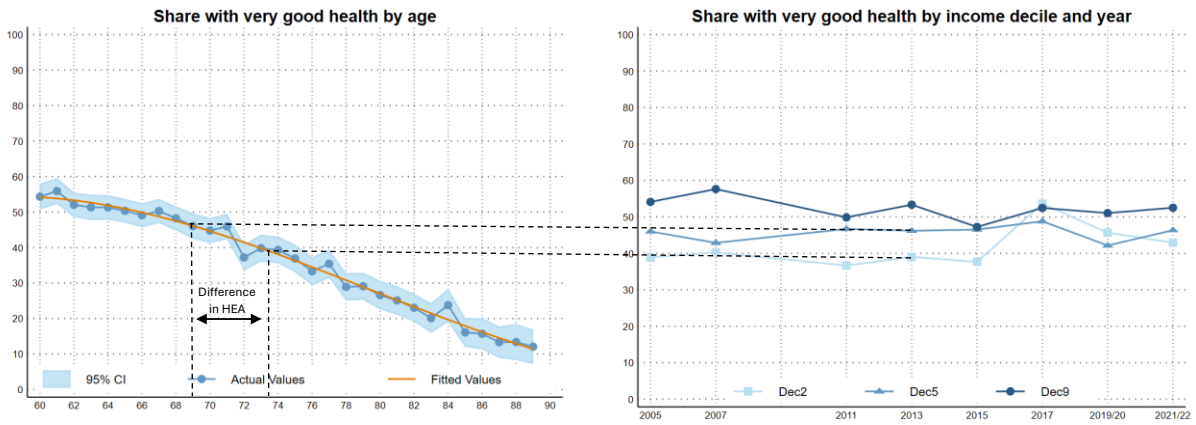
$$HEA_{d,w} = a + \frac{(p_{d,w} - c_a)}{(c_{a+1} - c_a)} if c_{a+1} < p_{d,w} < c_a$$

Put simply, the measure translates the health of a typical individual from an income decile in a specific wave into an age equivalent based on the health profile of the general population. In our example, the share of respondents in very good health in wave 5 is 0.3904 for decile 2 and 0.4619 for decile 5. This corresponds to a Health-Equivalent Age of 73.44 and 68.92 respectively, a difference of 4.52 years. Individuals in income decile 2 reach the same health status about 4.5 years earlier in life than those in decile 5.

We do the same exercise for the difference between the 2nd and 9th deciles, and between the 5th and 9th deciles. Figure 9 shows the same analysis for the four other health measures in panel b) through e).

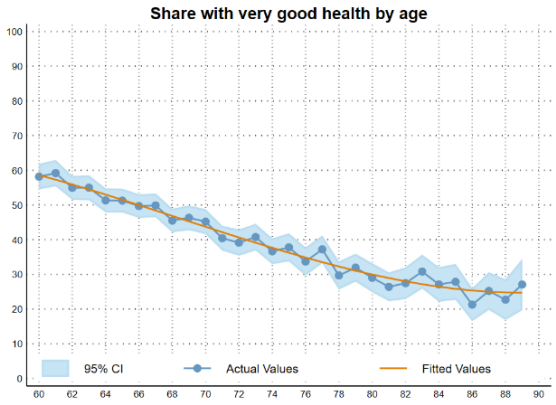
Figure 9 : Share of individuals with very good health - Functional health

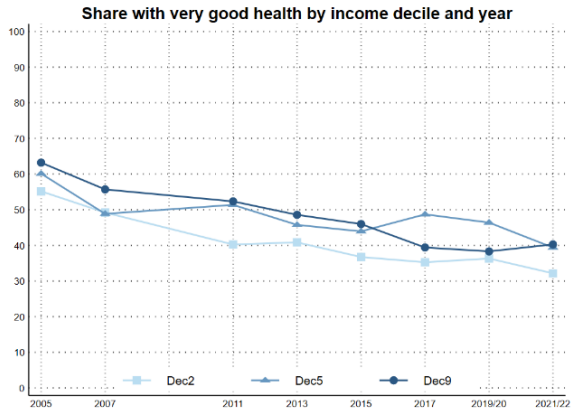
a) Functional health



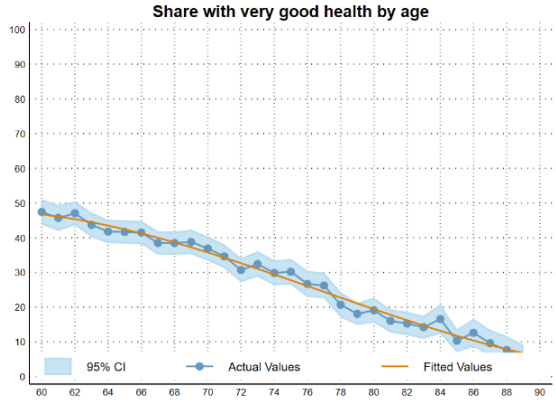
[9] Example:
The probability to be in very good health in decile 2, wave 5 : $p_{2,5} = 0.3904$
The probability to be in very good health at age 73 in the overall population : $c_{73} = 0.3981$
The probability to be in very good health at age 74 in the overall population : $c_{74} = 0.3808$
$HEA_{2,5} = 73 + (0.3904 - 0.3981) / (0.3808 - 0.3981) = 73.44$
A typical person from decile 2 in wave 5 has a health-status equivalent to a 73.44-year-old.

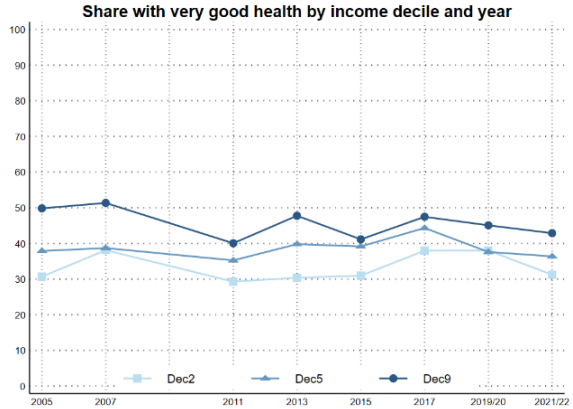
b) Diagnosed health



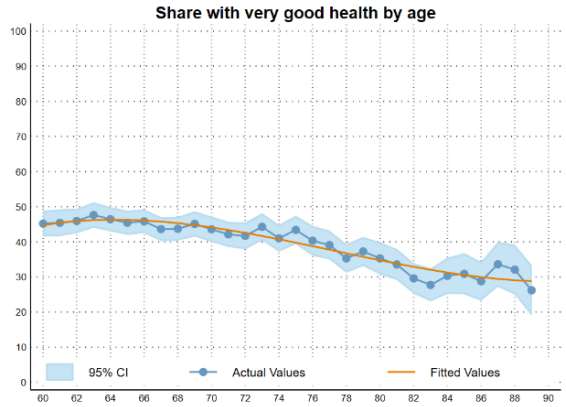


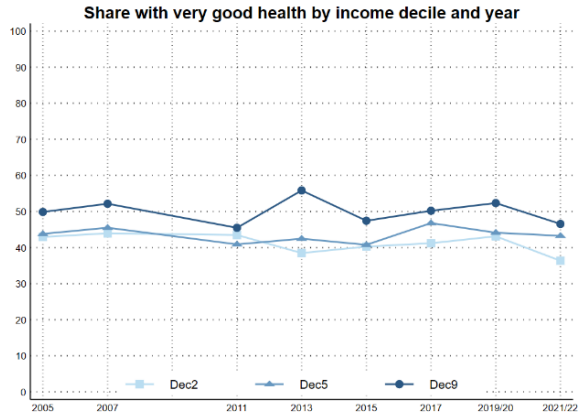
c) Comprehensive health



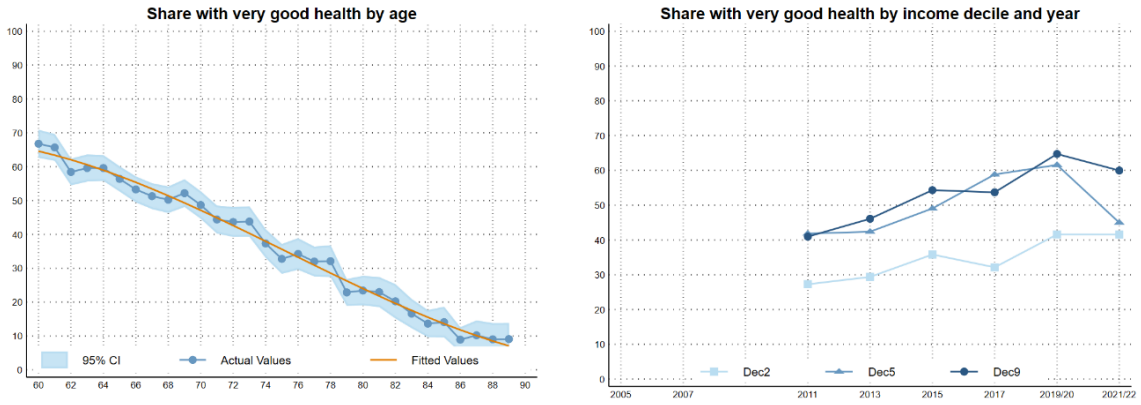


d) Mental health





e) Cognitive health



Source: Authors' calculations based on SHARE data.
Notes : The left panel shows the share of individuals in very good health by age. The right panel shows the share of respondents in very good health by decile and year.

Table 2 summarizes the findings from this analysis by presenting the differences in Health-Equivalent Age between the 2nd, 5th and 9th decile, for all five health measures. We focus on the years 2005 (Wave 1), 2013 (Wave 5) and 2021/22 (Wave 9). Moreover, in addition to "very good" health (i.e. health in the top 34 percent of the health distribution), we also display results for only "good" health as defined by the upper 67 percent of the health distribution. Keep in mind that cognitive health is not available for the first wave in 2005.

While some of the differences are remarkably large, the overall pattern of change is mixed as shown in Table 3. An upward trend in the difference in HEA is evident for diagnosed and mental health, in contrast to a downward trend for functional and comprehensive health. Hence, the results do not point to a consistent rise in health inequalities.

Table 2 : Differences in Health-Equivalent Age

	2005			2013			2021/22		
	2nd to 5th decile	2nd to 9th decile	5th to 9th decile	2nd to 5th decile	2nd to 9th decile	5th to 9th decile	2nd to 5th decile	2nd to 9th decile	5th to 9th decile
Very good health (>66th percentile)									
Functional health	4.47	13.34	8.86	4.52	11.50	6.97	2.29	7.90	5.61
Diagnosed health	2.51	2.51	0.00	3.17	4.97	1.81	5.26	5.84	0.59
Comprehensive health	4.69	13.23	8.55	6.28	13.42	7.14	3.31	8.31	5.00
Mental health	1.10	11.52	10.41	4.20	16.28	12.08	7.25	18.39	11.13
Cognitive health	-	-	-	5.55	7.19	1.64	1.49	9.08	7.59

Good health (>33rd percentile)									
Functional health	6.98	13.14	6.15	2.32	5.63	3.31	4.27	7.50	3.22
Diagnosed health	0.00	0.00	0.00	2.87	6.19	3.32	2.98	5.35	2.37
Comprehensive health	5.41	9.31	3.90	3.07	14.38	11.31	4.14	5.17	1.02
Mental health	3.13	14.79	11.65	10.55	19.10	8.55	18.66	8.41	-10.25
Cognitive health	-	-	-	2.68	6.31	3.63	5.24	12.16	6.91

Source: Authors' calculations based on SHARE data.
Notes : The table displays the difference in Health-Equivalent Age for the 2nd, 5th and 9th decile in 2005, 2013 and 2021/22. I can be read as follows : For respondents in 2005, the difference in functional health between the 2nd and 5th income deciles would amount to 2.47 years of ageing.

Table 3 : Change in differences in Health-Equivalent Age from 2005 to 2021/22

	2nd to 5th decile	2nd to 9th decile	5th to 9th decile
Very good health (>66th percentile)			
Functional health	-2.18	-5.44	-3.25
Diagnosed health	2,75	3,33	0,59
Comprehensive health	-1.38	-4.92	-3.55
Mental health	6.15	6.87	0.72
Good health (>33rd percentile)			
Functional health	-2.71	-5.64	-2.93
Diagnosed health	2.98	5.35	2.37
Comprehensive health	-1.27	-4.14	-2.88
Mental health	15.53	-6.38	-21.90

Source: Authors' calculations based on SHARE data.
Notes : This table summarizes how the difference in HEA changed between 2005 and 2021/22. Cognitive health is missing from this table as it can be measured only from 2011 onward.

7. Conclusion

The present paper provides a descriptive analysis of the evolution of socio-economic health inequalities among Belgian retirees over the past 20 years. For this, the analysis uses data from the Survey of Health, Ageing and Retirement in Europe (SHARE) and employs multiple complementary approaches : (1) the morbidity gradient, which shows the variation in health outcome across different income deciles; (2) the concentration index, which is a measure of the degree of socio-economic inequality in illness; and (3) differences in Health-Equivalent Age, a more intuitive measure of health inequalities. To provide a more holistic picture of health, five different health measures are used capturing different aspects of health.

The motivation behind this analysis is to examine whether past pension reforms – typically involving increases in the statutory eligibility age and adjustments that reduced system generosity – had a disproportionate impact on poorer individuals compared to richer ones, thereby contributing to widening health inequalities. While such concerns are well founded in theory, our findings provide little empirical support for them. The results do not reveal significant evidence of rising health inequality over the period considered.

Some caveats should be acknowledged. The analysis is purely descriptive and therefore has inherent limitations. In particular, we are unable to directly link specific pension reforms to changes in health inequalities. Furthermore, various other factors may exert an influence on health inequalities over that period as well. A more rigorous analytical approach will be needed in future work to disentangle the underlying mechanisms and to identify which design features of the pension system most strongly influence health outcomes. Such evidence would enable policymakers to better anticipate and mitigate unintended negative effects on vulnerable groups, and to align social and health programs more effectively with pension policy.

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Appendix

Table A1 : Functional health – list of variables used

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

Source: SHARE.

Table A2 : Diagnosed health – list of variables used

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		

Source: SHARE.

Table A3 : Concentration indices

		Functional health	Diagnosed health	Comprehensive health	Mental health	Cognitive health
2005	Conc. Index	-0.13	-0.06	-0.12	-0.07	-
	95% CI	[-0.19 , -0.08]	[-0.14 , 0.02]	[-0.17 , -0.06]	[-0.13 , -0.02]	-
2007	Conc. Index	-0.07	-0.02	-0.08	-0.11	-
	95% CI	[-0.12 , -0.01]	[-0.08 , 0.04]	[-0.14 , -0.02]	[-0.17 , -0.05]	-
2011	Conc. Index	-0.10	-0.10	-0.09	-0.08	-0.12
	95% CI	[-0.16 , -0.05]	[-0.17 , -0.02]	[-0.14 , -0.05]	[-0.14 , -0.02]	[-0.18 , -0.07]
2013	Conc. Index	-0.12	-0.07	-0.14	-0.07	-0.12
	95% CI	[-0.17 , -0.08]	[-0.12 , -0.01]	[-0.18 , -0.09]	[-0.11 , -0.03]	[-0.17 , -0.08]
2015	Conc. Index	-0.13	-0.13	-0.11	-0.10	-0.13
	95% CI	[-0.18 , -0.08]	[-0.18 , -0.08]	[-0.14 , -0.07]	[-0.15 , -0.05]	[-0.18 , -0.08]
2017	Conc. Index	-0.09	-0.11	-0.10	-0.06	-0.12
	95% CI	[-0.16 , -0.03]	[-0.19 , -0.04]	[-0.16 , -0.03]	[-0.12 , 0.01]	[-0.19 , -0.05]
2019/20	Conc. Index	-0.14	-0.10	-0.12	-0.13	-0.14
	95% CI	[-0.22 , -0.07]	[-0.18 , -0.02]	[-0.18 , -0.06]	[-0.21 , -0.04]	[-0.21 , -0.07]
2021/22	Conc. Index	-0.10	-0.09	-0.08	-0.06	-0.15
	95% CI	[-0.14 , -0.06]	[-0.14 , -0.04]	[-0.12 , -0.04]	[-0.12 , -0.01]	[-0.20 , -0.10]

Source: Authors' calculations based on SHARE data.
Notes : This table lists the concentration indices and the 95%-confidence intervals for the five health measures over years. Cognitive health is only available from 2011 (Wave 4) onward. Lower values indicate more inequality.