

Social Security and inequality in Italy: the role of pension reforms

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Abstract

This paper discusses in which direction and to what extent the public pension system reforms of the past three decades may have altered the redistributive role of the public pensions in Italy.

Using detailed individual data from the regular and retrospective waves of the Survey on Health, Ageing and Retirement in Europe we describe the distributions of the average lifetime earnings, of the pension benefits as well as those of the social security wealth, financial and real assets of the Italians. We construct and compare several inequality measures for workers and for retirees and show their trends along time.

In a second step we explore the role that the pension reforms have had in determining the evolution of inequality along the individuals' lifecycle. Several elements contribute to generating and/or amplifying inequalities. First, the differences in the earnings from employment together with the length of the working life and the potential interruptions in the working career directly determine the amount of the pension benefit an individual will receive when retired. Second, inequalities in later life are also influenced by the retirement age and the life expectancies. The public pension system reforms impacted both these elements, through (i) the changes in the benefit computation rules (direct effect) and (ii) the variations in the retirement age induced by the tightening of the eligibility requirements (indirect effect). Our analysis reveals that the reforms enacted in the recent years in Italy increased to some extent the redistributive role of the public pensions, by reducing more the SSW of more educated individuals.

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1. Introduction and Motivation

The recent demographic trends of fast population ageing have challenged the sustainability of the public pension systems in most industrialized countries (Gruber and Wise, 1998; OECD, 2019). The recent economic literature has studied extensively the determinants of the decision to retire, aiming at identifying the drivers of exits from the labor market and designing effective policies. These studies pointed out that the most important determinants of labour market choices of older individuals are: the health status (Disney, Emmerson, Wakefield, 2006), job satisfaction (Teemu et al, 2012), eligibility requirements, the level of pension benefits and income, dynamic retirement incentives (Gruber and Wise, 2004, Coile and Gruber, 2007).

For several decades the Italian economy has been characterized by changes in Social Security rules. At the same time improved health conditions and increased longevity have changed the demographic structure of the population, which is characterized by a large share of older individuals, to the extent that demographers refer to an inverted age-pyramid¹. Other relevant trends have emerged: on the one hand, rising female Labor Force Participation, partially mitigating the fall in the number of workers, but, on the other hand, persisting out-flows from the labor market into retirement.

These trends, coupled with the high level of public debt (over 130% of GDP), and low level of GDP growth, prompted important reforms of the Italian social security system. The other drivers of the concerning long- term outlooks, which project high public pension exposure, are a low fertility rate (around 1.4 children per woman) and a high life expectancy.

The past three decades have witnessed important reforms of the public pension system, aimed at increasing its sustainability. The main instruments used were changes in the computation of pension benefits and changes in the eligibility requirements, both in the statutory retirement age and in the number of years of contribution to the social security. All these elements influence the individuals' retirement choices by changing the incentives as well as the possibilities to exit the labor market. In addition, they also induce alterations to the redistributive role of the pension systems.

An important feature of the public pension systems is in fact the insurance they provide to individuals who are retired from the labor force, and therefore unable to respond to negative shocks by increasing their earnings. Angus Deaton and co-authors have emphasized this role of the Social Security system, and investigated its workings in the US and in other countries (see for instance Deaton, Gourinchas and Paxson, 2002). An important question we ask is whether recent Italian pension reforms have affected

¹ Italy has the largest share of individuals aged 65 and over in Europe. Worldwide, it comes second only to Japan (UN, 2019)

this insurance mechanism, and, if so, in what direction. The Italian case is particularly interesting because of the radical reforms enacted in the mid-1990s and again in 2011.

In a previous contribution, we analyzed the retirement behavior of older Italians over the past twenty years in relation to dynamic financial incentives and other potential determinants of labor force participation. We discussed the changes to the Italian Social Security system that were introduced in 1995, implementing a Notionally Defined Contribution method of benefit calculation, while retaining the PAYG nature of the public pension system (see Brugiavini and Peracchi, 2007 and Brugiavini, Pasini and Weber 2019). We also highlighted how further pension reforms (particularly in 2011) increased the labor force participation for workers in the age group 50 to 65 by introducing tighter eligibility conditions for pensions, while recent inversions in the direction of the reforms allowed some relatively young workers to exit the labor market through specific provisions.

All this resulted in a complex patchwork of rules, which depend on age, seniority and type of occupation requiring a careful analysis of individual cases if one wants to assess the distributional effects of the pension system and of its reforms.

This chapter is organized as follows: in Section 2 we provide a brief background of the Italian pension system and the timing and nature of the reforms in the last 30 years. Section 3 describes the microdata while section 4 analyses the main inequality indicators with a particular focus on the potential redistributive role of the pension benefits. Section 5 displays and discusses the estimates of a simple empirical specification that we run in order to get more insight into the potential effects of the reforms on the distribution of SSW. Section 6 draws the main conclusions.

2. Social Security Reforms and Pathways to Retirement

In a previous volume, we have documented the reform process that took place in Italy and the way it interacted with other macro-economic and demographic trends. In particular, we have shown that there exists a sizeable labor force participation reversal at older ages over the recent decades: we have related the “U-shaped” pattern of labor force participation rates to the pension reforms of the early 1990s (Brugiavini, Pasini, Weber, 2019). We have shown how eligibility to early retirement and old age pension schemes have been restricted over the years, making it progressively more difficult for individuals in their 50s or early 60s to start drawing a pension.

In the present chapter we focus on the impact of the changes in the incentives to retirement due to pension reforms on the retirement decision of the individuals in Italy.

2.1 The Italian Social Security System and the 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 recent period of radical changes. Figure 1 provides a synopsis of the main changes over time.

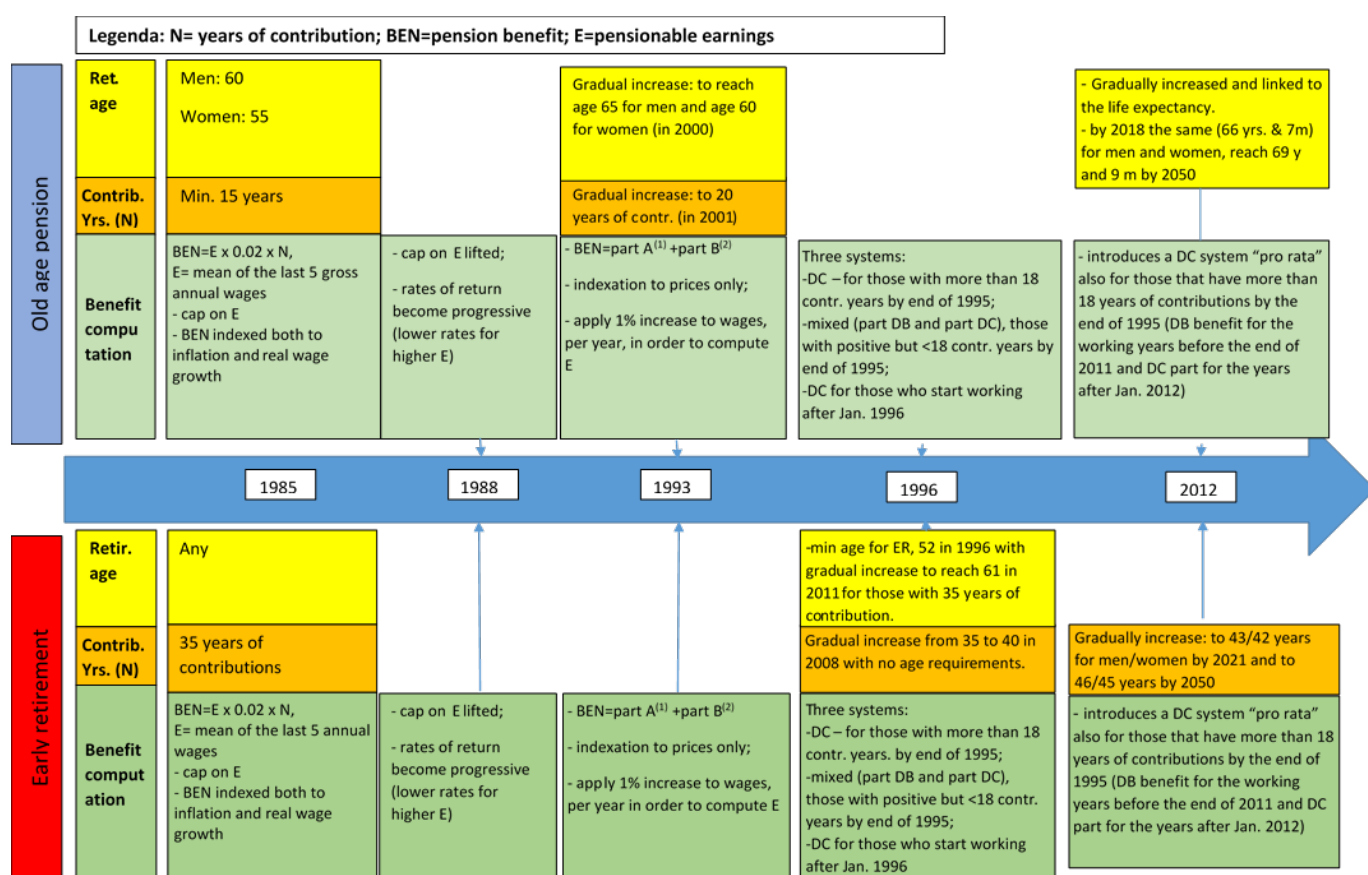
1. Starting in 1969 the social security system offered two retirement paths: an old age pension or an early retirement (seniority) pension, disability benefits or unemployment benefits did not emerge as pathway to retirement². Eligibility criteria for both types of benefits were based on the number of 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.

2. 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.

² Disability benefits have been of some relevance during the 1970's, but important changes to the award process took place in 1984, which made disability insurance basically negligible

Figure 1. Timeline of pension system reforms in Italy



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.

3. 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. Capturing the dynamics of inequality along the life course

Several elements contribute to inequality among individuals. In his Nobel Prize lecture in 2015, Deaton emphasized that evaluating/measuring inequality should be done not only at one point in time but in a life-course perspective.

Public pension systems play a redistributive role in old age, but the level of redistribution varies largely among countries, based on the main features of the social security (OECD, 2017, Belloni et al, 2019).

In the Italian mandatory pension scheme, pension benefits have been undoubtedly always related to earnings, both under the DB and under the NDC calculation methods and therefore may achieve only limited levels of progressivity. Benefits of individuals that are still subject to the DB system are computed based on the earnings in the last years of their working career (presumably characterized by higher wages), allowing for a replacement rate that can reach as much as 80%. Under the NDC the pension amount depends on all the earnings from employment gained throughout the entire working life, while for those subject to the mixed system (DB+NDC - a rather large share of our sample) is a combination between the two.

OECD elaborations using data for 2013 rank the Italian mandatory (public) pension scheme among those characterized by very low progressivity. The progressivity index³ is at levels close to those of Finland or Portugal (less than 0.15) and the calculations also indicate that a variation of 1% in the Gini index of life time income is in large part transferred on the G-index of social security wealth. However, based on real survey data, Belloni et al., 2019, finds that in 2011 the system was characterized by significant progressivity, directed mainly to benefit the “lifetime poor” individuals (especially women).

The main elements guaranteeing some redistribution of income at older ages in the Italian system are:

1. Minimum benefits. Since 1983 the Italian law stipulates that low pension benefits, under a given threshold considered the “minimum vital”, are to be integrated to a minimum amount that is indexed every year based on prices evolution. However, this measure will be phased out for individuals that have started working after 1995.
2. Social assistance. This is a means tested benefit provided only to individuals with a very low income in old age. The age requirement, which was initially fixed at 65, has been gradually raised based on the life expectancy; at present is 67.

³ Defined as $(1 - \frac{G_{SSW}}{G_{LTI}})$, where G denotes the Gini concentration index, SSW is Social Security Wealth and LTI denotes Life Time Income

3. Reduced accrual rates for pensionable earnings larger than given ceilings, when the benefit is computed using the DB or mixed DB+NDC methods. Such a measure reduces slightly the replacement rate for high earners.
4. Maximum covered earnings for contribution purposes for individuals that retire under a pure NDC system. Contributions should not be paid for the part of earnings above a given ceiling (revalued each year based on price evolution) as they will not be taken into account for benefit computation.
5. Progressive indexation of pension benefits, with low benefits being fully revalued based on inflation and higher ones being indexed only partially. This measure has been subject to continuous and rather frequent variations over time with respect to the various thresholds that separate between the indexation levels.

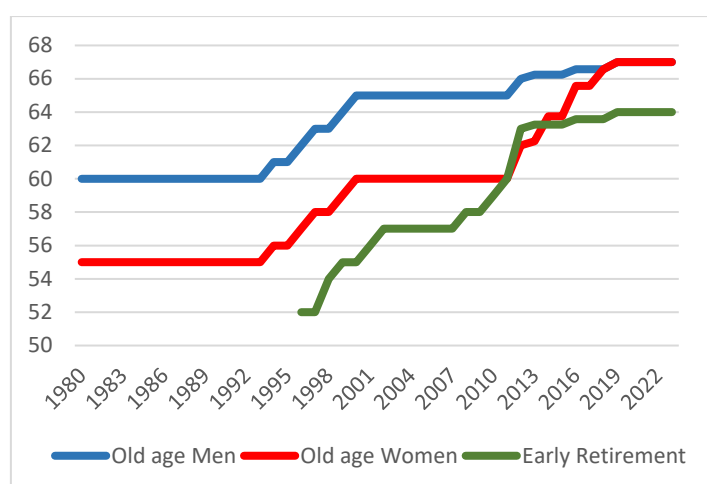
It is important to underline that in a system such as the Italian one inequalities may be amplified also by discontinuities in the working career, periods of not employment (unemployment, temporary exits of the labour market), with twofold consequences: on the one hand a reduction in the number of years of contributions, on the other hand lower levels of earnings leading to lower contributions.

The reforms in the past three decades have been altering to some extent the redistributive function of the social security system in Italy through several direct channels, such as: (i) the variation in the benefit calculation rules; (ii) variation in the indexation rules of the pension benefits. However, another important element is at work with effects that are far from being clear. More tight eligibility requirements (increase in the retirement age) that lead to an increase in the working life and postponing the retirement moment lead to shorter flows of pension benefits. The concern is that this may disadvantage lower income individuals that are on average also characterized by lower life expectancies.

Figure 2 shows how eligibility ages have changed over time, distinguishing by gender. The increase in the Statutory Retirement Age (SRA) and early retirement age, although enacted gradually have been very large. First, between 1993 and 2000 Italians (both men and women) faced an increase of 5 years in the SRA for old age. The second significant increase, introduced by the Monti-Fornaro reform, enacted in 2011, was less important for men but dramatic for women. Indeed, women have faced an increment of more than 7 years in their SRA in a timespan of only 8 years.

For the early retirement pathway, accessible only to those with long working careers, the rise in the minimum eligibility age started in 1996, when the age requirement was 52, and kept growing since, reaching age 64 in 2019, with an overall increase of 12 years.

Figure 2. Evolution of the statutory and early pension eligibility ages in Italy, by gender



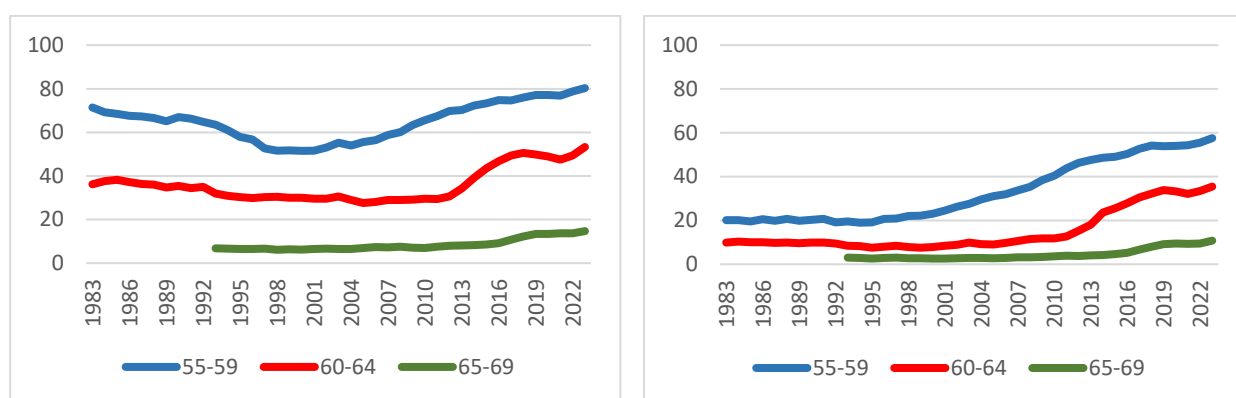
The literature has shown that financial incentives play a role in the retirement decisions of individuals. In a recent paper, Brugiavini et al. 2020, show how the variations in the eligibility requirements and benefit computations introduced by the Italian reforms have altered the incentives to retire/work, such as, Social Security Wealth, the index known as Implicit Tax on Work and the Replacement Rate. Their results suggest that for medium income (medium education) individuals belonging to the generations “at risk” of retirement, the reforms in the 1990s produced an important reduction of Social Security Wealth, even if they did not determine a decrease in the replacement rate or in the dynamic incentives to retire. In fact, older generations experienced an increase in the statutory retirement age and contribution years, but they still enjoyed a generous benefit computation rule based on the defined benefit method. Differently, the Monti-Fornero reform of 2011 determined an important drop not only in Social Security Wealth, but also in the dynamic incentives and replacement rates, because it entailed for all workers an additional tightening in the retirement eligibility requirements as well as the immediate implementation (pro rata) of the Notional Defined Contribution system.

The present chapter investigates how the variations introduced by the public pension system reforms have changed the inequality patterns along the life cycle in Italy, by altering the redistributive role of the pension benefits.

In order to gain *prima facie* evidence on the effects of the changes in pension rules it is useful to present aggregate profiles of the labor force trends prevailing in Italy over a sufficiently long time-span. On the one hand, important changes to the economic, educational and welfare system took place during the 1970s and 1980s, regarding the educational system and the industrial structure of the country, on the other hand the welfare system lagged somewhat behind in offering coverage and protection to the changing working environment. Employment rate for older workers (grouped in three distinct age bands:

55-59, 60-64 and 65-69) are documented in Figure 3, left panel for men and right panel for women. There are clear gender and age differences, but we observe a “U-shaped” pattern: while the early years are characterized by a steady decline, especially for the men in the age group 55-59, in recent years we observe a sharp increase in the employment rate. A simple inference is that these trends reflect changes in pension rules, but variability at the individual level is substantial, and group-means could conceal important differential impacts of incentives to retire.

Figure 3. Employment by age group – men (left panel) and women (right panel)



3.1 The data

The analysis of social security wealth and pension reforms requires very detailed datasets, which provide comprehensive information at the individual level on the working life history. In addition, it is important to know a set of socio-economic and household related variables, such as education, marital status, health status, household composition, income, or wealth measures. Ideally, one would like to have access to a variety of datasets providing information for workers and retirees in the country: administrative archives have the advantage of supplying accurate data regarding the working careers of individuals but have the drawback that generally they do not include information about health, social status or the household situation and composition. On the other hand, survey data contain information on the socio-economic condition of the respondents, but do not cover their entire working life. In Italy, we have access to two sources of data: the INPS (Italian National Institute of Social Security) archive, based on administrative data, and a sample drawn from the SHARE survey for the Italian older population (Survey on Health Ageing and Retirement in Europe).

SHARE is a longitudinal, multidisciplinary survey focused on a representative sample of population aged 50 or more. The survey started in 2004 and is run every two years. Until now, data for the first nine waves have been collected and released. SHARE provides information on multiple aspects of the individuals' lives: accommodation, socio-economic status (education, income, real and financial assets), social

network, physical and mental health, health care, cognitive capacities, financial situation etc. There are several advantages in using SHARE data. First, the survey is longitudinal and hence we can follow the individuals from the time they enter the survey until the last interview, observing the changes in household composition, financial situation, health, and working status. Second, the third and the seventh waves of the survey (SHARELIFE) collected comprehensive retrospective data about the respondents' life histories, since their birth until the interview year, including detailed information on their working careers. In particular, we use information from both regular waves (1-2 and 4-9) and SHARELIFE. Regarding the individuals' working lives, SHARELIFE provides information on all the states with their start and end date: employment spells, unemployment spells, maternity leave, out of the labour force spells, occupation and type of contract (part time or full time). Brugiavini et al. 2019 generated the Job Episodes Panel based on these spells, by reshaping the data in longitudinal form, such that every respondent enters the dataset with as many records as years of life, until the time of the last interview.

In this chapter, we make use of calculations performed for a previous volume of the NBER Social Security Around the World project (Brugiavini et al., 2024), in which we reconstructed the entire work and earnings history of the Italian SHARE sample by pooling together a large subsample of the INPS administrative records and the SHARE data. Moreover, we developed and employed a pension calculator to compute the pension benefits an individual is entitled to at the end of his/her working career as well as his/her pension wealth. For a detailed description of the methodology and of the results of the imputation procedure, we refer the reader to Brugiavini et al., 2024.

3.2 A first glance at inequality in SHARE data

In a first step we describe the inequality patterns along time within the SHARE sample. For this we take into account all respondents in the survey and we use the Gini index to characterize several items that compose the individuals' economic situation.

Figure 4 displays the evolution of the Gini index of the household real and financial assets together with the G-index of the old-age pension benefits for the retired individuals, separately for the workers and the retirees in our sample, between 2004 and 2022.

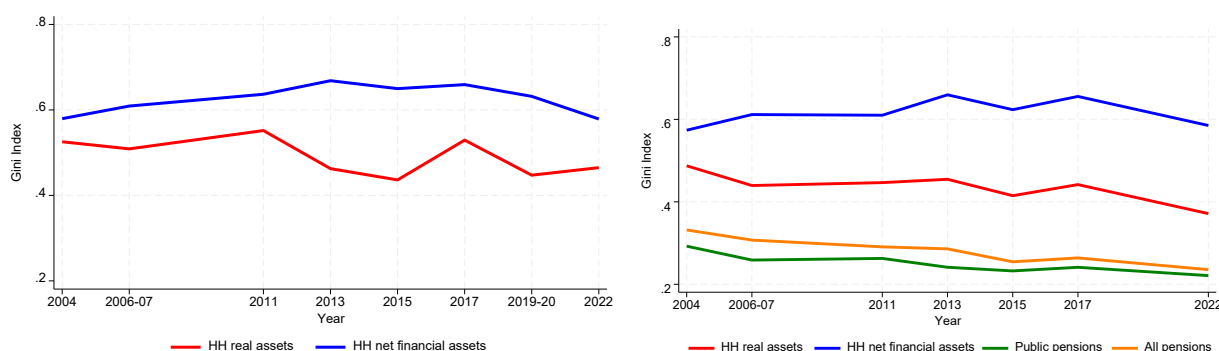
Watching the ownership of financial assets, inequality displays similar patterns and comparable magnitudes for both workers and retirees. It has been large throughout the whole period under analysis, already since 2004 and increasing slowly during 2007-2013, remaining at higher levels up to 2017 and declining slightly afterwards, but just to return to the 2004 levels. The higher magnitude of the Gini index between 2007 and 2017 may be due to issues related to the financial crisis.

When regarding real assets instead, inequality seems to have decreased over time among both workers and retirees with a larger decline for the last ones (from 0.47 to 0.35).⁴

As for the pension benefits, the index displays a slightly decreasing trend starting from 2004 for both the public and the overall (public + private) pensions. This may be related in part to the reforms enacted in 1993, 1996 and 2011. In particular, the reform in 1993 switched the indexation of pension benefits from wage growth rate to only inflation and introduced some changes in the calculation of pension benefits (see paragraph 2 above). Later on, the 1996 reform, introduced the progressive transition from a DB to a NDC system, changing gradually the benefits computation method, while the last radical reform (2011) speeded up the convergence towards the NDC system for all employees.⁵

In Italy, private and occupational schemes have played a very limited role. However, we can observe that when we include all types of retirement benefits the inequality measure is higher than in the case of public pensions alone. This is probably because employees benefiting from private pensions (either occupational or voluntary) are typically relatively well off. The gap between these indices decreases gradually, and are almost equal by 2022.

Figure 4. Gini index of household real and financial assets, by employment situation. Workers (left), retirees (right)



While the measure of inequality in pension benefits is much lower than the ones for the real and financial assets, it is higher than similar measures in countries characterized by flat pension benefits, such as the UK.

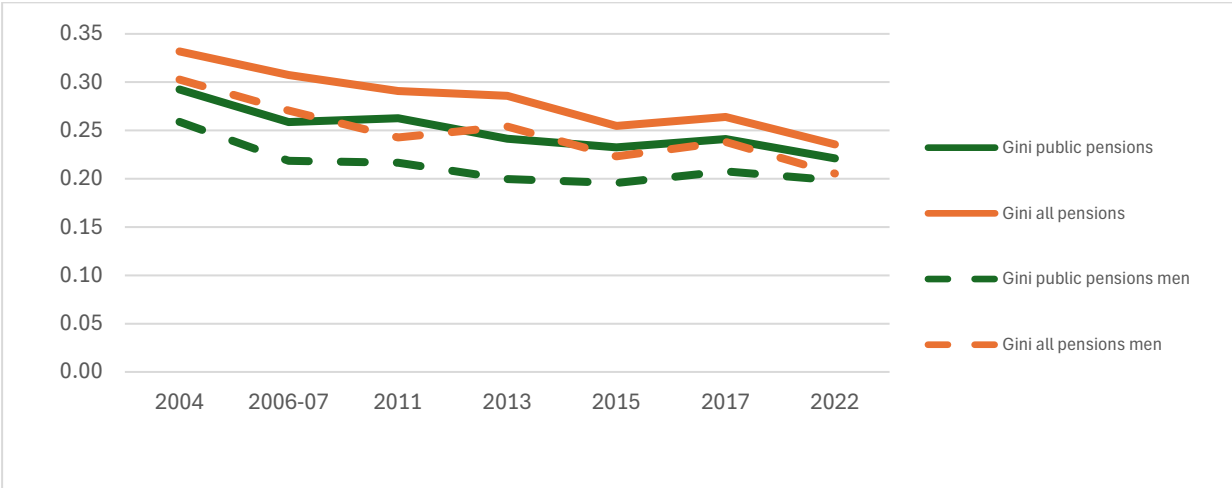
The observed levels and changes in pension income inequality are mostly driven by individual working careers and earnings histories. This is particularly relevant in the assessment of gender differences.

⁴ The spikes related to the year 2017 (wave 7) may be due (at least in part) to the fact that in this survey wave respondents that answered the retrospective interview did not report on their assets.

⁵ The peak that we find in 2019 (wave 8) may be driven by the fact that the data collection in this wave was suspended due to the pandemic and only about 2/3-rds of the panel respondents were interviewed.

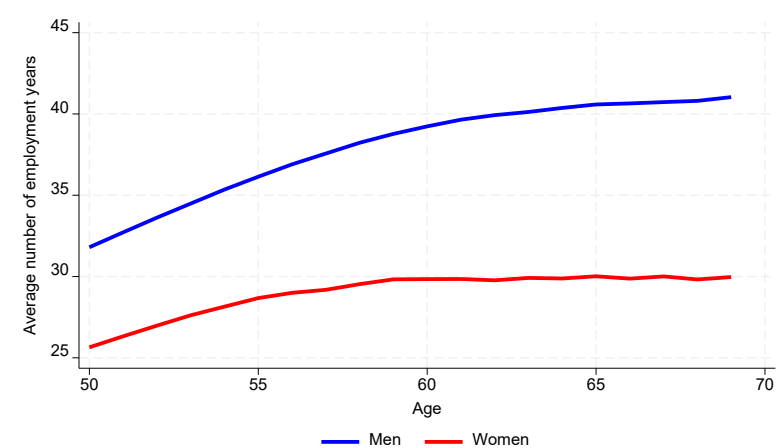
When we compute the inequality measure of the pension benefits for the subsample of men and compare it with the Gini index constructed based on the entire sample of SHARE retiree respondents (Figure 5 below) we see that inequality for men is smaller, indicating therefore that part of the gap is due to gender issues.

Figure 5. Gini index of public and all pension benefits, full sample vs. men subsample



Indeed, our data reveal a striking difference in the length of the working career between men and women (Figure 6 below). By the age of 50, the difference in the average number of employment years between males and females is about 6 years and the gap increases as people get older. At the age of 65, men have accumulated on average about 41 years of work while women display an average of only 30 years. This is partly responsible for the disparity in pension benefits and pension wealth that we find between males and females at old age.

Figure 6. Duration of working career by age and gender



A second element of crucial importance in determining inequality throughout life is represented by earnings. We discuss the role of earnings in the next subsection.

3.3 Descriptive evidence on inequality along the life cycle

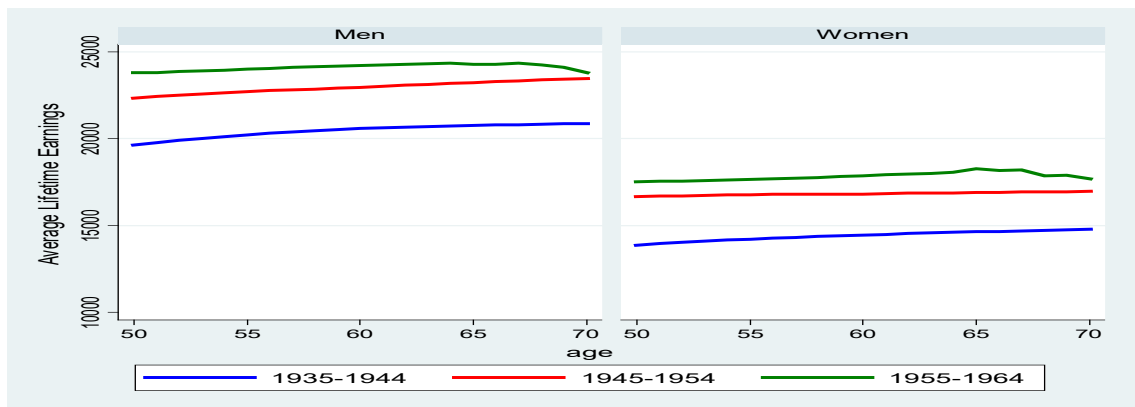
For the analysis that follows, we only keep in the sample the individuals who report that they have been engaged in paid work at some point in their life and who also participated in a retrospective SHARELIFE survey (either wave 3 or wave 7). Overall, our sample is composed of 3083 individuals of which about 43% are women. Table 1 provides a description of our sample with respect to the year of birth cohort and the level of education: we observe that the education level is remarkably higher for younger generations. In particular, the proportions of individuals with lower or upper secondary education is much higher for the more recent cohorts that were affected by compulsory schooling reforms over the sixties and seventies of last century.

Table 1. Sample composition

Birth cohort	Number of individuals	Women (fraction)	No or basic education (fraction)	Lower secondary (fraction)	Upper secondary (fraction)	Tertiary (fraction)
<1925	24	0.42	0.71	0.13	0.13	0.04
1925-1934	252	0.27	0.65	0.15	0.12	0.08
1935-1944	775	0.39	0.51	0.21	0.18	0.10
1945-1954	1083	0.45	0.31	0.27	0.27	0.15
1955-1964	891	0.52	0.15	0.35	0.33	0.18
1965-1974	56	0.89	0.09	0.38	0.39	0.14

Figure 7 describes the evolution of the average lifetime earnings (ALTE) by age, separately by birth cohort and gender. The graph highlights large and persistent gaps between men and women for all cohorts but also significant variations across cohorts for both genders. The curves are almost horizontal suggesting that there is not much difference if considering earnings between ages 40-49 or using the measure computed based on all earnings/years of the working career until retirement/the time of observation. Therefore, in what follows we will use the former measure (based on the earnings between ages 40-49) because it allows comparisons between workers and retirees and among different cohorts.

Figure 7. Average lifetime earnings by age, gender and cohort of birth



The histograms below (see Figures 8 and 9) give a more detailed description of the distribution of the average lifetime earnings in our sample. It emerges clearly that, although both the distributions of men and of women's ALTE are rather symmetric, the females' distribution is shifted to the left with respect to the males' one and it spreads over a narrower range of values (Figure 9).

Figure 8. Distribution of ALTE

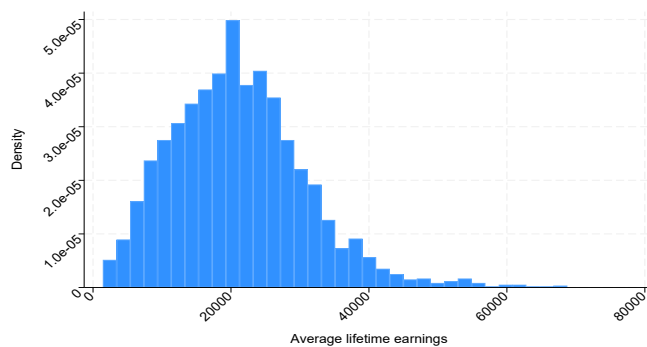
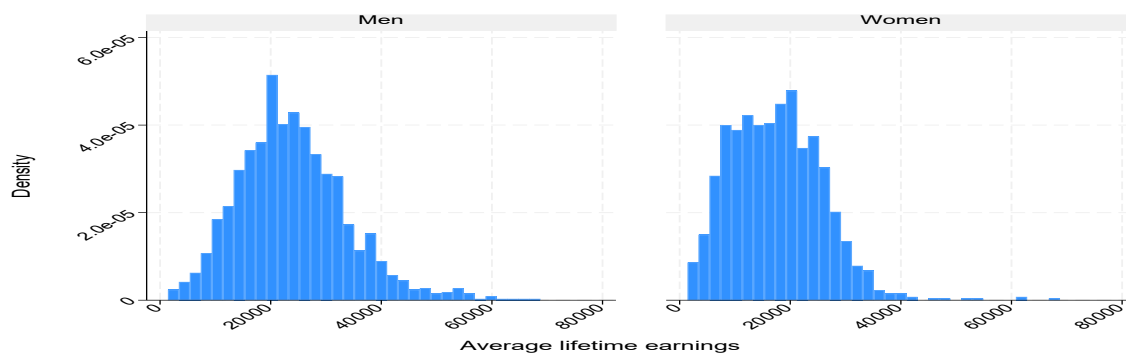
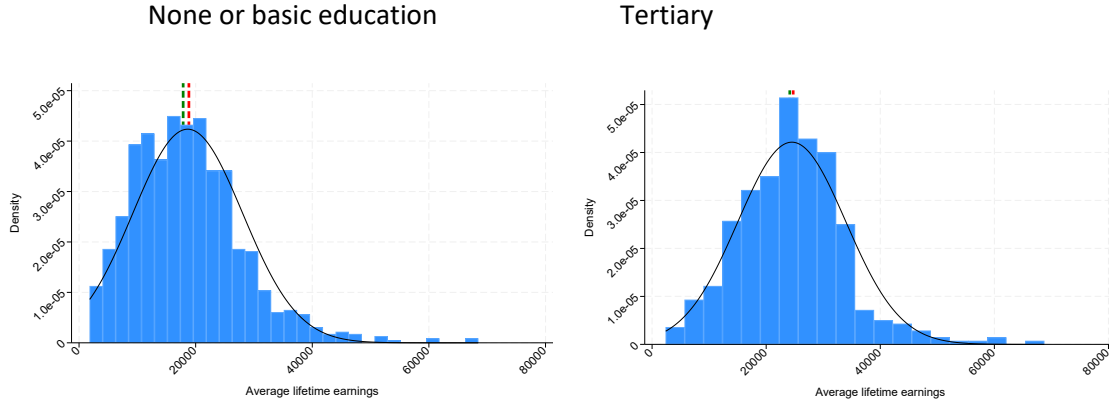


Figure 9. Distribution of average lifetime earnings by gender



The distributions by level of education show a difference between low and high education individuals (Figure 10 below and figure A1 in the appendix). The density for individuals with no or basic educations has a lower media compared to those with a tertiary degree, and is also bimodal, with a remarkable peak close to the lower end that is missing for those with tertiary education.

Figure 10. Distribution of average lifetime earnings by education level



Depending on the level of progressivity of pension benefits the differences in the ALTE will be reflected on the amount of pension benefits and pension wealth the individuals expect to collect at old age.

Social security wealth for an individual who retires at age t is the present discounted sum of the future stream of pension benefits that he/she will be entitled to, adjusted by their survival probability:

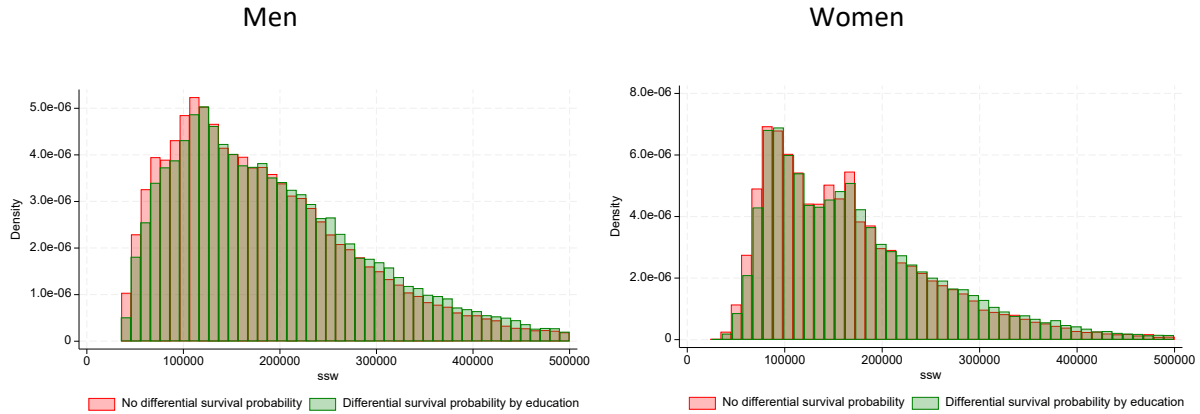
$$SSW_t = \sum_{a=t}^T B_a \sigma_{ta} \beta^{a-R}$$

where σ_{ta} represents the survival probability at age a in time t and β is the discount factor. In the sequel, we are going to compute SSW for all individuals in our sample across the ages 55-70, irrespective of whether they were retired or working at any given age within the said interval. The benefits at age “ a ” are set to what individuals would be entitled to if they retired at that age. They are therefore set to zero if the person was not eligible for any pension at age “ a ”.

The amount of SSW also depends on the life expectancies considered in the computations. These are of course different by gender, but also relate to education and life-time resources.

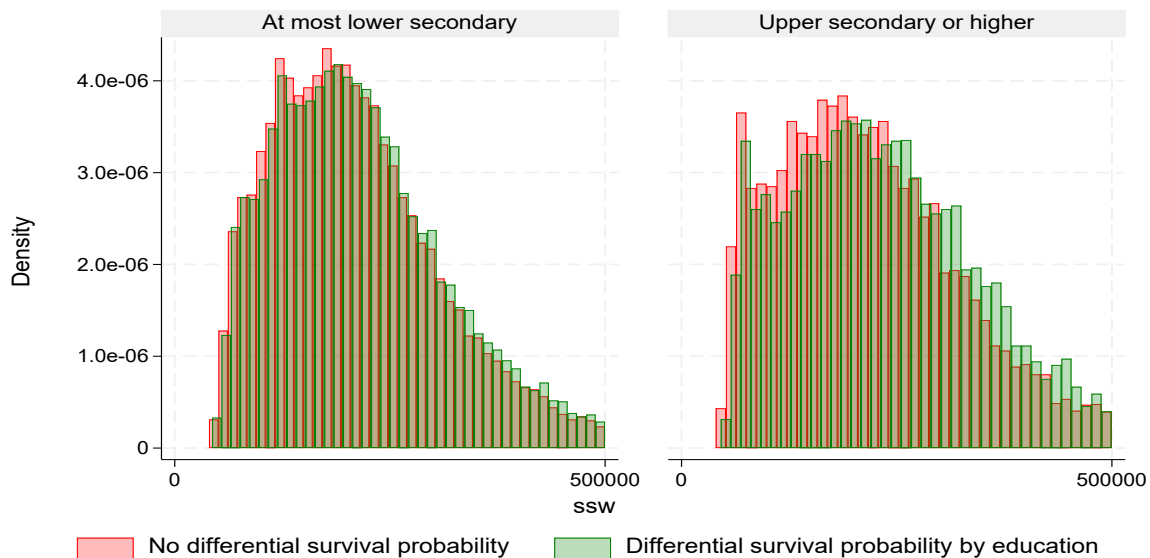
To investigate the role of differences in life expectancy by education, in Figure 11 we display the distribution of SSW separately for men and women, but for each gender we compute SSW using common or education-specific life expectancies. For men we see that the density is shifted to the right when we use education-specific probabilities. For women, changes are less clear-cut: there is a shift to the right at the bottom end of the distribution, but less of an increase in the probabilities at the upper end.

Figure 11. Distribution of SSW with common and education-specific survival probabilities: Men (left), Women (right)



We provide a more detailed representation of the main drivers of the differences for men when we plot the distribution of SSW separately by level of education. We consider two groups of individuals: those who have at most a lower secondary degree, and those who have upper secondary or tertiary education. The histograms in Figure 12 show that the individuals who see their pension wealth increased due to higher survival probabilities are the more educated.

Figure 12. Distribution of SSW with common and education-specific survival probabilities, men



The education gradient of SSW varied considerably over time. In Figure 13a we plot the average SSW for men by the same two education levels that we used in Figure 12 over the time period 1990-2022 when the pension reforms took place. The left picture does not allow for education-specific survival probabilities, the right picture does. We notice from the LHS picture that the wide gap by education was dramatically reduced by the Monti Fornero reform of 2011. The RHS graph confirms the redistributive

effect of this reform, even though the reduction is less pronounced given the higher life-expectancy of better educated individuals. Figure 13b extends the analysis to women – even though the trends in the 1990s and 2000s differ, the effects of the Monti-Fornero reform are qualitatively similar.

In Figure 14 we replicate the analysis by ALTE quintiles. We can detect drops in SSW both in the early 1990s (the Amato and Dini reforms) and in 2011, and a strong income gradient throughout. The gaps across individuals in different ALTE quintile increase when considering also the differences that exist between these categories with respect to their life expectancy. Figure 14 confirms the role played by the Monti-Fornero reform in the reduction of inequality.

Figure 13a. SSW with common and education-specific survival probabilities over time, men

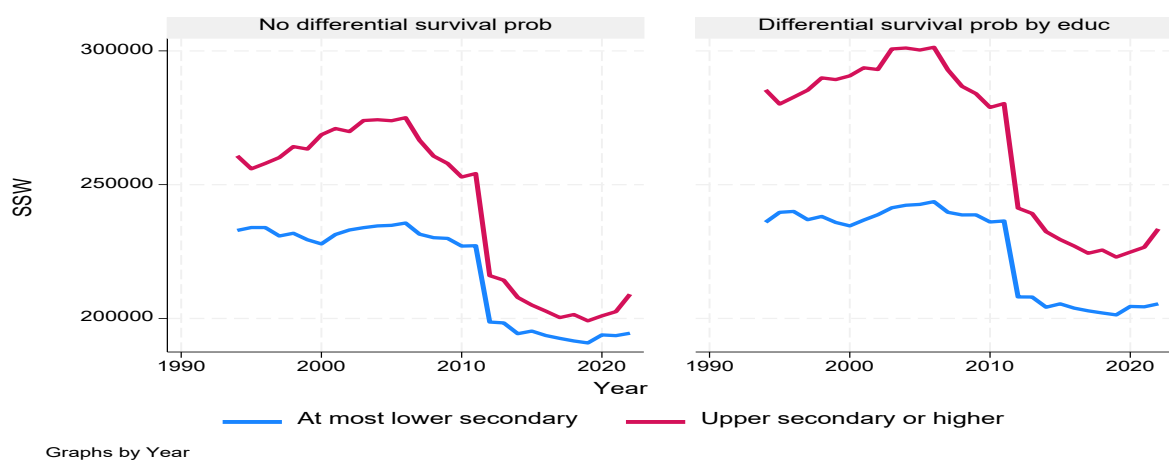


Figure 13b. SSW (at ages 55-70) with common and education-specific survival probabilities over time, all

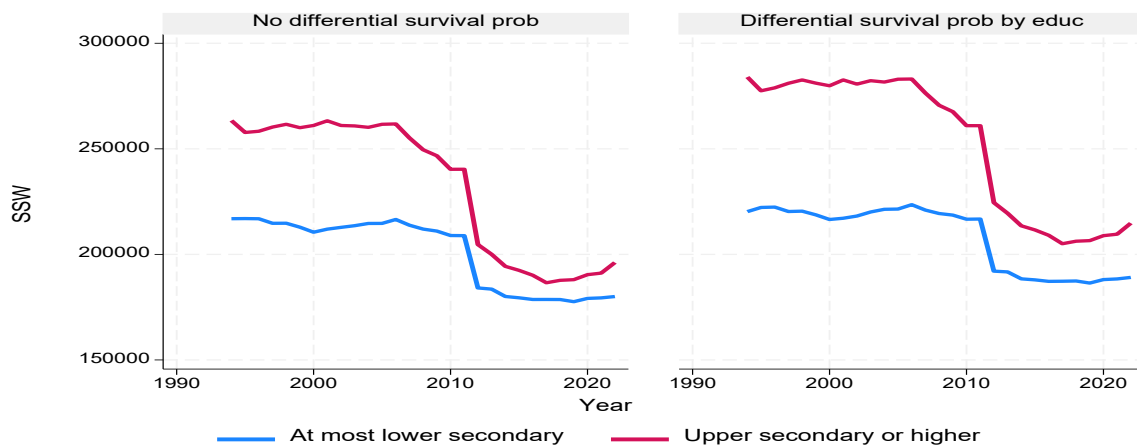
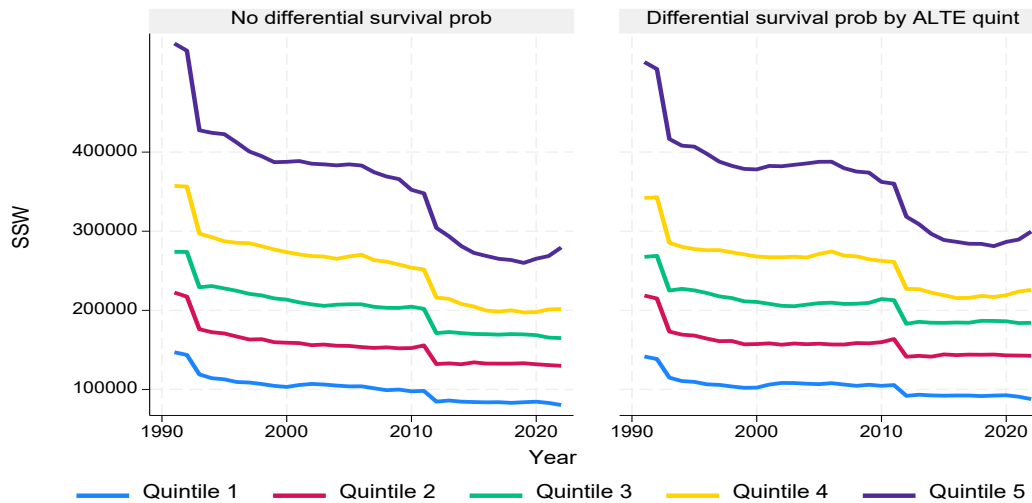


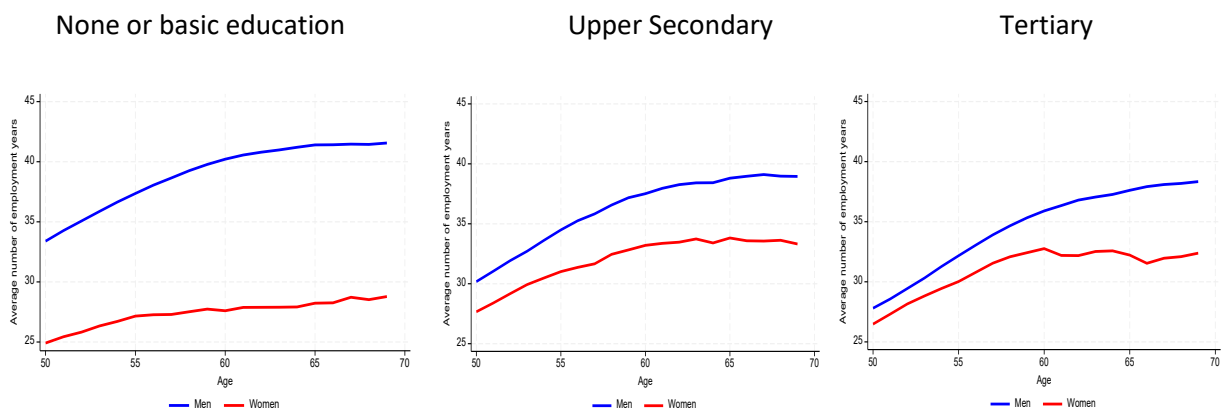
Figure 14. SSW with common and education-specific survival probabilities by ALTE over time



3.4 Inequalities in the working career

The length of working careers displays important heterogeneities by education and different patterns for men and women. As Figure 15 documents, low educated males exhibit significantly longer working careers at any age between 50 and 70 compared to the other education categories, while women display an opposite pattern: those with an upper secondary or tertiary degree accumulate more years of employment at any age than the less educated ones.

Figure 15. Length of working career by education and gender

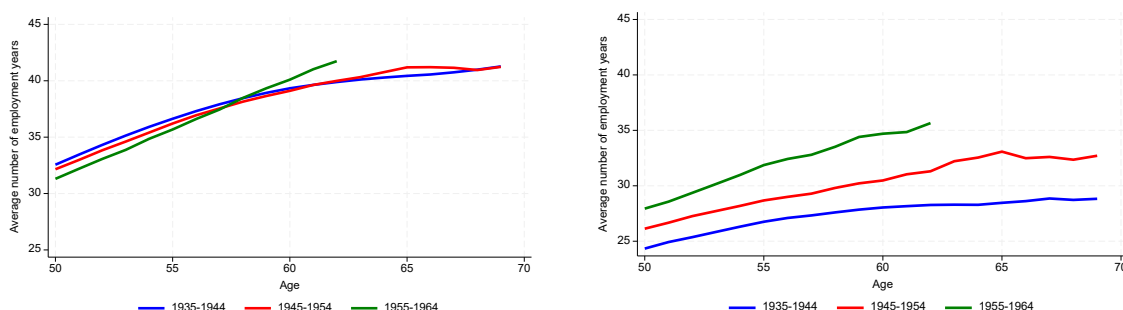


If we further analyze the number of employment years by age, separately by cohort and gender (Figure 16), we observe that men display similar patterns for the three cohorts under analysis. We also see a slightly lower cumulative number of working years at younger ages (up to age 58) for the more recent cohorts, probably due to the time spent in education and a later start of working life. However, individuals in the cohort 1955-1964 display a higher cumulative number of employment years above the age of 58,

which may relate to tighter eligibility requirements for both an old age- and an early retirement pension (both higher retirement age and number of years of contribution to SS).

In the case of women, there is a dramatic rise in the number of employment years at all ages for the younger cohorts and the gaps across cohorts increase as individuals get older. It is important to recall that in our analysis we only keep in the sample women that have been engaged in paid work at some moment during their life, so our statistics are not influenced by those who were homemakers throughout. While part of the gaps between cohorts may be due to a secular variation in female labor market participation, the widened gap at older ages is potentially due to the public social security reforms that tightened the eligibility requirements for a pension.

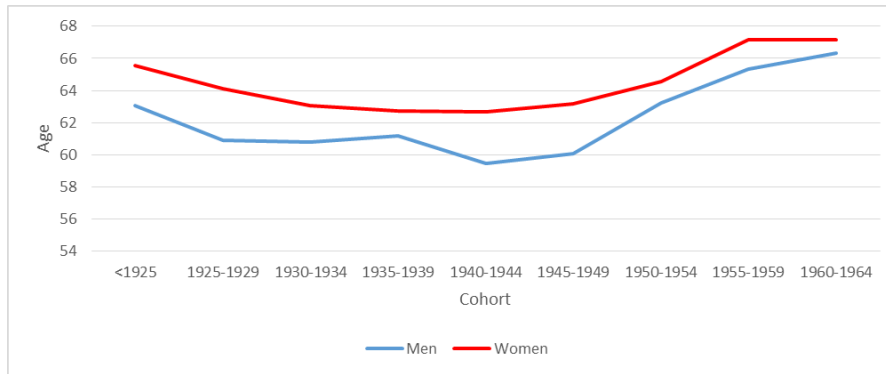
Figure 16. Average length of working career by cohort and gender, men (left panel) women (right panel)



The effect of the changes in eligibility age on retirement age are shown in Figure 17, that displays the average effective or expected (for the younger individuals) retirement ages for SHARE respondents by birth cohort and gender. We see a U-shaped curve for both men and women, with a maximum of 67 years of age touched by the most recent cohort of women (born 1960-1964).

We also notice that the effective retirement age for men lies always below that of women. Men typically have longer (and potentially uninterrupted) working careers that allow them to retire earlier by using the early retirement pathway, an option which has been less often available to females who often experience work disruptions related to maternity and/or care provision (either child rearing or assistance to older people).

Figure 17. Average retirement age for men and women by cohort of birth



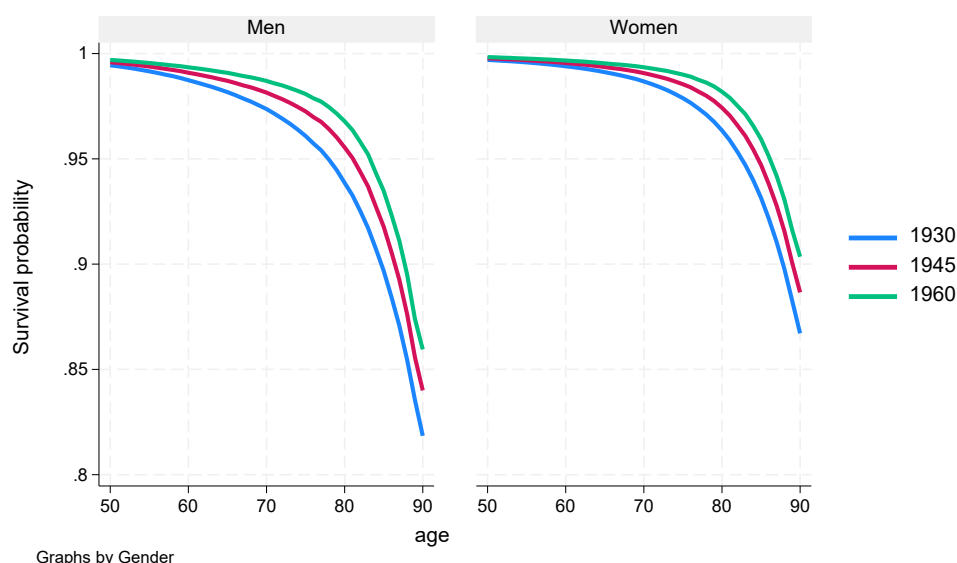
3.5 The role of survival probabilities

As highlighted above, a source of inequality comes from the different survival probabilities/life expectancies both across cohorts and, within the same cohort, among individuals with different levels of education/income. Recent research highlights that using common lifetables for designing pension schemes significantly impairs our ability to assess their redistributive role (Sanchez-Romero et al., 2020).

To describe the survival probabilities of the Italian population, we use the data provided by the Human Mortality Database (HMD). Based on HMD lifetables, spanning from 1910 to 2020, and following the approach of Peracchi and Perotti, 2009, we construct the survival probabilities by birth cohort and gender, for the generations born between 1900 and 1960.

Figure 18 describes the survival probabilities for three one-year birth cohorts 15 years apart. We take individuals born in 1930, 1945 and 1960, at ages between 50 and 90, and separate men and women. It emerges an important gap between genders and across generations with women displaying significantly higher survival probabilities. Younger cohorts are characterized by higher survival probabilities for both genders but the increase with respect to the older generations is slightly larger for males who therefore recover part of the gap vis-a-vis the females.

Figure 18. Survival probability by cohort, gender and age

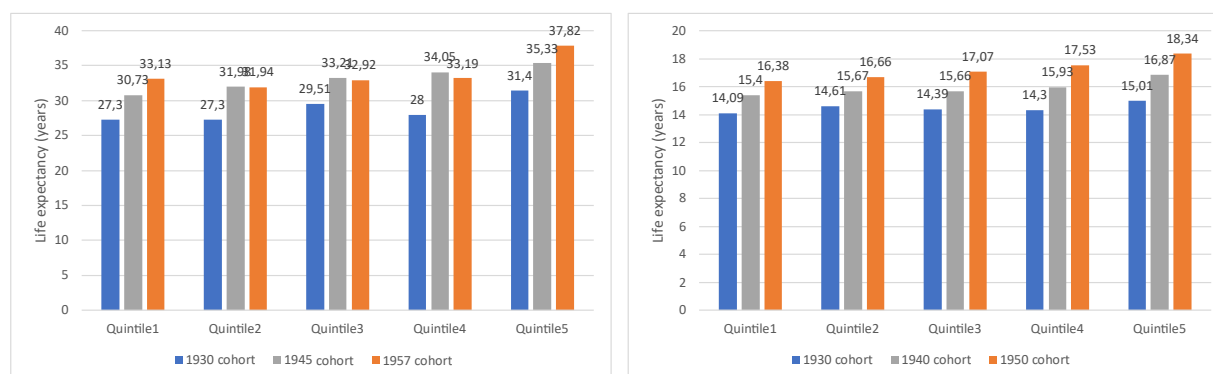


A very important issue in relation to our analysis is how life expectancy/survival probability varies by level of education/earnings. Indeed, it is commonly recognized and largely documented that educated (higher income) individuals enjoy better health and higher survival probabilities (Benzeval and Judge, 2001, ...). This may be due to multiple factors. Highly educated individuals are often engaged in occupations characterized by work environments with lower exposure to risks. They can afford better conditions, healthier living environments and lifestyles and have access to better medical care. Moreover, many of them are “endowed” a higher level of health stock early in life.

Unfortunately, there are no official data available on survival probabilities by education/income and birth cohort for Italy. We use the life expectancies computed by Ghislandi and Scotti, 2022, based on administrative data from the Italian National Institute of Social Security (INPS). We have to acknowledge that these data include private and public employees but provide no information on other categories, such as the self-employed (or homemakers).

Figure 19 depicts the life expectancy for men aged 50 (left) and 65 (right), by earnings quintile, separately for three cohorts of birth, 1930, 1945 and 1957. We see non-negligible gains in life expectancy for all earnings quintiles for the post-WW2 generations, both at age 50 (between 3.5-6.5 years) and at age 65 (between 2 to 3.3 years). In addition, very important for our analysis is the gap between low and high earnings individuals, of about 4.5 years at age 50 and about 1-2 years at age 65. We should note however that these differences are smaller compared to other countries covered in this volume (see for example the UK chapter shows that the gap between the bottom and the upper earnings quintiles at age 55 was of about 7 years for men born in 1930 and around 6 years for men born in 1960).

Figure 19. Life expectancy of men by earnings quintile and cohort at age 50 (left panel) and 65 (right panel)



Data source: computations by Ghislandi and Scotti, 2022

It is worth stressing that the new NDC formula of computation of pension benefits takes into account the variation across generations in life expectancy by periodically adjusting/updating the transformation coefficients (applied to the contributions amount). However, these coefficients do not vary by gender, nor by education or income level.

4. The reforms and the evolution of inequality

To what extent have the pension system reforms of the past three decades in Italy affected the redistributive role of the public pension system and influenced inequality in old age? To answer these questions we note that the overall outcome involves (i) a direct effect through the changed computation rules of public pension benefits and (ii) an indirect effect induced by the variations in the eligibility requirements, more specifically, in the Italian case by the increase in the SRA.

4.1 The direct effect of reforms on inequality

Thanks to our analysis of micro data, we can start addressing these questions by comparing the distribution of pension benefits as we observe them today (“actual”) to those that we would observe if the pension reforms had not taken place (“counterfactual”).

Figures 20 and 21 display the actual versus counterfactual annual average pension benefits, between 1990 and 2022. The counterfactuals were computed under the assumption that the two most important reforms (Dini – 1996 and Monti-Fornero – 2011) had not been enacted.

We glean from the two figures that the effect of the 1996 reform on the amount of pension benefit was delayed due to the grandfathering approach, while the cumulated effect of the two measures, after 2011, was rather immediate and more significant. However, the patterns are different for men and women.

Due to their longer and uninterrupted working careers, men were affected much later by the Dini reform - that eventually prolonged the working lives of older males’ generations without any important change on

the amount of the pension benefit. The average actual annual pension benefit becomes lower than the counterfactual only after the Monti-Fornero reform, and, successively, in 2015, the curve also becomes downward sloping.

For women, instead, the average amount of actual pension benefits becomes lower than the counterfactual much earlier. However, the curve maintains a positive slope, the pension benefits continue to increase (although at a slower rate) also after the two reforms. This may be the consequence of the large increase in the number of working/contribution years that enter the benefit calculation formula. These are particularly relevant for women, who, especially in the generations under the present analysis, have been characterized by short and discontinuous working careers with negative consequences on the amount of their pension benefits.

Figure 20 Actual versus counterfactual pension benefits

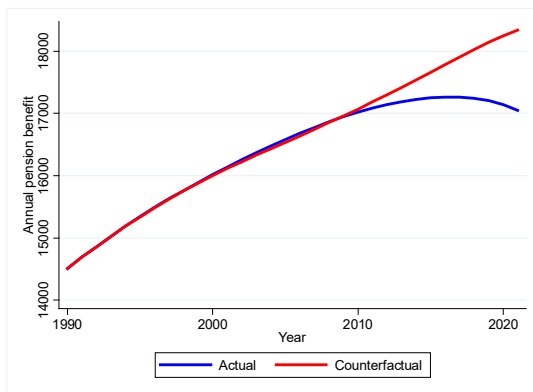
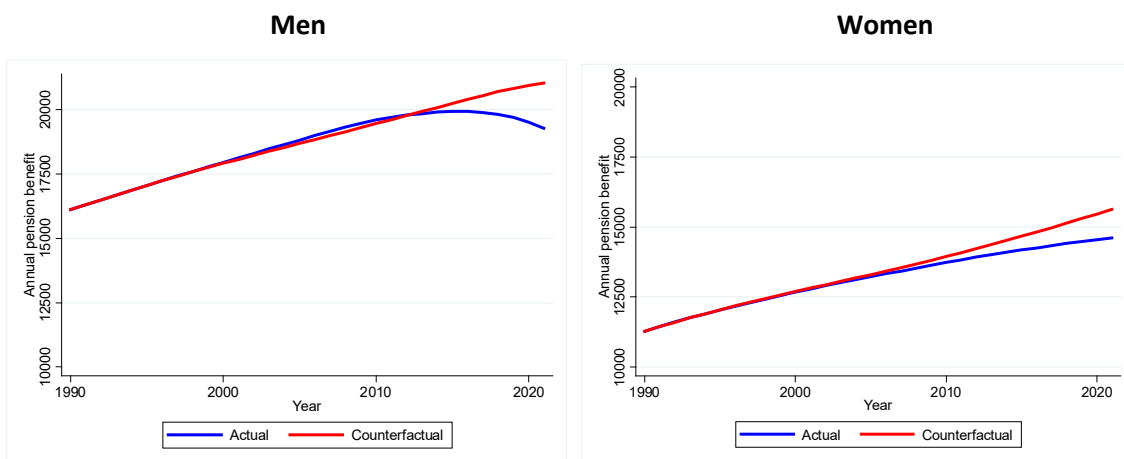


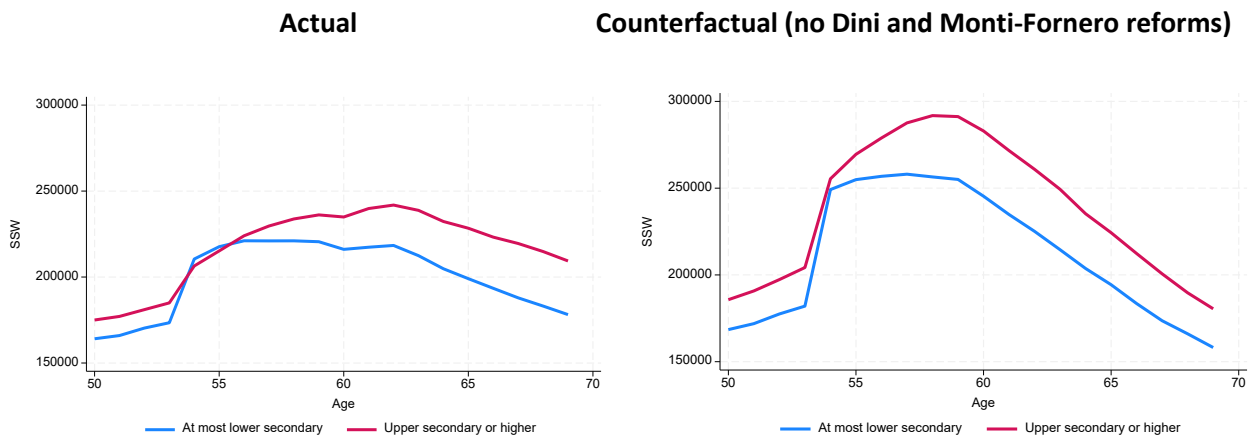
Figure 21. Actual versus counterfactual pension benefits by gender, men – left - and women – right



From an inequality perspective, it is extremely important to understand how the reforms affected pension wealth (SSW). In Figure 22, we split the sample in two groups of similar size: those with at most lower secondary education, and those with upper secondary or tertiary education. From Figure 22 it emerges that in the absence of reforms the gap among individuals with different levels of education would have been

much larger especially if retiring at younger ages (below 63). However, at retirement ages above 62 there is a similarly large gap by education.

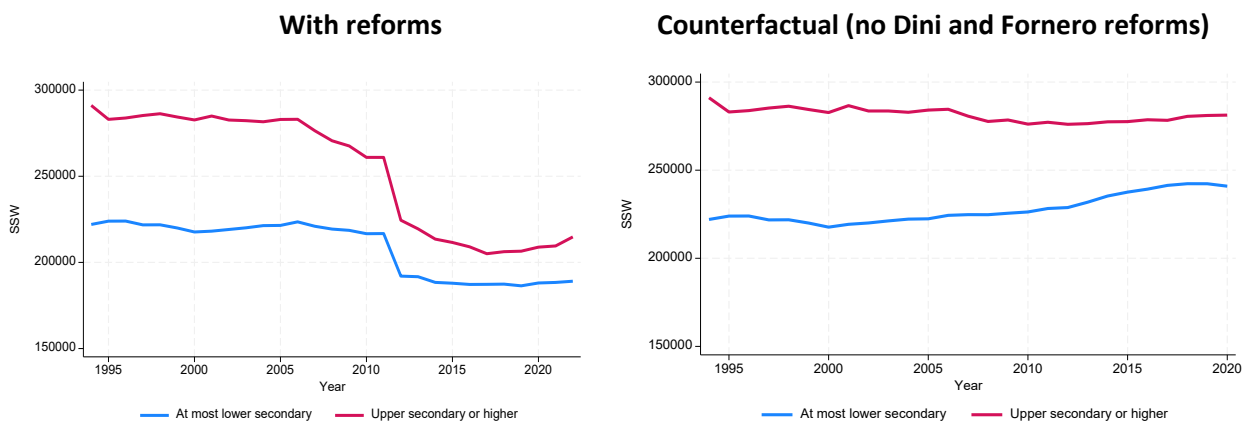
Figure 22. Average SSW by age and education in presence (left) and in absence of reforms (right)



We can get additional insights from Figure 23, which displays the current and counterfactual trends in SSW over the years from 2004 to 2022, separately by education.

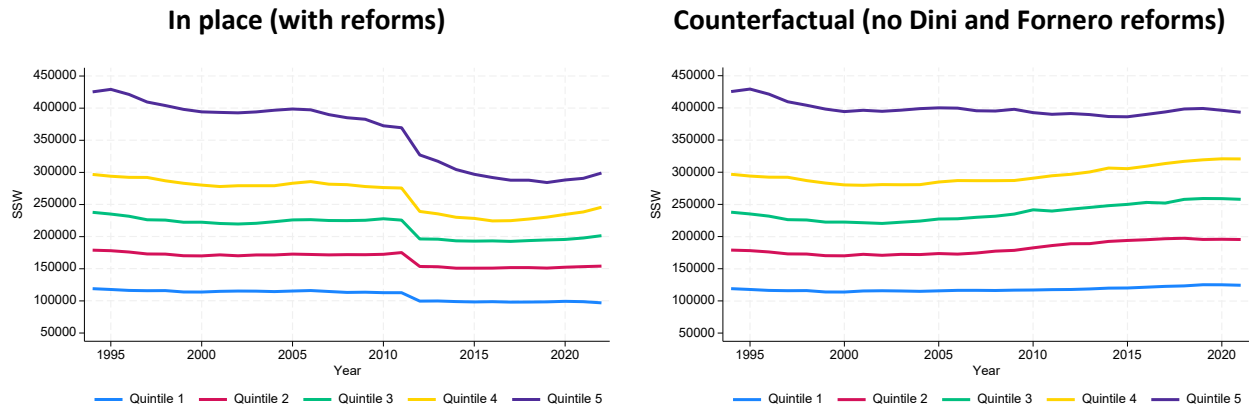
The graph documents several interesting effects. On the one hand, we can see a dramatic decline in the SSW for all the individuals due to the 2011 Monti-Fornero reform, of larger magnitude for the higher educated ones. When comparing the current/effective situation with the counterfactual we can observe that while there is a slight reduction in the observed gap between high and low educated individuals already starting in 2007, the decline is much more important after 2011. Our computations indicate that in the absence of interventions the difference in the average SSW between the individuals with higher and lower education would have fallen much more slowly, and remained in the 50,000 Euros region after 2020. This highlights the fact that the recent pension reforms, in particular the 2011 Monti-Fornero reform, have played a significant role in reducing inequality at older ages.

Figure 23. Average SSW by level of education in presence (left) and in absence of reforms (right)



A similar message emerges when displaying the SSW at age 60 along time by ALTE quintile (Figure 24). This comparison emphasizes the redistributive role of the public pension system due to the most recent reform that penalized most the top quintile, and had a minimal effect on the bottom quintile of the income distribution.

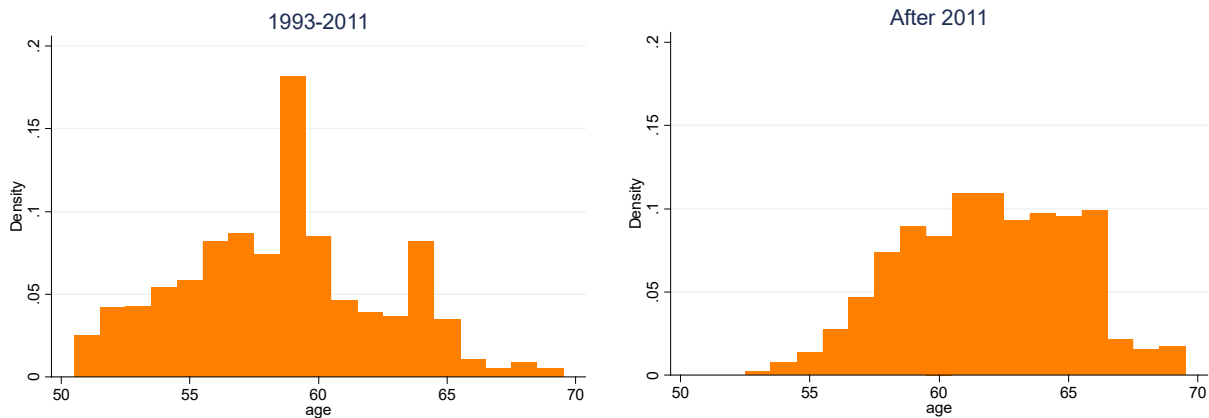
Figure 24. Average SSW by income quintile in presence (left) and in absence of reforms (right)



4.2 The indirect effect of reforms on inequality

A less evident effect of the reforms is the one exerted through the changes in the eligibility requirements that postponed the exit of employees through retirement. The Amato and Dini reforms introduced a gradual increase in the retirement age and the years of contribution already starting with 1993, but the measure implemented in 2011 was much more dramatic, especially for women. Figure 25 shows the distribution of the effective retirement ages among the individuals in our sample for those who retired before 2011 versus those who retired after this year. We can easily observe a shift from the age band 55-60 in which most retirements occurred in 1993-2011 towards ages above 60 in the years after the Monti-Fornero reform. Figure A3 in the appendix describes in more detail the changes along time in the effective retirement ages, by distinguishing four time periods: before 1993, 1994-1999, 2001-2011 and after 2011.

Figure 25. Distribution of retirement ages in the SHARE sample before and after 2011



We evaluate the magnitude of the indirect effect by comparing the pension wealth under the actual conditions with the pension wealth that individuals would have obtained if the pension reforms had changed only the eligibility requirements for retirement while leaving unaltered the computation of pension benefits. We calculate the SSW of the individuals under the actual and the “no reform” hypothesis as weighted means of the SSW when retiring at any age in the interval 50 to 75, where the weights are the probabilities of retiring at that given age. For this exercise, we make use of the estimations of predicted and counterfactual retirement probabilities by age from Brugiavini et al., 2024. The average SSW by cohort of birth under the two scenarios is shown in Figure 26.

To understand the overall effect, we must keep in mind that postponing retirement has two effects on SSW going in opposite directions. On the one hand, it shortens the time span over which pension benefits are collected. On the other hand, it determines an increase in the number of employment years and therefore, in the number of years of contribution, which in turn increase the amount of the pension benefit.

The predicted and the counterfactual SSW coincide for the individuals born up to 1943, but they deviate for those born after this date and the gap increases as we move towards younger generations. For the most recent cohorts, SSW is reduced because of the reforms compared to the counterfactual scenario because the first effect prevails.

Figure 26. Average SSW using predicted vs. counterfactual retirement probabilities

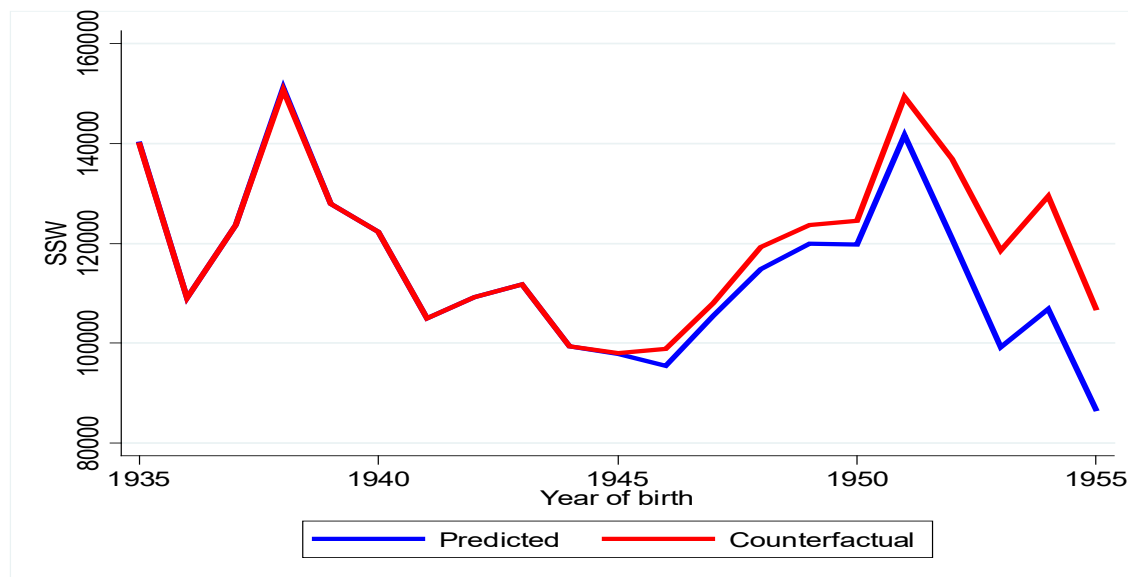
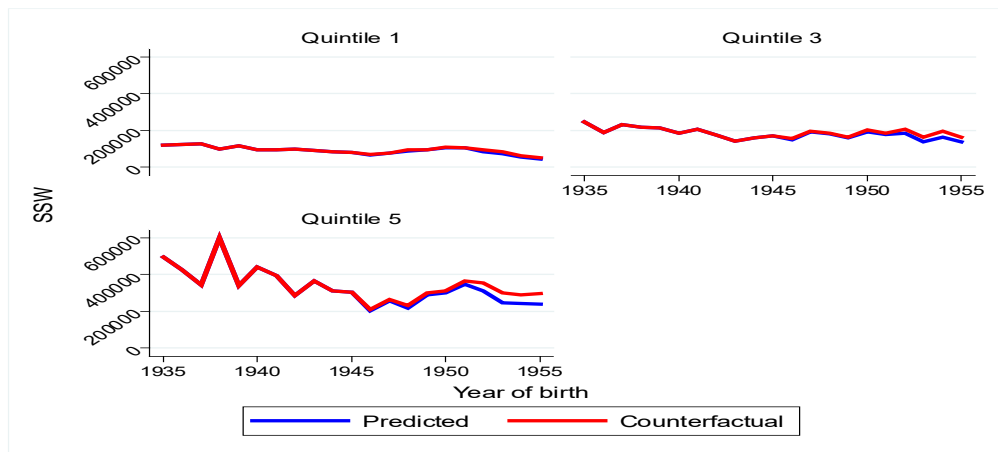


Figure 27 presents plots of SSW in the (predicted) actual versus the counterfactual scenarios by ALTE quintile. It is immediate to observe that the indirect negative effect of the reforms is strongest for the highest income quintile. For the lowest income quintile, the overall effect is negative, but of much smaller magnitude, possibly because these individuals started working much earlier and the longer working careers allowed them to retire at younger ages even after the reforms came into force.

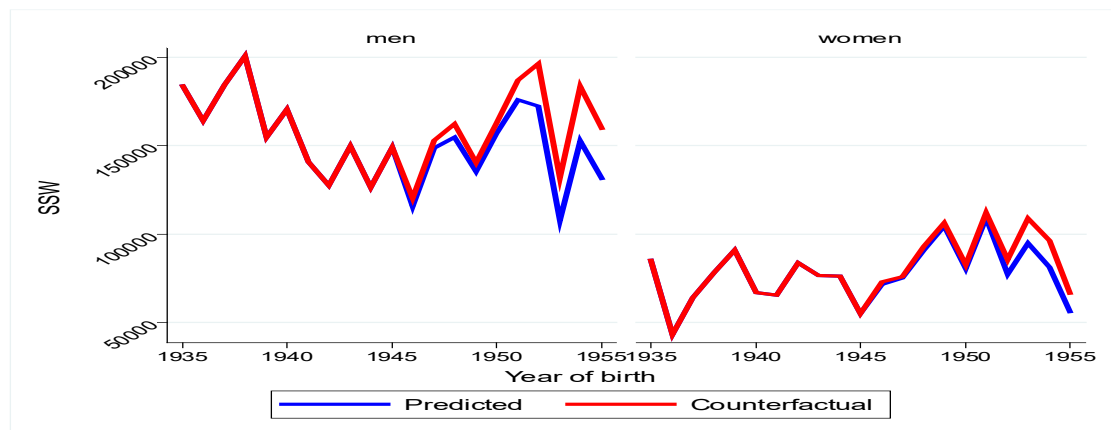
Figure 27. Average SSW using predicted vs. counterfactual retirement probabilities by ALTE quintile



It is also interesting to observe, that while the changes in the eligibility for women have been more dramatic than those regarding men, the indirect effect on males is larger than that on females (Figure 28). One possible explanation hinges on the larger life expectancies of women that may have buttressed the mitigating effect of the benefit increase.

Before coming to firm conclusions, we should stress that the indirect effect of the 2011 reform is only in part visible in our data because the reform affects more the younger generations that have not yet retired.

Figure 28. Average SSW using predicted vs. counterfactual retirement probabilities by gender



5. Econometric analysis of the effects of pension reforms on SSW

Estimation of a multivariate linear regression can help us to get a clearer picture of the direction and magnitude of the effects that pension reforms had on the pension wealth.

We run an ordinary least square regression in which the dependent variable is the social security wealth (expressed in thousands of 2022 euros) and the explanatory variables are age, gender and schooling degree of the individual, plus two binary variables associated with the pension reforms of 1996 and 2011

respectively. To these, we also add in a more complete specification, the interaction variables between the level of education and the reforms dummies. Table 2 below reports the results of these estimations.

The estimates in column 1 shows the average effect of the reforms, controlling for the covariates listed above: Both reforms are significantly and negatively associated with the amount of the SSW and the magnitude of their effects is larger in absolute terms for the Monti-Fornero reform.

In column 2, we show the distributional effects of the reforms by introducing interaction variables. The estimates reveal important differences. The 1996 reform had a large negative impact on all, but we don't detect significant difference by education (if anything, the more educated individuals were affected less). The Monti-Fornero reform also had a negative impact for all, but there is strong evidence of a significant additional negative impact for individuals who attained upper secondary or tertiary education.

Table 2. OLS estimates of SSW

VARIABLES	(1) SSW/100000	(2) SSW/100000
Age	0.00117 (0.00169)	0.00171 (0.00172)
Woman	-0.417*** (0.0377)	-0.415*** (0.0374)
Upper secondary or tertiary education	0.355*** (0.0405)	0.442*** (0.165)
Dini reform	-0.203*** (0.0639)	-0.259*** (0.0709)
Monti-Fornero reform	-0.599*** (0.0303)	-0.433*** (0.0352)
Upper educ*Dini reform		0.129 (0.158)
Upper educ* Monti-Fornero reform		-0.417*** (0.0596)

Given the differences in the labor market histories of women compared to men, and given the differential requirements for pension eligibility that existed prior to the reforms, we perform the above regressions separately for the subsample of men and of women (Table 3). Columns (1) and (2) show the effects by gender regardless of education. The decrease in SSW associated to both reforms is of comparable magnitude for men and women.

In columns (3) and (4) we allow for separate effects by education. We find that the 1996 reform (Dini) is associated with a decrease in the SSW for both males and females and the magnitude of the effect is not significantly different for more educated individuals, even though we estimate effects of opposite sign for men with higher education (who were less affected) and for women (who were more negatively affected).

As for the Monti-Fornero reform, when we allow for differential effects by gender and education, we observe that men with lower education were worse affected than women, but the gender difference disappears when we look at individuals with upper education.

Table 3. OLS estimates of SSW, by gender

VARIABLES	SSW/100000	SSW/100000	SSW/100000	SSW/100000
	Men	Women	Men	Women
Age	-0.00461* (0.00249)	0.00875*** (0.00214)	-0.00384 (0.00253)	0.00891*** (0.00219)
Upper secondary or tertiary education	0.329*** (0.0588)	0.387*** (0.0537)	0.299 (0.212)	0.739*** (0.248)
Dini reform	-0.190** (0.0831)	-0.197** (0.0927)	-0.256*** (0.0919)	-0.214** (0.100)
Monti-Fornero reform	-0.637*** (0.0424)	-0.555*** (0.0427)	-0.501*** (0.0483)	-0.337*** (0.0505)
Upper educ*Dini reform			0.212 (0.203)	-0.0761 (0.238)
Upper educ* Monti-Fornero reform			-0.360*** (0.0858)	-0.510*** (0.0806)

6. Conclusions

This chapter analyzes the evidence on inequalities throughout life, with a focus on the old age in Italy. More specifically, we aim to explore how the social security reforms enacted in the past thirty years may have altered the redistributive role of public pension benefits. Triggered by concerns on the sustainability of the SS system, the interventions in Italy were meant to postpone retirement, lengthen the working lives and create a better balance between contributions paid throughout the working life and the benefits received in old age. Therefore, eligibility requirements have been tightened for all retirement routes with increases in the SRA between 7 to 12 years, over the past thirty years, for men and women respectively. The goal of achieving the balance between contributions paid and benefits received was tackled through the passage from a DB to a NDC system which led to a decrease in the generosity of the pension system.

Both the 1995 Reform and the 2011 Reform started being particularly effective after the year 2011, in fact the 2011 reform was explicitly designed to address the financial imbalance of the public pension system in a short period of time, which is why the effects of this reform were immediately reflected in retirement decisions.

It restricted the possibility to claim a pension at relatively young ages (less than 62) even for those individuals with 40 or more years of contributions and introduced with immediate effect a calculation methodology based on a pro rata share of defined contribution pension benefits.

From an inequality perspective the effects of the reforms can be evaluated through the variations that they produced in the amount of pension benefits and Social Security Wealth (SSW) with respect to the pre-reforms period. By analyzing in parallel the actual and the counterfactual values of the pension wealth we find that the implications were twofold: (i) a direct effect on the amount of the SSW collected in old age, that stems from the change in the calculation method of pension benefits and (ii) an indirect effect, due to the changes in the retirement ages of individuals.

The evidence is that the 2011 reform negatively affected to a larger extent the more educated individuals, which also represent the categories with larger income, leading therefore to a slight decline in the inequality of the SSW with respect to the past. It is important to note that for the Italian pension system these effects persist even when considering the differences in the survival probabilities between individuals with different levels of education (income).

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Appendix

Figure A1. Distribution of ALTE by cohort

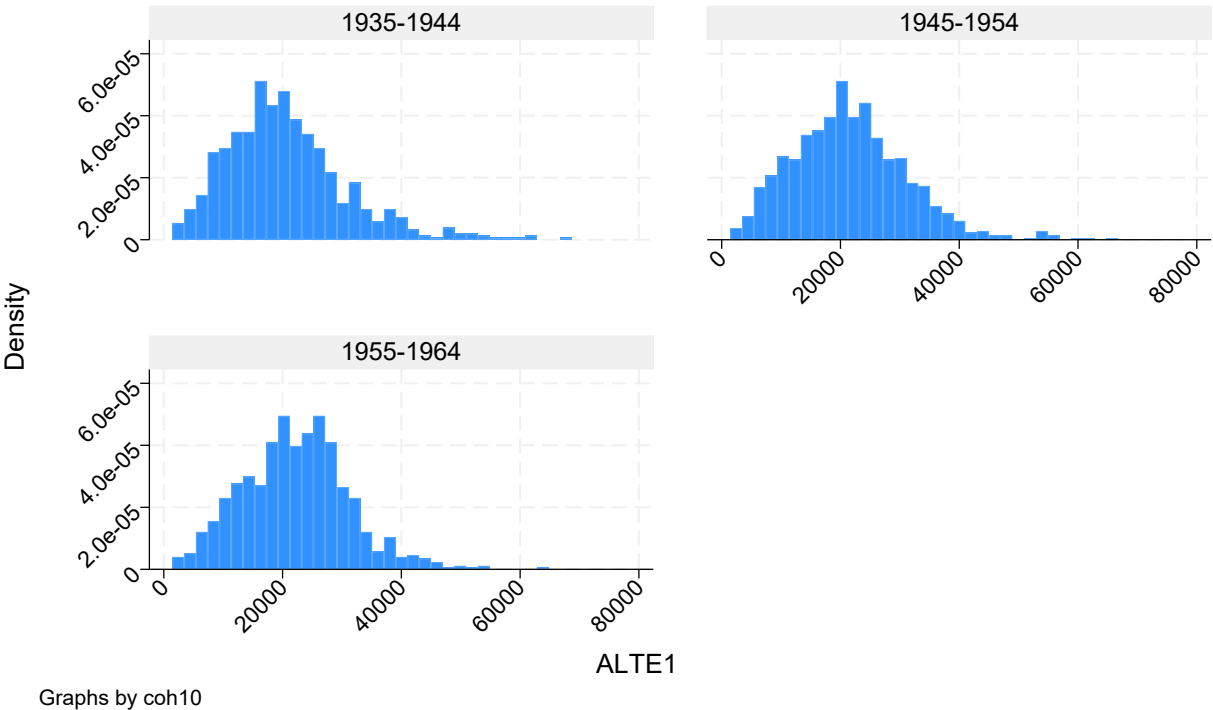


Figure A2, Distribution of ALTE by education

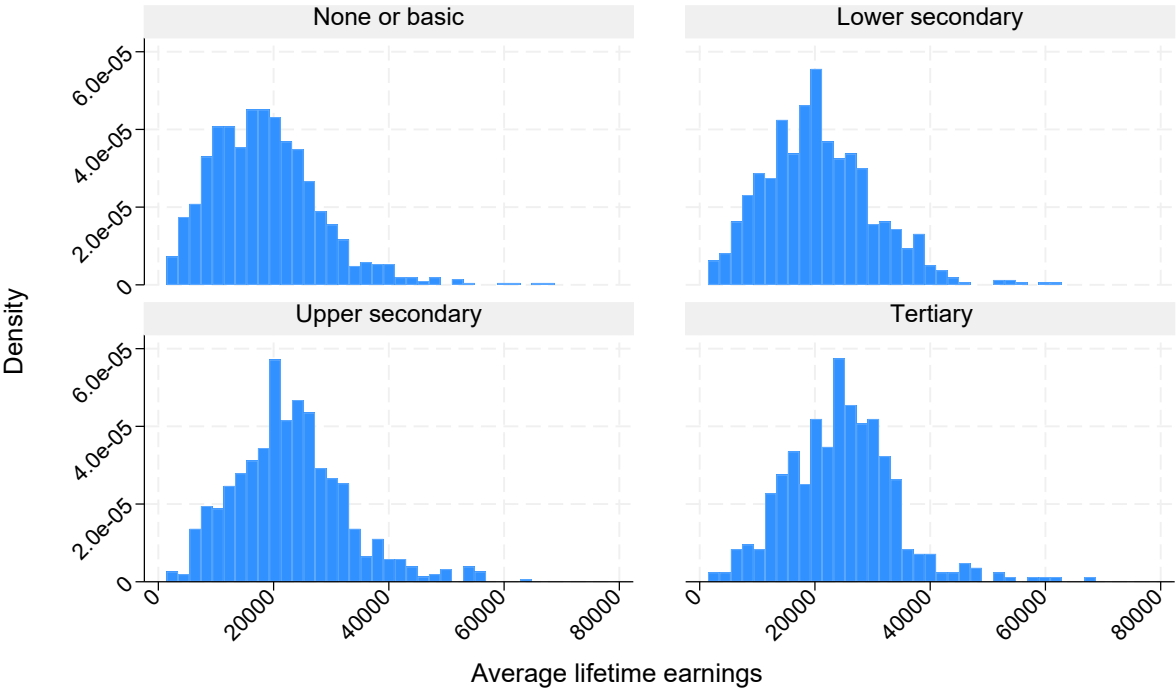


Figure A3. Distribution of actual retirement ages by time period, men (left) versus women (right)

