The Effects of Pension Reforms on Health Inequality in Italy

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Abstract
Using data from the Survey on Health, Ageing and Retirement in Europe (SHARE), we explore whether the recent pension reforms enacted in Italy had an impact on the inequality in health among individuals. We construct a set of indexes measuring several health outcomes (both physical and mental) and analyze their evolution along time (across SHARE waves) from 2004 to 2022, by relating them to the households' income. While we can observe some differences in the health-income gradient between genders, we do not find evidence of a positive relationship between the introduction of the pension reforms and an increase in inequality.

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1. Introduction

In Italy, a number of pension reforms were implemented over the past three decades, all of which decreased benefit generosity and increased the retirement age. Decreasing benefit generosity may induce reductions in spending on food and healthcare, and later retirement ages may cause a longer time in arduous, unpleasant or mentally exhausting jobs. These negative effects should be most important for older individuals in the lowest income and wealth brackets. Hence, the main question we address in this paper is whether these reforms increased health inequality for Italian retirees.

The pension reforms were a response to population ageing and its likely effects on the sustainability of the public pension system, an issue that became particularly high on the political agenda because of the very high government debt, the generous pension system in place until the mid-1990s and the large and increasing number of retirees.

The demographic trend of substantial population ageing that has characterized Italy over the last decades is due to two main causes: an important increase in the life expectancy coupled with a dramatic fall in the fertility rates. As Figure 1 documents, the distribution of the age at death changed along time: while in 1991/93 most deaths occurred at ages between 70-90 for women and 60-88 for men, in 2021/22 they were postponed to ages between 75-97 and 70-95 for females and males respectively.

Figure 1. Distribution of age at death, across time by gender

Source: Authors' elaborations on HMD data.
Note: We show the distributions based on 3 years moving averages.

In terms of healthcare, the Italian National Health Service (Servizio Sanitario Nazionale SSN) has been in place since 1978 and is currently made up of twenty different, regional-based systems. It is organized on three levels: a national level through the Ministry of Health, at the regional level with the Regional Governments, and at the local level, through the local health authorities (health districts). The system provides public universal coverage with a full variety of health-care services, including: primary care,

hospital care, prevention, maternal and child-care, mental health…Despite the existence of regional differences and the recent rise of out of pocket expenditures, the Italian health care system ranks very high among the OECD countries in terms of quality and cost-effectiveness, considering the low level of spending (around 6.2% of GDP as opposed to 9.2% of the OECD average). Hence, the cohorts that we study in this paper have enjoyed a rather generous and stable supply of care within the public system.
We therefore focus our attention on public pensions, particularly on those reforms that may have been the drivers of changes in the retirees' health.

2. The Italian pension system and its reforms

The Italian social security system has been characterized by, essentially, three regimes: a first spell in which a rather generous defined benefit system was in place, a second spell in which a sequence of reforms, starting in the 1990s, took place and a more recent period of radical changes.
Starting in 1969 the social security system offered two retirement paths: an old age pension or an early retirement (seniority) pension, disability benefits or unemployment benefits did not emerge as pathway to retirement. Eligibility criteria for both types of benefits were based on the number of years of contribution and an age requirement. Before 1993 old age benefits could be collected at age 60 for men (55 for women) while early retirement pensions (ER) could be collected, irrespective of age, if at least 35 years of contribution had been paid into the system. Pensions benefits were earnings related, based on average gross earnings over a 5-year window before retirement and an accrual factor of 2% for every year of contribution (up to a maximum of 40 years). Workers who had worked for forty years could collect gross pensions equal to 80% of their last wage. Early Retirement benefits would not attract any actuarial penalty: a retiree in her/his 50s would still enjoy a benefit equal to 80% of the last wage. Pension benefits were indexed to nominal wage growth.
An important reform was enacted in 1992, which increased the statutory retirement age from 60 to 65 for men and from 55 to 60 for women. It also changed the way benefits were indexed, by price inflation only, and changed the benefit computation introducing a pro rata system, i.e. a computation methodology that counted the share of contributions paid under each specific regime. For example, contributions paid by workers over their entire work history would be split in two parts: contributions paid before 1993, (share A) and contributions paid since 1993 (share B). A different legislation would be associated to share A or share B. In particular, share B used a broader base for the weighted average of earnings (over a 10-year window before retirement) and an accrual factor of 2% for every year of contribution after 1992. Past earnings were revalued at a 1% rate per year.

In 1995 the so called "Dini Reform" legislated a more radical set of rules, based on a notional defined contribution (NDC) system. However, the reform envisaged a long transitional phase and a "grandfathering" approach, protecting the older cohorts of workers, so that the new rules would be operational for all workers in the year 2032. In the interim phase benefits are computed as a weighted average of the pension benefit resulting from the old regimes (parts A and B) and the new regime (part C), also on a pro rata basis. Early retirement pension eligibility ages were raised according to a formula that accounted for both age and years of contribution: Thus, a worker could take early retirement in the year 1996 if aged 52 and had accumulated 35 years of contribution, but would need 40 years of contributions in 2008.

In 2011, the Italian Government was under considerable pressure to guarantee sustainability of social security expenditures and changed the calculation of benefits by implementing a rapid convergence to the NDC system (Monti-Fornero reform). Eligibility for old-age pension became much tighter: since 2018, there are no differences between men and women, and by 2050, the statutory retirement age is to increase to 69 years and 9 months for all types of workers. Under the new regime, which is currently in place, retirees can still access the ER option, but with a marked increase in the number of years of contributions needed for eligibility: 42/41 years for men/women in 2012, gradually rising to 46 years for men and 45 for women by the year 2050.

3. Data and sample

We use data from the Survey on Health, Ageing and Retirement in Europe (SHARE). We focus on a subsample of individuals aged 65 and above as these were most affected by the pension reforms of the past two decades and, in particular, by the stringent Monti-Fornero reform enacted in 2011. Table 1 describes the main characteristics of our sample.

The mean age is rather similar in all income groups, but the share of women is significantly larger in the lowest tertile. There is a large gap in mean household income between the poorest and the richest group and the discrepancy becomes dramatically larger when coming to wealth. It is important to observe also the difference in the composition by schooling attainments: the first two income tertiles include mainly individuals with lower education (86% in the first group and 82% in the second), while individuals in the richest group display significantly larger shares of more educated individuals.

Table 1. Sample characteristics

Variable	Income Tertile 1	Income Tertile 2	Income Tertile 3	Total
Women	0.57	0.53	0.49	0.53
Age	71.32	71.56	71.33	71.42
HH size	2.33	2.11	2.08	2.16
Less than upper secondary educ	0.86	0.82	0.57	0.74
Upper secondary education	0.11	0.13	0.25	0.17
Post-secondary and tertiary educ	0.03	0.05	0.18	0.09
Income and Wealth				
HH income	7495.63	12990.21	23853.38	15064.63
HH net wealth	116598.80	146477.00	227561.00	164910.60
Health measures				
N. ADL+IADL	17.23	17.39	18.03	17.56
Diagnosed conditions	8.93	8.94	9.19	9.02
Cognition	14.67	15.46	17.26	15.87
Eurod	8.76	9.01	9.43	9.08
Health index 44	0.81	0.82	0.85	0.83
N. Observations				12071
N. individuals				5071

Individuals in the highest income tertile are characterized on average by better health for all the conditions considered but the difference is larger for the cognition score.

The composition of the subsample by age groups changed to some extent between the first and the last waves of the survey. Indeed, by 2021/22 the share of individuals aged 75-79 had increased by almost 10% with respect to the first wave of the survey, with a corresponding decrease by about the same amount of the percentage of those in the younger age band (65-69), as shown in Figure 2.

Figure 2. Sample composition by wave and age group

In what follows, we will analyze separately the evolution of each of the five health measures that we construct, along time (from wave 1 of the survey – 2004 to wave 9 – 2022) by relating them to the household income deciles. Given that men and women are potentially different in relation to the evolution of their health status at older ages and might also have been affected differently by the various pension reforms we perform the analysis by gender.

4. The income-health gradient by income decile

In this study, we examine health inequalities across different income groups. Income is measured at the household level and adjusted using the OECD equivalence scale, which assigns a weight of 1 to the first adult in a household and 0.5 to each additional member. We use the imputed total household income provided by SHARE, which aggregates various income sources. As a result, all individuals within a household are assigned the same income group. This approach reflects our view that an individual's health is more closely linked to total disposable household income than to personal income alone.

To avoid potential bias from changes in income that may result from deteriorating health or entry into retirement, we fix individuals' income groups based on the first wave in which they are observed in our sample.

We consider five 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).
All these measures are defined in such a way that a higher value corresponds to better health.

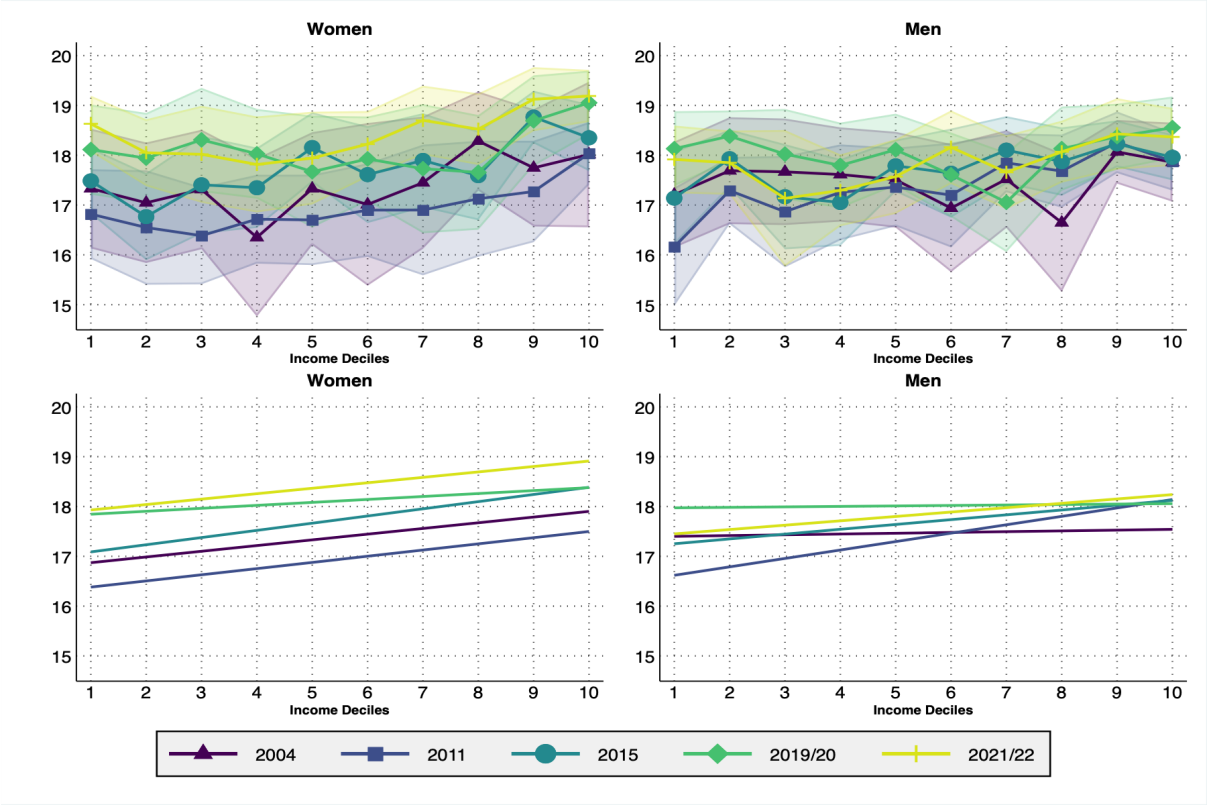
In the sequel, we construct health-income gradients by plotting the five health measures against the income deciles, and investigate whether the slopes of these gradients became steeper over the 2004-2022 period in Italy.

Functional limitations

Figure 3 describes the functional limitations measure based on the mean cumulative number of ADL and IADL limitations by income decile, and gender, separately for several survey waves. While the upper panels display the mean scores in the two subsamples, the lower ones report the values obtained through linear estimations. The graphs seem to indicate some differences between genders but do not delineate a specific trend along time. For women, the income-functional limitations gradient remains practically unchanged across waves[1]. For men, we start from an initially flat curve (wave 1) that becomes slightly positive in the following years, which may suggest a small increase in the health inequality along time. Such patterns are synthetized in Figure 4 that displays the income-health gradient across all SHARE regular waves for the functional limitations index, by gender. Women, which were already characterized by some positive level of inequality, display some fluctuations but, overall, there is no clear evidence that the pension reforms induced larger discrepancies between the poorer and the richer in relation to this health measure. For males (right panel), except for wave 8, the income-health gradient, which was almost flat until 2007, increased slightly starting with 2011, settling at a higher level after 2013 (with the exception of 2019-20).

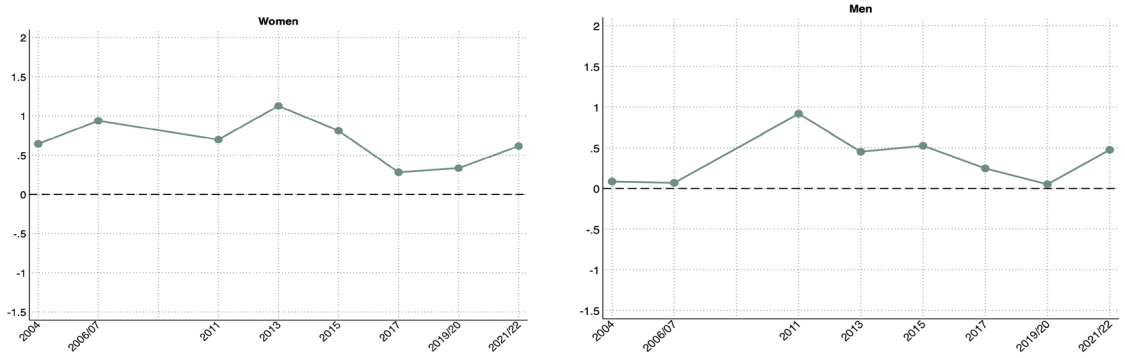
[1] The only particularity seems to be related to wave 8 (2019/2020), when the curve is flatter indicating lower levels of inequality. However, we should acknowledge that data collection in wave 8 was incomplete (suspended) due to the outburst of the COVID-19 pandemic.

Figure 3. Functional limitations measure by gender, wave and income decile



Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. 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 4. Income-health gradient, functional limitations



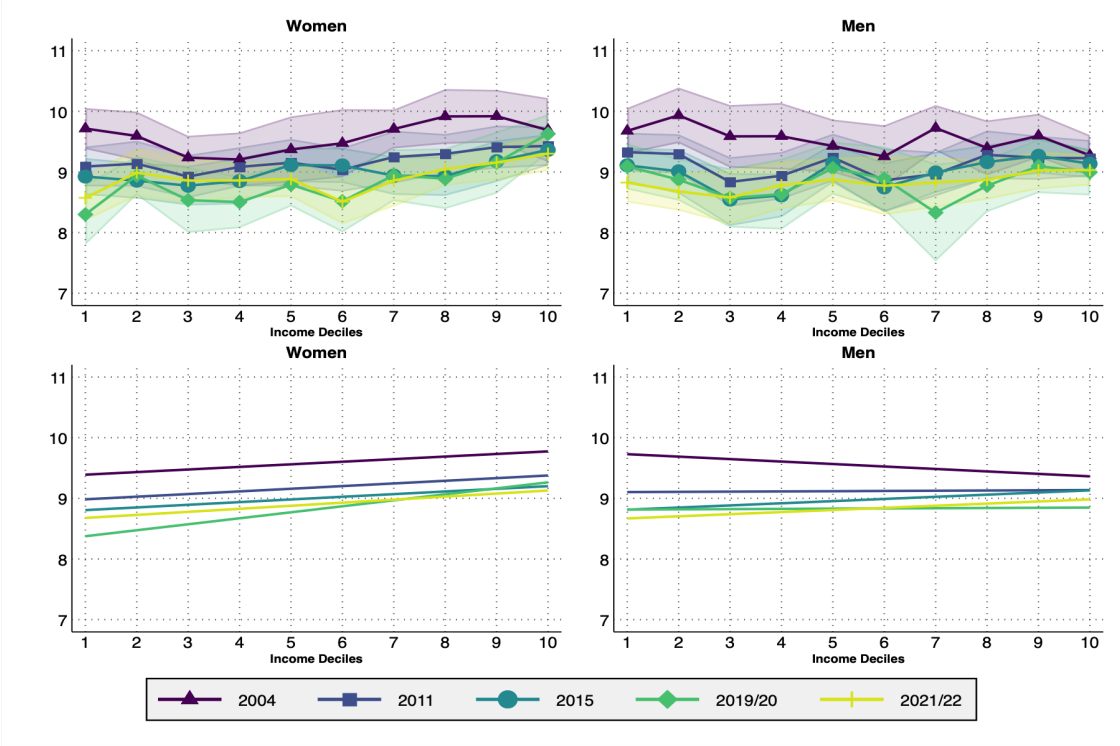
Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. We depict the slopes over the years, which we retrieved from a linear regression of the health status on income deciles. The slopes are normalized by dividing them by the mean of the health outcome in Wave 9.

Diagnosed health

The image of how the diagnosed health index varies across waves and by income decile is provided by figures 5 and 6 below. For women the picture is very similar to that for functional limitations. The level of inequality remains unaltered along the time-period that we analyze (except in 2019-20) suggesting

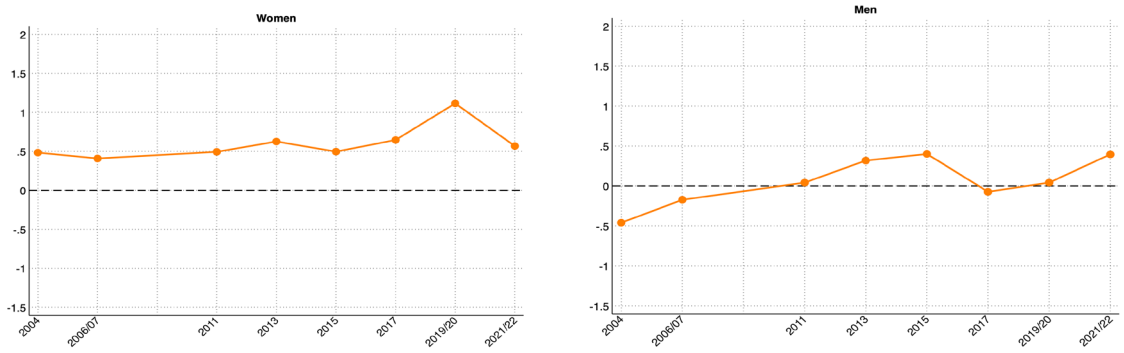
that the Monti-Fornero reform, that increased retirement age sharply for women, did not produce any changes in the inequality among women with different incomes. Differently, men display at first a negative income-diagnosed health gradient, which becomes positive for a four year period after 2011, then falls to zero, and then again positive in 2021-22. While one might be tempted to relate the increase in the inequality for males after 2011 to the pension reform, a word of caution is in order. This health measure is constructed based on diagnosed illnesses, hence the negative initial values may also be due to lower check-up frequency (and, therefore, lower rates of being diagnosed with some illness) for men in the poorer income deciles.

Figure 5. Diagnosed health index by gender, wave and income decile



Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. 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. Income-health gradient, diagnosed health

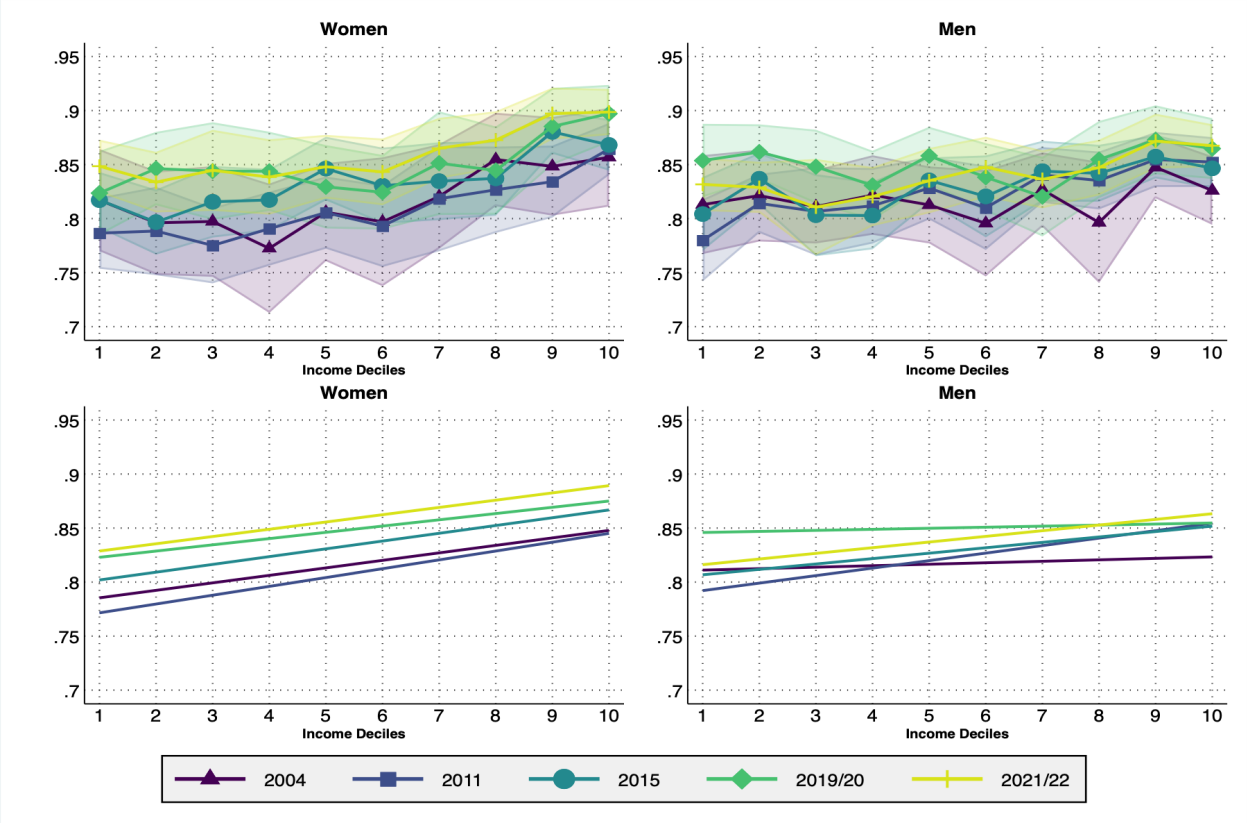


Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. We depict the slopes over the years, which we retrieved from a linear regression of the health status on income deciles. The slopes are normalized by dividing them by the mean of the health outcome in Wave 9.

Comprehensive health

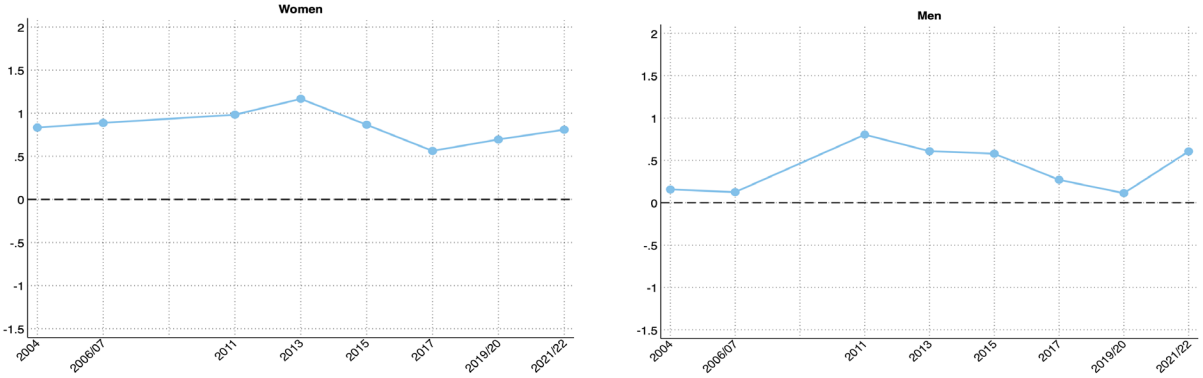
Comprehensive health aggregates a large set of self-reported health deficits, including chronic conditions, functional limitations, and difficulties with daily activities. Figures 7 and 8 show no systematic change in the slope for men, and a relatively flat income profile in the gradient for women.

Figure 7. Comprehensive health by gender, wave and income decile



Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-c.i. 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 8. Income-health gradient, comprehensive health



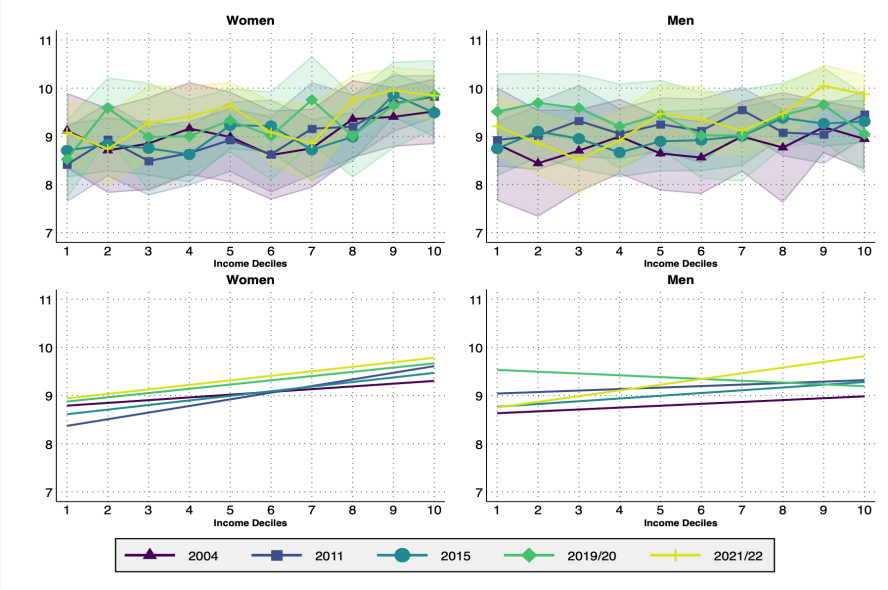
Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. We depict the slopes over the years, which we retrieved from a linear regression of the health status on income deciles. The slopes are normalized by dividing them by the mean of the health outcome in Wave 9.

Mental health/depression and Cognition

Mental health is measured using the Euro-D depression score. Figures 9 and 10 show that the mental health gradient increased until 2011 for women, and then fell slightly, while no detectable pattern is observed for men. It is worth stressing that there is a marked increase in the income gradient for men in the years immediately after the Covid pandemic.

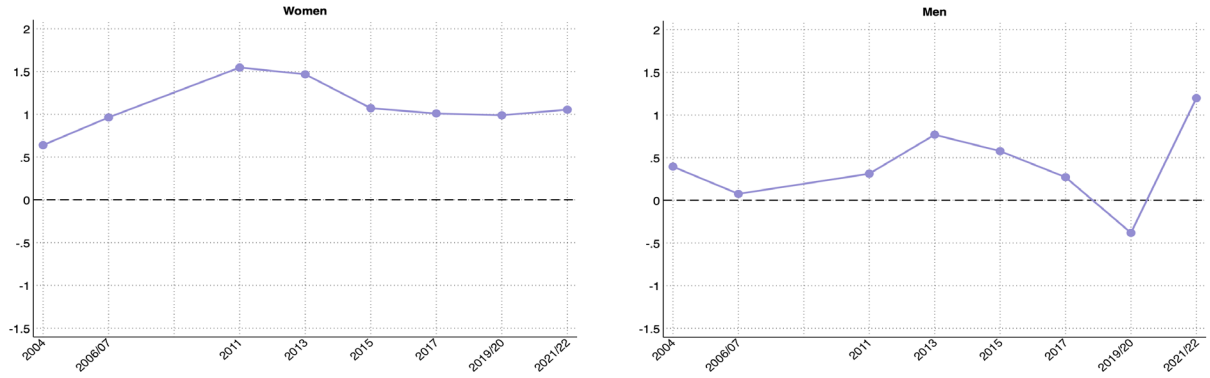
The cognition measure we use can be computed only since 2011. Figures 11 and 12 display the way cognition varies with income, by gender and wave. The gradients vary erratically for both women and men over the available waves.

Figure 9. Mental health by gender, wave and income decile



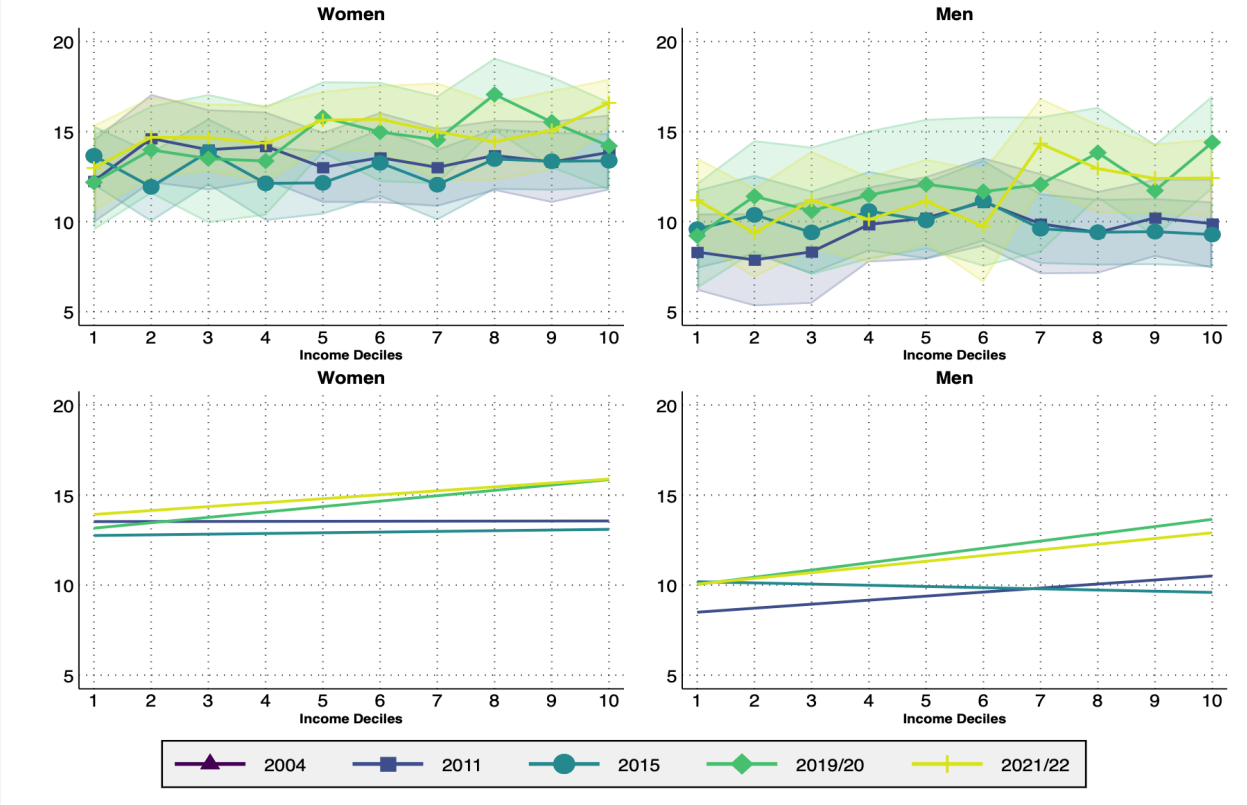
Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on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

Figure 10. Income-health gradient, mental health/depression



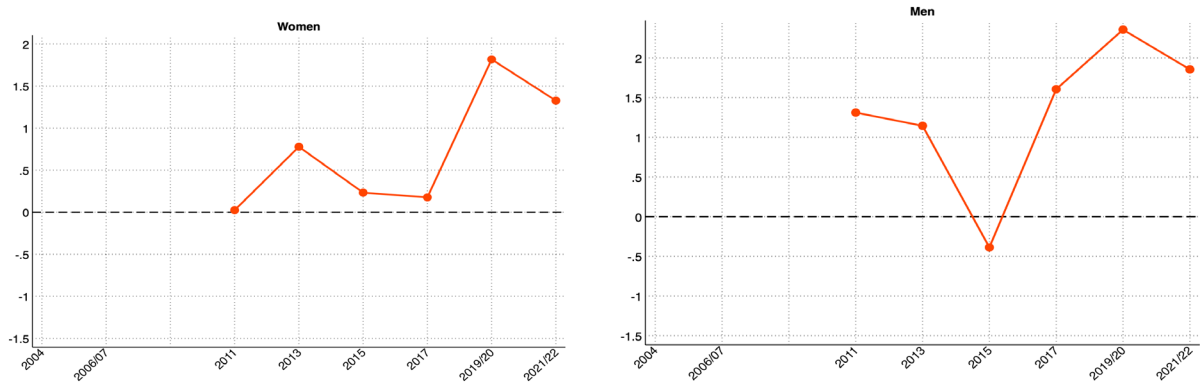
Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. We depict the slopes over the years, which we retrieved from a linear regression of the health status on income deciles. The slopes are normalized by dividing them by the mean of the health outcome in Wave 9.

Figure 11. Cognition by gender, wave and income decile



Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. 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 12. Income-health gradient, cognition



Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. We depict the slopes over the years, 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. The gap in healthy life years between the rich and the poor

Another way to investigate the effects of the pension reforms on health inequality is to evaluate whether the introduction of the pension reforms increased or decreased the gap in healthy years between the rich (in terms of income) and the poor.

Figure 13 is based on functional health and serves as an example. We define "very good" functional health as having a functional health score that is better than the 66th percentile in the total distribution of all individuals age 65-89 in Wave 1, where we pool women and men. The left panel shows how the share of respondents with very good functional health declines with age. In the right panel, we show how this share changes over time for the second, the fifth and the ninth income decile. We then translate the differences between income deciles in the right panel into life years of the left panel, i.e., we calculate how many years earlier would an individual in the second decile be of the same health status than a much healthier individual in the fifth or ninth income decile. We call it 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.

In our example, the share of individuals with excellent functional health in Wave 5 (2013) is about 14 percentage points higher for the ninth income decile than for the fifth decile (right panel of Figure 13). This corresponds to 6.7 years longer in the state of very good health (left panel).

We do the same exercise for the difference between the second and the fifth, and then the large difference between the second and the ninth decile, and then continue for the other three health measures. Figures 13

through 17 show strictly declining health as age increases, and in general the expected line-up of health in the second, fifth and ninth income deciles.

Figure 13. The gap in healthy life years, functional health

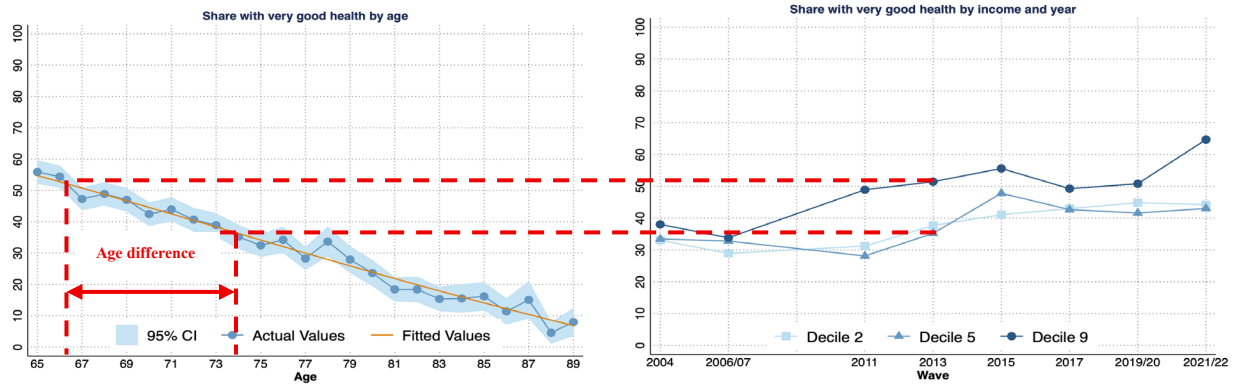


Figure 14. The gap in healthy life years, diagnosed health

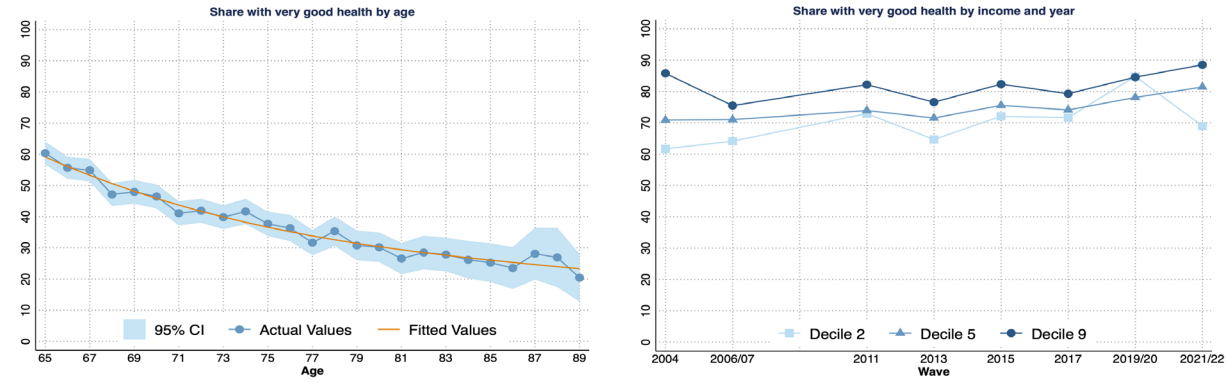


Figure 15. The gap in healthy life years, comprehensive health

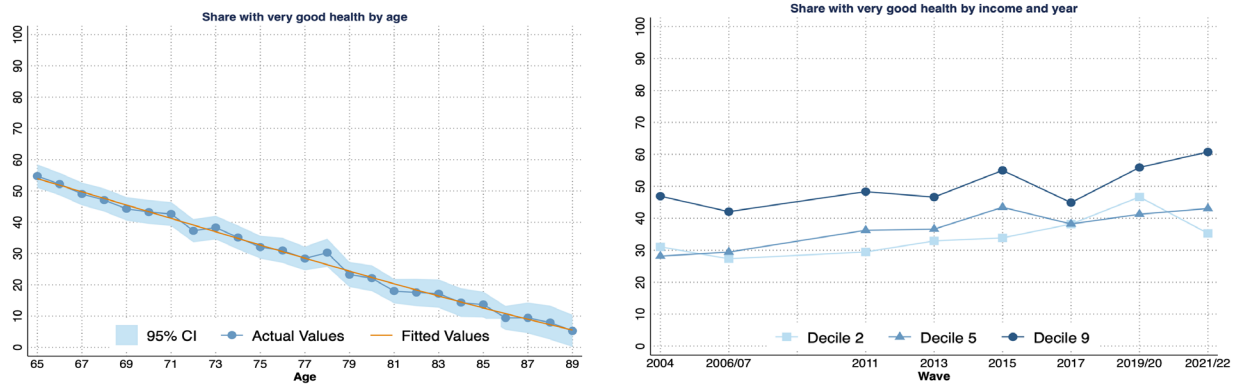


Figure 16. The gap in healthy life years, mental health – depression

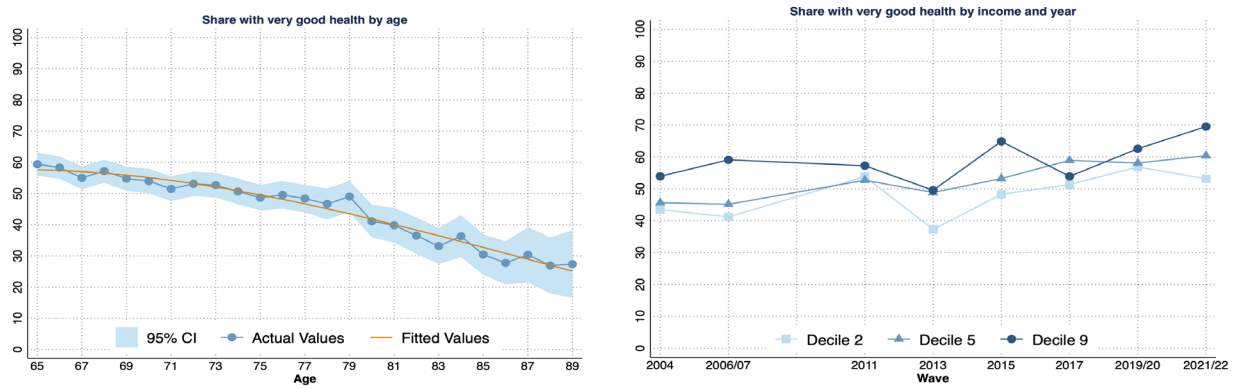
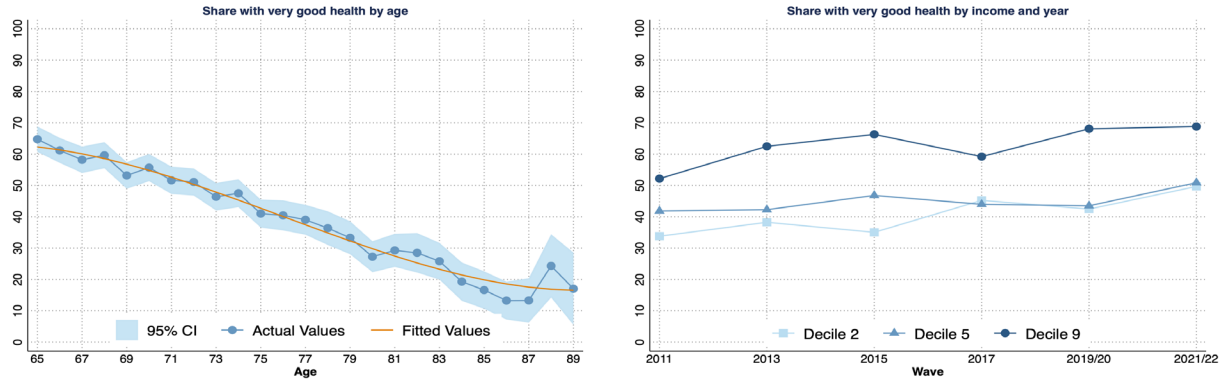


Figure 17. The gap in healthy life years, cognition



We summarize these results in Table 2, which displays all differences between the second, fifth, and ninth deciles expressed as the number of years to catch up, for all health measures. We consider the years 2004 (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 "good" health as defined by the upper 66 percent of the health distribution. Note that cognitive health is not available for the first wave in 2004.

Some of these differences are strikingly large. The pattern of change, however, is rather mixed, as summarized in Table 3. It fails to support the notion of a consistent increase in health inequality.

Table 2. "Lost" years of health

a) Excellent health (>%66 percentile in Wave 1/Wave 4 for cognition)

	2004			2013			2021/22		
	2-nd to 5-th	2-nd to 9-th	5-th to 9-th	2-nd to 5-th	2-nd to 9-th	5-th to 9-th	2-nd to 5-th	2-nd to 9-th	5-th to 9-th
Functional health	0.2	2.4	2.2	-1.2	6.7	7.9	-0.6	5.2	5.8
Diagnosed health	-1.3	0.0	1.3	1.8	1.6	-0.3	0.2	4.0	3.9
Comprehensive health	-1.4	7.4	8.8	1.7	6.4	4.7	3.6	8.8	5.1
Mental health	1.4	7.7	6.4	7.0	7.5	0.5	7.0	7.0	0.0
Cognition	-	-	-	1.5	11.7	10.2	0.5	7.3	6.8

b) Good health (>33% percentile in Wave 1/Wave 4 for cognition)

	2004			2013			2021/22		
	2-nd to 5-th	2-nd to 9-th	5-th to 9-th	2-nd to 5-th	2-nd to 9-th	5-th to 9-th	2-nd to 5-th	2-nd to 9-th	5-th to 9-th
Functional health	1.2	6.6	5.4	5.3	8.4	3.1	-0.6	5.3	5.9
Diagnosed health	-2.1	0.0	2.1	2.0	1.4	-0.6	-1.8	4.2	6.0
Comprehensive health	1.2	10.4	9.2	5.0	8.8	3.8	1.5	7.2	5.7
Mental health	6.7	18.2	11.6	5.2	10.6	5.4	13.1	13.1	0.0
Cognition	-	-	-	3.2	13.4	10.2	5.2	9.9	4.6

Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. This table displays the catch-up years for the second, fifth, and ninth income deciles in 2004, 2013, and 2021/22, respectively. It can be read as follows: For respondents in 2004, the difference in health between the second and the fifth income deciles would amount to 5.7 years of aging. For cognitive health, we have information on the health status only from 2011 onward.

Table 3. Change in "lost" years of healthy life from 2004 to 2021/22

	Very good health			Good health		
	2-nd to 5-th	2-nd to 9-th	5-th to 9-th	2-nd to 5-th	2-nd to 9-th	5-th to 9-th
Functional health	-0.8	2.8	3.5	-1.8	-1.3	0.5
Diagnosed health	1.4	4.0	2.6	0.3	4.2	3.9
Comprehensive health	5.0	1.3	-3.7	0.3	-3.2	-3.5
Mental health	5.7	-0.7	-6.4	6.4	-5.1	-11.6
Average	2.8	1.9	-1.0	1.3	-1.4	-2.7

Source. Own calculations, based on SHARE release 9.0.0. Weights applied.
Note. 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 2011 onward.

6. Concentration Indices

Another way to measure inequality is based on the concentration curve, a variant of the Lorenz curve.

The concentration index *CI* – hence the correspondence to the Gini coefficient – is defined as

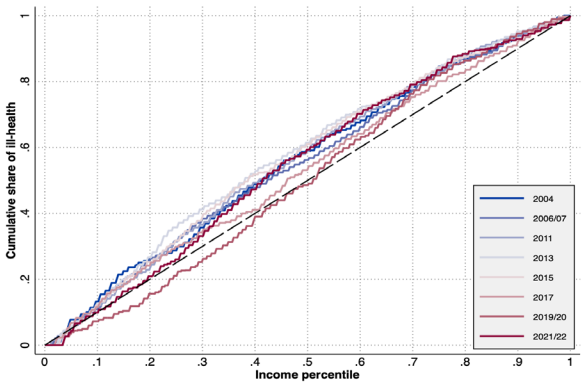
$$CI = \frac{1}{n}\sum_{i=1}^{n}\frac{h_i}{\bar{h}}(2R_i - 1)$$

where h_i is the health status of individual *i* and R_i the income percentile of individual *i*.

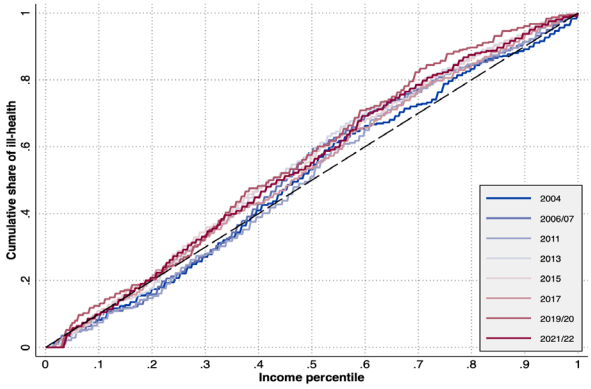
Figure 18 shows the concentration curve for each wave of the SHARE data. It plots the cumulative share of individuals with bad health against the percentiles of income. No inequality is represented by the 45 degree line. The further the concentration curve is to the left of the 45 degree line, the more inequality is present. A visual inspection of the curves yields no discernible changes between waves for all health measures. Figure 19 displays the development of the concentration indices from wave to wave for the five health measures. Zero implies perfect equality. A larger inequality implies a more negative value of the concentration index. None of the concentration indexes shows an unambiguous decline (an increase in health inequality) or increase (a decline in health inequality).

Figure 18. Concentration indices

a) Functional health

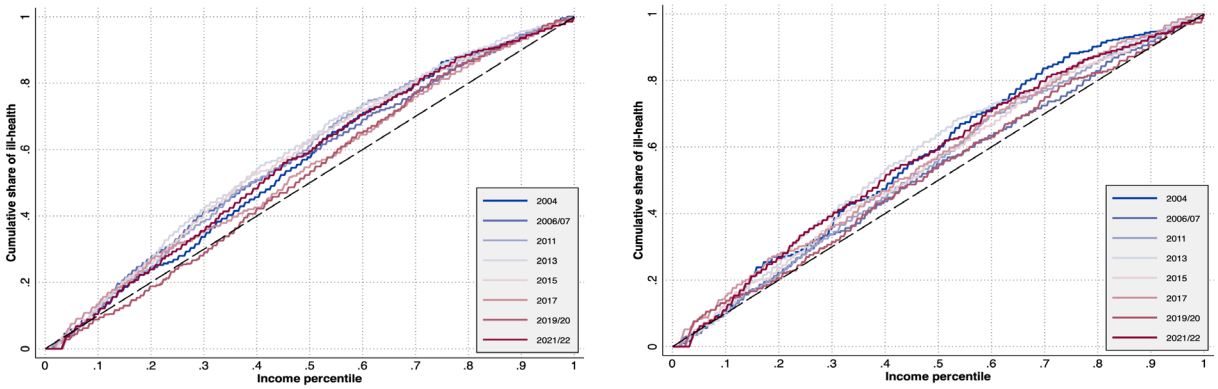


b) Diagnosed health



c) Comprehensive health

d) Mental health



e) Cognition

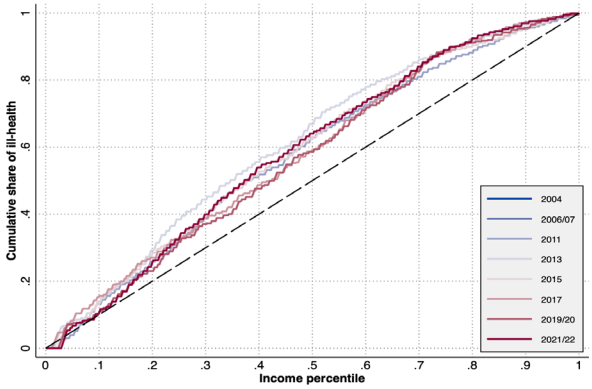


Figure 19. Concentration indices over waves

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

7. Conclusions

This paper investigated the impact of benefit-reducing and retirement-age-increasing pension reforms on health inequality among retirees in Italy. We used panel data provided by the Survey of Health, Ageing and Retirement in Europe (SHARE) that span the time between 2004 and 2022 and five different health measures, including functional, mental and cognitive health. All five measures displayed substantial health inequality by income decile. Our research question was then whether this inequality increased over time, and, if so, could it be due to pension reforms?

We first looked whether the steepness of the health-income gradient increased. We established that the health-income gradient remained flat from 2004 through 2022. We then computed the number of years for individuals in a lower income bracket needed to catch up with the health of individuals in a higher income bracket. We did not find a systematic pattern that would indicate that these years to catch up increased from 2004 to 2022. Finally, we computed the concentration index of health by income. It stayed flat from 2004 to 2022 for all of our health measures.

We conclude that health inequality has not increased during the period in which benefits decreased and retirement ages went up.

We should stress that the period under investigation may be too short to pick up the longer-term effects, particularly if we consider that, the most important pension reform took place as late as 2011 in Italy, and it was triggered by an important economic and financial crisis. Thus, the short-term health effects may have be due to reductions in access to public health services, or to an increased sense of insecurity. The onset of the pandemic around the end of our sample may also be a confounding factor.

We should also acknowledge that the data could mask heterogeneities. There may well be specific occupation groups that have suffered from the pension reforms. Examples might be construction or some types of factory workers. The sample size (roughly 5,000 individuals) is sufficiently large to separate healthy and unhealthy individuals in each income decile, but not large enough to further stratify by occupation. Arduous jobs make up only a small share of all occupations in Italy, and most workers in these jobs have been partly exempted from the postponement of pension eligibility age. Hence, while reducing pension benefits and increasing the retirement age appears to be a policy option without negative health effects for most, policy makers may need to continue combining them with special programs if they want to protect workers in arduous occupations.

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