Aug, 2025
GRINS DISCUSSION PAPER SERIES DP N° 51/2025 ISSN 3035-5576

GRINS

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ACKNOWLEDGEMENTS

This study was funded by the European Union - NextGenerationEU, in the framework of the GRINS - Growing Resilient, INclusive and Sustainable project (GRINS PE00000018). The views and opinions expressed are solely those of the authors and do not necessarily reflect those of the European Union, nor can the European Union be held responsible for them.

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Author(s): Carlo Mazzaferro, Martina Griseri. Title: Intergenerational Inequalities in an Aging Welfare State: Labor Market and Pension System Income Dynamics in Italy, 1977–2022.. Publication Date: 2025.

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JEL classifications: H55; J11; J21; D31; I38

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
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Discussion Paper Series

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Discussion paper n. 51/2025

Carlo Mazzaferro, Martina Griseri

ISSN 3035-5567

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Abstract

This paper investigates the evolution of the relative income position of workers and retirees in Italy over the 1977–2022 period, amid demographic aging, pension reforms, and labor market transformations. Using data from the Bank of Italy's Survey on Household Income and Wealth (SHIW-HA), we construct an income-based classification of workers and pensioners to analyze trends in income levels, inequality, and poverty. Our findings confirm a structural reversal: retirees have experienced rising real incomes, declining inequality, and reduced poverty risk, while workers—especially younger cohorts—face stagnating wages, growing inequality, and rising poverty. The analysis highlights the role of institutional changes, particularly the shift from defined-benefit to notional defined-contribution pensions and labor market deregulation, in shaping these dynamics. We employ various indicators—including Gini coefficients, poverty rates, income composition analysis, and cohort-based comparisons—to assess intergenerational disparities. The study contributes to the literature by emphasizing the strong link between the pension system and the labor market and underscores the urgent need for coordinated policy responses to ensure both financial sustainability and social adequacy in aging welfare states.

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Introduction

Italy has undergone a profound demographic transition that has already reshaped the population's age structure. According to the 2022 Census, the old-age index (computed as the ratio between individuals aged 65+ and those aged 0-14) reached 193,1% in 2022. As discussed by Scolfaro (2016), Italy is among the countries most affected by what is known as the "second demographic transition", driven by persistently low birth rates (around 1.4 children per woman) and rapid population ageing. These trends are only partially offset by immigration and have led demographers to describe Italy as one of the "oldest countries in the world", with a median age exceeding 44 years. Building on such a demographic imbalance, this paper investigates the evolving relative income position of retirees and workers in Italy over the period 1977–2022, a time marked by significant reforms in both labor market regulation and the pension system.

A substantial body of literature has examined the evolution of poverty and income inequality between generations, particularly focusing on the diverging economic conditions of younger and older households and individuals in Italy and across OECD countries. Empirical studies have highlighted how labor market reforms, pension system restructuring, and demographic transitions have created the conditions for a widening intergenerational divide (Brandolini, 2009; Franco et al., 2008; Rosolia & Torrini, 2016; Naticchioni et al., 2016). While pensioners have seen a substantial improvement in income levels, together with a reduction in poverty rates, and income equality—largely due to the maturing of generous defined-benefit (DB) schemes (Fiorio, 2011; Arezzo & Strangio, 2019; Brandolini et al., 2019)—younger workers have faced stagnating wages, rising inequality, and increasing labor market fragmentation (Rosolia, 2010; Ballarino et al., 2014; Castellano et al., 2021). These dynamics have led to structural intergenerational inequality, with fiscal policies favoring pension spending (OECD, 2011; Ballarino et al., 2014). At the same time, concerns rise about the long-term adequacy of Italy's pension system, especially under the transition to a notional defined contribution (NDC) model that may exacerbate workers' precarious conditions by tying benefits more closely to unstable and low-wage career paths (Borella, 2004; Borella & Coda Moscarola, 2004).

Our contribution to the literature is fourfold. First, we update and extend previous findings by offering a comprehensive 45-year overview with recent data, reinforcing claims about the growing economic advantage of retirees with respect to workers. Second, we unpack the relative positions of retirees and workers by analyzing income not only in mean terms but across distributional, compositional, and household dimensions. Third, we provide links with

the institutional mechanisms that have driven the intergenerational divide. Fourth, we provide an income-based definition of pensioners and workers, rather than the more common age-based categorization found in existing literature. This approach enables consistent comparisons over a long period during which the statutory and effective retirement ages have changed substantially. It also aligns more closely with the core objective of the study, as we are interested in evaluating the relative income position of workers and retirees as economically defined groups. Furthermore, our analysis highlights key implications for welfare state design, emphasizing that the growing generational imbalance threatens the adequacy and fairness of social protection systems. As the pension system transitions to Notional Defined Contribution (NDC) rules, future retirees risk inadequate benefits due to unstable careers and low earnings. Addressing this requires coordinated reforms in both the pension and labor markets, aimed at improving job quality. By situating our findings within broader discussions on demographic change and policy reform, the study advances understanding of evolving social inequalities in aging societies.

Our analysis is structured as follows. *Section 1* presents data and methods, specifically focusing on the definitions used to separate the two groups. *Section 2* provides an extensive literature review, focusing on previous works and results on which we built our analysis. This will provide a framework in which we insert our results. *Section 3* outlines some socio-demographic characteristics of the sample and focuses on the relative dynamics of pension and labor incomes, trying to outline the institutional factor that shaped them, both on the labor market and the pension system. Further consideration is given to intergenerational trends for both incomes, as we provide a cohort-based decomposition of the mean income levels at the same age for both groups. In *Section 4* we explore more deeply the drivers detectable in data for the rising divide between retirees and workers in terms of income, by considering multiple income sources and the role of capital income, by adding the household dimension, by assessing income distribution using different measures such as the Gini index and quintile decompositions. Furthermore, we conclude the section by analyzing the Eurostat-60 poverty rates. Finally, *Section 5* discusses our results and draws some policy implications and potential correctives. An extensive outline of the major institutional changes for the Social Security System and the labor market is provided in the *Appendix*.

Section 1 - Data and Methods

We are interested in assessing workers' and retirees' income relative position and their evolution over time. To the scope, we employ data from the Bank of Italy's Historical Archive (SHIW-HA). We take into account variables carrying information about demographic and occupational characteristics, household income, individual earnings and old age pension treatments.

We consider pensioners as individuals whose main source of income is represented by work-related pension income[1]. Parallelly, we consider workers as individuals owning a positive labor income as the main income source, both employees and self-employed, who defined themselves as workers[2]. To avoid overlaps with retirees, since there are some who self-identify as workers but have retirement income as their main source of income, we also impose that to be defined as a worker, an individual must have self-employment or salaried income as their main source of income.

While the relative poverty and inequality among younger and older households have already been explored in the literature, (Mazzaferro et al., 2005; Franco et al, 2008; Brandolini, 2009; Berloffa, Villa, 2010; Franco et al, 2012; OECD, 2013; OECD 2015; OECD, 2017; Naticchioni et al, 2016; Rosolia, Torrini, 2016; Brandolini et al, 2019; EU, 2021; RGS, 2023; RGS 2024; EU 2024), we specifically focus on retirees and workers, by looking at different determinants of the two groups' condition.

We use previous works to validate our results, updating them in the light of the most recent years trends. We also consider contributions with a more international perspective (OECD, 2011; OECD 2013; OECD 2017; Franco et al, 2011; EC, 2024), to insert our results in a broader framework.

[1] A particular dataset pertaining to pension statistics can be found in the historical archive of the Bank of Italy. We extracted the information required to differentiate between various pension income sources from this section of the repository; then we separated different types of pensioners based on their income source. We chose to consider only old-age and early-retirement pensioners with work-related benefits. Survivor pensioners and inability pensioners (defined as those whose main source of income is inability or survival pension treatment) are not included in our definition.

[2] Such a self-definition exists also for pensioners. However, we did not consider such a variable for them, as our definition provides a broader picture. In fact, there are some pensioners in our dataset who self-define as workers, but whose main source of income is work-related pension income. We therefore prefer to consider them among the pensioners.

Section 2 - Literature review

Relative poverty and inequality among different generations have been deeply explored in literature, both concerning Italy and OECD countries. More specifically, a growing body of empirical research investigates how labor market and pension reforms, as well as demographic shifts, have jointly influenced income inequality and poverty in Italy, revealing a critical and widening divide between the economic position of workers and pensioners. The evolution of this divide, and the policy regimes that shape it, are traced using different data sources and a wide range of inequality measures. We briefly review some contributions, which will serve as a framework to better understand our results.

As for the data sources, two kinds of data are mainly considered. Some of the empirical studies rely on administrative datasets such as the Work Histories Italian Panel (WHIP) and INPS records, which offer longitudinal detail on wages, contracts, and job duration (e.g., Brandolini, 2009; Rosolia, 2010; Rosolia & Torrini, 2016; Naticchioni et al., 2016,), while others make use of household surveys, chiefly the Bank of Italy's Survey of Household Income and Wealth (SHIW) and EU-SILC, used to assess household-level income distribution, consumption potential, and equivalized poverty status (e.g., Borella, 2004; Franco et al., 2008; Brandolini, 2009; Berloffa & Villa, 2011; Franco et al., 2012; Brandolini & Smeeding, 2012; Ballarino et al., 2014; Naticchioni et al., 2016; Arezzo & Strangio, 2019; Brandolini et al., 2019). The inequality measures considered include Gini coefficient and its decompositions, income distribution percentiles, decile ratios, quantile regressions, present value ratios (PVRs), and RIF decomposition to assess income dispersion and separate composition effects (changes in workforce characteristics) from price effects (returns to those characteristics). Poverty measures, such as Eurostat poverty rates and poverty gap are considered to assess the relative poverty of workers and pensioners. As for the reference unit, some studies focus specifically on workers (Franco et al., 2008; Brandolini, 2009; Rosolia, 2010; Ballarino et al., 2014; Rosolia & Torrini, 2016; Naticchioni et al., 2016; Castellano et al., 2021), while others refer mainly to pensioners (Borella, 2004; Borella & Coda Moscarola, 2004; Fiorio, 2011, RGS, 2023; RGS, 2024; EU, 2024). Moreover, a few studies compare pensioners with respect to the rest of the population or consider intergenerational differences on the whole population (Mazzaferro et al., 2005; Franco et al., 2008; Berloffa & Villa, 2011; OECD, 2011; Franco et al., 2012; OECD, 2013; OECD, 2017; Brandolini et al., 2019; OECD, 2021).

Even if they slightly differ in methodologies, almost all the previous contributions document similar trends concerning poverty and inequality among pensioners and workers.
Overall, pensioners' relative position with respect to workers significantly improved during the past decades, both concerning income, inequality and poverty levels.
More specifically, Arezzo and Strangio (2019), who explored the contribution of pension income to income inequality dynamics from 1987 to 2014, demonstrate that pensions have become the most equally distributed income source, and its importance has grown, particularly in the South. Such an equalizing effect has helped reduce aggregate income inequality, a result also confirmed by Fiorio (2011), who states that pension income played a significant equalizing role in the broader distribution of household disposable income throughout the 1990s and early 2000s. However, the transition from a Defined Benefit (DB) system to a Notional Defined Contribution (NDC), poses some concerns for a growing intergenerational disparity, as younger cohorts will retire under less generous rules. In fact, according to Borella & Coda Moscarola (2004) and Borella (2004), Italy's pension system can potentially reshape pension redistribution. Earlier cohorts, particularly those retiring under pre-reform rules, enjoy replacement rates well above actuarially fair levels. In contrast, younger workers—especially those with unstable careers, such as the self-employed and women—are expected to face lower replacement rates and greater exposure to retirement poverty. Under the NDC, pensions are more closely linked to lifetime earnings, resulting in a retirement income system that reinforces labor market inequalities, rather than mitigating them: pension reform sequencing has created a transition generation, where current retirees benefit from legacy DB rules while younger workers accumulate entitlements under less generous conditions (Borella, 2004). However, at present, the generational effect on for the reformed pension system is still not detectable. As noted by Brandolini et al. (2019), the last cohorts of pensioners ultimately received higher average benefits than previous generations, despite the transition toward a mixed calculation formula. This outcome was largely driven by longer contribution histories and delayed retirement decisions, which partially offset the lower generosity of the new system.

On the other hand, labor market shows a marked increase in income and earnings inequality, particularly since the early 1990s. Rosolia and Torrini (2016) and Naticchioni et al. (2016) show that workers, particularly from younger cohorts, have suffered declining entry-level wages and rising earnings volatility. More specifically, Rosolia and Torrini (2016) analyze INPS administrative data to trace earnings trajectories over the working lives of private-

sector employees from different birth cohorts. They find that entry wages have declined steadily since the mid-1990s, and that younger cohorts face more fragmented and volatile earnings paths than their predecessors, leading to persistent lifetime income gaps. Naticchioni et al. (2016) further stress that these effects are particularly acute for high-skilled workers, who once enjoyed substantial wage premiums but now face diminished returns on education. This erosion reflects a disconnect between human capital investments and labor market rewards, undermining the promise of meritocratic advancement. This outcome can be attributed to two main factors. First, institutional changes in the labor market disproportionately affected younger individuals, while older workers were largely shielded by already holding stable positions when the reforms were implemented. Second, such a dynamic may also reflect a structural supply-demand mismatch. The expansion of higher education has led to a substantial increase in the supply of skilled labor among younger cohorts, making high-skilled workers relatively less scarce than in the past. However, in the Italian context, the demand for high-level skills has not kept pace with this growth in supply, contributing to a marked decline in wages for younger high-skilled workers[3]. Furthermore, Rosolia (2010) finds that while weekly wages remained relatively stable, annual earnings declined due to shorter employment spells, reflecting the expansion of atypical contracts and precarious work. This has introduced a new form of polarization—not only in pay but also in work time and career continuity. Younger workers, women, and migrants are disproportionately affected by fragmented employment and lower wage growth, particularly in southern regions. Labor market deregulation, beginning in the 1990s, introduced flexibility but also fragmented careers. Brandolini (2009) and Ballarino et al. (2014) show that fixed-term and part-time contracts, concentrated among youth, women, and southern workers, contribute to low wages and limited future pension entitlements. This is confirmed also by Castellano et al. (2021), who adopt a structural approach by decomposing the Gini coefficient of individual gross wages using Recentered Influence Function (RIF) regressions. Their analysis, based on EU-SILC data, focuses on changes in wage inequality among employees in Italy and other European countries between 2005 and 2013. The authors show that in Italy labor market transformations—particularly the spread of non-standard contracts and wage stagnation among younger workers—have contributed significantly to rising inequality,

[3] It is important to note that educational attainment in Italy remains below both the OECD and EU averages. This suggests that a supply-demand mismatch alone is unlikely to fully account for the observed deterioration in labor market outcomes for younger high-skilled workers. Were this the primary explanatory factor, it would imply that the demand for skills in Italy is significantly lower than in other advanced economies—an assumption that warrants further scrutiny (Naticchioni et al., 2016).

especially at the lower end of the wage distribution. These findings are closely aligned with the patterns observed in our analysis: while pension income inequality has declined over time, the relative position of younger workers has deteriorated, both in terms of average earnings and internal dispersion.

This inter-cohort divergence contributes to structural intergenerational inequality. Fiscal prioritization of pension spending has crowded out social investment in education, family support, and active labor market policies, leaving younger cohorts with weaker institutional support (Ballarino et al., 2014; OECD, 2011).

Poverty rates follow similar patterns. Pensioners have generally seen improvements in their absolute and relative income position. Mazzaferro et al. (2005), Franco et al. (2008) and Berloffa and Villa (2011) show that poverty among pensioner households fell significantly from the late 1980s to the early 2000s, with pensioners enjoying higher equivalized incomes than non-retired households. More specifically, the authors observe a reversal of the poverty level trend for the two groups in Italy: as it significantly drops for pensioners, it rises for workers, further emphasizing the relative divide between the two groups. Such tendencies must be looked at in light of the welfare system's structure. In fact, as OECD (2013; 2017) shows, in many developed economies, pensioners fare better than workers in terms of poverty risk and income stability. Such a trend is particularly relevant for many Southern and Western European countries—such as Italy, Spain and Greece—characterized by relatively high replacement rates and strong pension floors. This highlights the importance of institutional design: similar poverty outcomes can stem from different balances between adequacy and redistribution in the welfare system. In fact, poverty trends among retirees and workers have evolved differently across countries. In countries like Italy, retirees now face a significantly lower poverty risk than workers, largely due to high replacement rates, the expansion of pension coverage, and the relative stability of benefits. While labor incomes were hit by stagnation and growing precariousness, pension income proved more resilient, contributing to retirees' improved financial security (OECD, 2013; 2017). Internationally, the picture varies. In Anglo-Saxon countries (e.g., the US, UK, Canada), market-oriented pension systems and means-tested benefits have led to higher poverty among pensioners. In Eastern Europe, pension poverty declined after substantial reforms in the 2000s, though working-age poverty remains persistent. In contrast, Nordic countries show low poverty rates overall, but with less generous pension benefits due to lower replacement rates. Our findings align with these patterns and reinforce earlier studies. Brandolini & Smeeding (2009) and Franco et al. (2012) particularly stress the central role of public pensions in reducing

elderly poverty. However, they point out at risks rising for pensioners with incomplete careers or minimum benefits, especially under NDC pension schemes. In fact, as Berloffa and Villa (2011) point out, differences within the retiree population are also emerging: older cohorts benefited from more generous DB schemes, while newer retirees will increasingly rely on less redistributive NDC rules, thus raising concerns on the future adequacy of the pension system.

The existing literature, alongside with testifying a general improvement of pensioners' income position and a worsening of the workers' one, poses fundamental questions on the sustainability of such trends and their implications in term of adequacy.

We insert our contribution in such a framework, specifically comparing workers and pensioners in Italy in a wide time span, to capture long-term trends both on the labor market and the social security system. Our work further extends the methodology, by computing different indicators to investigate the relative income position of the two reference groups from different perspectives.

Section 3 – Population characteristics and relative income position of pensioners and workers

Before starting our analysis, we briefly outline some socio-demographic characteristics of the whole population, particularly stressing some specificities of the two groups we consider.

Socio-demographic characteristics	1984	2000	2022
Males	49%	48%	49%
Females	51%	52%	51%
North	45%	45%	46%
Centre	19%	19%	20%
South	36%	36%	36%
Percentage of pensioners	13%	17%	20%
Percentage of workers	35%	36%	39%
No education	14%	16%	9%
Primary education	33%	24%	13%
Secondary education	46%	54%	64%
High education	7%	6%	13%
Share of high-educated workers	6%	13%	26%
Share of pensioners with no education	32%	15%	3%
Aged < 18	25%	17%	16%
Aged 18-34	24%	24%	17%
Aged 35-49	20%	21%	19%
Aged 50-64	18%	18%	24%
Aged 65-80	11%	15%	17%
Aged >80	2%	4%	7%
Mean age for pensioners	69	69	74
Mean age for workers	40	39	45
Singles	4%	7%	14%
Couples	12%	16%	18%
Couples+children	76%	65%	54%
Other families	8%	12%	14%
Average household size (members) for pensioners	2.7	2.5	2.2
Average household size (members) for workers	3.7	3.4	3.1
Homeowners	64%	70%	80%
Non-homeowners	36%	30%	20%

Table 1. Socio-demographic characteristics for the whole population.
Source: Personal elaboration based on SHIW-HA data.

Table 1[4] provides a comprehensive overview of the demographic and socioeconomic characteristics of pensioners and workers in Italy over the observed period. First, it shows that the population's composition by gender and geographic area has remained largely stable,

[4] Even if our work focuses on the 1977–2022-time span, *Table 1* provides data only from 1984 on, as the age variable is only estimated for individuals in the 1977-1983 period.

with minimal variation over time. More significant is the increase in the share of pensioners, which rose from 13% in 1984 to 20% in 2022, compared to a more moderate growth in the share of workers (from 35% to 39% in the same period). This reflects the gradual ageing of the population, as evidenced by the decline in the proportion of individuals in younger age groups (under 35, from 49% to 33%) and the increase in older age groups, particularly those aged 65–80 (from 11% to 17%) and over 80 (from 2% to 7%). Furthermore, the average age has increased for both pensioners (reaching 74 years in 2022, up from 69 in 1984) and workers (from 40 to 45 years). There has also been a significant improvement in educational attainment. The share of individuals with no formal education has more than halved (from 14% to 9%), with a particularly marked decrease among pensioners (from 32% to just 3%). At the same time, the share of those with secondary education rose from 46% to 64%, and for those with tertiary education it doubled (from 7% to 13%). Among workers, the proportion of individuals with a university degree increased sharply, from 6% to 26%.
Family structures have also undergone major transformations: the proportion of couples with children decreased by 22 percentage points (from 76% to 54%), while the share of single-person households more than tripled (from 4% to 14%). More specifically, average household size also declined—for pensioners (from 2.7 to 2.2 members) and for workers (from 3.7 to 3.1)—indicating a trend toward smaller, more individualized households. Lastly, the proportion of homeowners rose significantly, from 64% in 1984 to 80% in 2022, reflecting a growing accumulation of housing wealth among Italian families, while the share of non-homeowners decreased from 36% to 20%. Overall, the table reflects a process of population ageing, improved human capital, changing family structures, and increased household wealth. These transformations are crucial for interpreting income dynamics and understanding the broader social and economic context in which pensioners and workers operate. In the next sections, we will briefly review the existing literature on the topic and delve deeper into income trends and the income relative position of the two groups.

We start our analysis by considering pension and labor individual incomes. Values are reported at constant prices[5] and net of personal income tax[6] (IRPEF). Presenting net incomes helps avoid distortions that may arise from differences in tax liabilities, especially across individuals or time. Net income is also considered a better indicator of economic well-being, as it reflects the actual resources available to households. It is crucial to account for

[5] We computed real incomes by using the deflator of consumption provided by the Bank of Italy. All the income values are expressed at 2022 prices.
[6] SHIW-HA provides only incomes net of taxes and contributions.

significant changes in the Italian personal income tax system (IRPEF) when comparing household net incomes over time. As highlighted by Baldini (2020), the number of tax brackets and top marginal rates has declined markedly since the 1970s. While the overall progressivity of the tax system has modestly increased—driven by policy adjustments, fiscal drag, and the expansion of in-work tax credits—this trend has not been uniform across the income distribution. Lower-income households have benefited from expanded exemptions and tax credits, often resulting in negligible or zero effective tax rates. In contrast, middle-income households now bear a larger share of the overall tax burden and have experienced greater effective progressivity. At the top of the distribution, despite reductions in marginal rates, overall tax incidence has increased slightly, though with diminished progressivity. These structural reforms—particularly the reduction in the number of brackets, shifts in marginal rates, and the redesign of credits and deductions—have altered the distribution and level of net incomes in ways that complicate direct temporal comparisons. Households with equivalent gross incomes may face different net tax liabilities depending on the tax regime in place at a given time. As a result, observed changes in net income across years may partially reflect fiscal policy adjustments rather than genuine shifts in market income or economic well-being. This introduces important caveats when using net income data to analyze long-term trends in inequality, redistribution, or material living conditions.

Figure 1 shows the dynamics for the mean pension benefit and the mean labor income in the reference period.

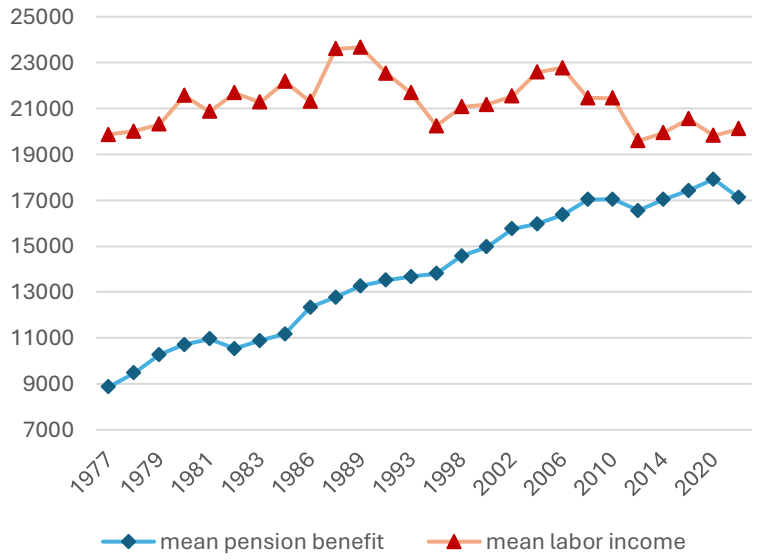


Figure 1. Mean retirement income, mean labor income at 2022 prices.
Source: Personal elaboration based on SHIW-HA data.

The mean net labor income shows a slightly increasing trend around the end of the 1980s, when it reached a yearly value of 23.5 thousand of euro at 2022 prices. However, since the early 1990s, the net labor earnings level settled at around 20 thousand, stagnating since then. The mean work-related pension benefit shows a much steeper increasing pattern, rising from a yearly average value of 8.800 in 1977 to a maximum of 17.900 in 2020. The graph clearly shows a progressively closing gap between the two income sources, with pension benefits and labor income presenting significantly different dynamics over time.

Even if a straightforward interpretation is complex to give, we can consider some insight that can give a clue of the main relevant trends underneath. To do so, we take separately the Social Security (SS) system and the labor market.

As for the former, the most relevant factor relates to the relatively generous pension rules according to which pension benefits have been computed, starting from the 1980s. In fact, those who started to receive pension income in those years, benefitted, up to 1992, both from the double indexation mechanism (see *Appendix* for more detailed information) and from the before-1992 defined benefit (DB) rule, which closely links pension benefits to career progression. Furthermore, the considered retirees, during their working life, progressively experienced more stable and longer contributory histories, leading to a higher pension benefit comparing to older generations, who worked in the years following WW2 and had more unstable careers together with fewer years of contribution[7]. It is interesting to note that pensioners' position steadily improved, even though 1992 and 1995 pension reforms have reduced the generosity of the system[8]. That is because the DB rule still has played a significant role in the share of new pension benefits paid after 1995. Furthermore, the end of the double-indexation mechanism in 1992, potentially weakening the relative value of pensions over time, ended up having more limited impacts. This is largely due to the broader economic context of the period, characterized by low or stagnant real wage growth. In the absence of sustained increases in real wages, the decoupling of pensions from wage dynamics did not result in as pronounced a decline in the pension-to-earnings ratio as might have occurred under conditions of robust economic expansion. However, the transition from a defined benefit (DB) to a notional defined contribution (NDC) pension system has

[7] In fact, those who were pensioners, for instance, in 1978, according to that time's pension rules (at least 35 years of contribution for private sector employees), were probably born in 1920s and started working in 1940s. They clearly did not benefit from stable and long careers, also influenced by war and post-war years.

[8] In fact, the Notionally Defined Contribution system relies on a more actuarially fair computation rule, linking closely the amount of paid contribution to that of received benefits through a conversion coefficient that depends on job tenure, retirement age, life expectancy and real GDP growth. Comparing to the DB rule, that depended mainly on the last working years' wages, in NDC systems it is impossible to receive benefits higher than contributions paid.

introduced substantial changes in the determination of pension benefits. While most current benefits are still calculated under DB or mixed regimes, the progressive implementation of NDC rules—especially for younger cohorts—will increasingly influence average pension outcomes in the coming decades.

Figure 2 illustrates the average pension income by age for different birth cohorts, each represented by a line.

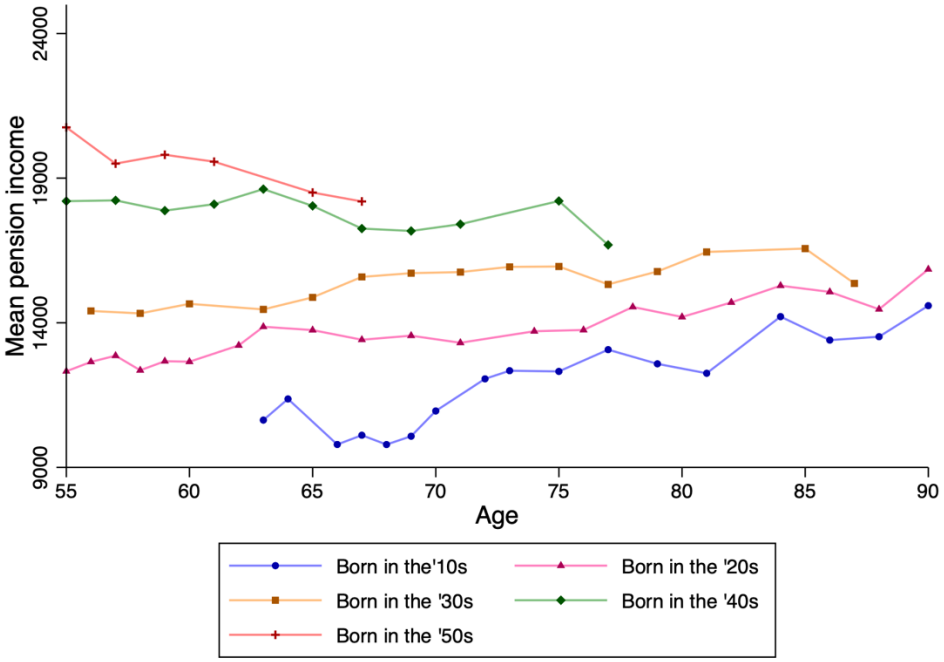


Figure 2. Mean retirement income by birth cohort at the same age. Values in Euro at 2022 prices
Source: Personal elaboration based on SHIW-HA data

The older cohorts — those born in the 1910s and 1920s — consistently exhibit the lowest pension income levels, though their trajectories tend to rise slightly with age. In contrast, younger cohorts — those born in the 1930s, 1940s, and 1950s — show progressively higher starting levels of pension income. However, their income patterns tend to decline modestly over time for the two youngest cohorts, suggesting that initial pension advantages may erode with age.

This pattern is especially pronounced around age 65, where the income gap between the youngest and oldest cohorts is at its widest.

However, while the use of net and real pension incomes improves the comparability of benefit levels across cohorts by controlling for inflation and taxation, differences in indexation rules over time may still affect the interpretation of medium-run pension trends.

In fact, in Italy, indexation mechanisms have evolved considerably, shifting from full wage- and inflation-linked adjustments to more selective and price-based systems. The 1992 Amato reform (*Law No. 335/1995*) marked a crucial turning point by limiting pension benefits indexation to price inflation, abandoning the more generous additional wage-linked updates previously in place. Subsequent laws, such as *Law No. 388/2000*, temporarily restored full inflation indexation for lower pensions but preserved differentiated adjustment brackets based on pension amounts. During austerity periods, indexation was further restricted: *Decree Law No. 78/2010* and *Law No. 228/2012* (Stability Law 2013) imposed indexation freezes on middle-to-high pensions, a measure partially reversed following *Constitutional Court ruling No. 70/2015*. More recently, the 2020 Budget Law (*Law No. 160/2019*) revised the indexation scale, confirming a multi-tiered structure where full adjustment applies only to pensions up to three times the minimum. These regulatory shifts imply that different cohorts may have experienced substantially different post-retirement income dynamics, depending on the timing and generosity of indexation policies in place during their retirement. As such, some of the observed patterns in average pension income—particularly the decline in older ages for some cohorts—may not solely reflect individual career paths or initial benefit levels, but also the cumulative effects of differentiated indexation regimes (MEF–RGS, 2023; INPS, 2022). In fact, although earlier retirees—such as those who exited the labor market in the 1980s and 1990s—show lower pension benefit levels, they benefited from more generous indexation mechanisms during much of their retirement. The double-indexation mechanism provided strong protection against the erosion of purchasing power, allowing real pension incomes to increase over time, as observed in the trajectories of the oldest three cohorts (born in the 1910s, 1920s, and 1930s), which show a generally rising trend.

In contrast, more recent cohorts—those born in the 1940s and 1950s—although entering retirement with higher absolute benefit levels, show a different trend: their pension incomes tend to decline over time in real terms. This reversal reflects the shift away from wage-linked adjustments toward inflation-only and more selective indexation policies. Thus, while the cross-sectional advantage of newer cohorts is evident in absolute terms, their longitudinal income trajectories reveal a potential weakening of income protection in retirement. This trend underscores the importance of considering both initial benefit levels and temporal dynamics when assessing pension adequacy across generations (MEF–RGS, 2023; INPS, 2022). Furthermore, another important factor to consider is the role of mortality. Cohorts that enter the dataset further back in time have likely already experienced the loss of their most economically disadvantaged members. This selective survival may partly explain the

observed upward trend in average pension income within older cohorts. As lower-income individuals tend to have higher mortality rates, the remaining sample for these cohorts becomes progressively composed of relatively better-off individuals, thereby biasing the average upward over time.

We now shift our focus to the labor market. Labor income shows consistent stagnation since the end of the 1980s. Until then, the Italian labor market was characterized by rising incomes and productivity, as well as strong union's bargaining power. Social transfers were provided to improve income conditions for the whole population and an automatic indexation mechanism, which linked wage levels to price increases, ensured the maintenance of workers' purchasing power (Banca d'Italia, 2013). The 1980s were characterized by a slight rise in the mean wage level, followed by a decrease and progressive stagnation in the following years, especially after the 1990s. Specifically, the 1993 July Agreement (*Protocollo Ciampi*) marked a turning point in Italy's economic and labor policy. By dismantling the automatic wage indexation, it established a new framework for incomes policy centered on collective bargaining and alignment with planned inflation targets rather than actual price movements. This shift was instrumental in curbing Italy's chronic inflation and facilitating its entry into the European Monetary Union. However, in the absence of automatic adjustment mechanisms, real wages became increasingly vulnerable to underestimations of inflation. Over time, this contributed to a persistent erosion of purchasing power, particularly in low-productivity sectors, and played a role in the broader stagnation of wage dynamics observed in the following decades. Furthermore, the weakening of unions' bargaining power and the numerous attempts to make the labor market more flexible ended up creating a dual labor market, where new entrants experienced atypical contracts and low wages, while older workers still benefitted from permanent employment and protections, as new reforms were designed (Naticchioni et al., 2016; Brandolini et al., 2018; Hoffman et al., 2022). Therefore, when considering labor income, looking at generational trends is particularly relevant. Since the 1990s, entry wages for younger cohorts have exhibited a persistent downward trend, with career trajectories that have generally failed to compensate for lower initial earnings. This pattern resulted in a significant decline in the lifetime earnings of younger generations (Rosolia & Torrini, 2007). In addition, younger workers have faced increasingly unstable and fragmented career paths. Another contributing to wage moderation is the slowdown in labor productivity growth, which is itself closely tied to the deceleration of total factor productivity. This dynamic largely reflects broader structural issues, such as the limited pace of

technological progress and inefficiencies in the organization of production factors (Brandolini, 2009). It is therefore not surprising that, starting from the 1990s, a relative deterioration in the economic conditions of workers compared to pensioners can be observed, as have inferred from *Figure 1*. At the same time, within the working population itself, younger cohorts have experienced worsening income conditions relative to older generations. *Figure 3* presents the trends in average labor income by birth cohort, computed at the same ages.

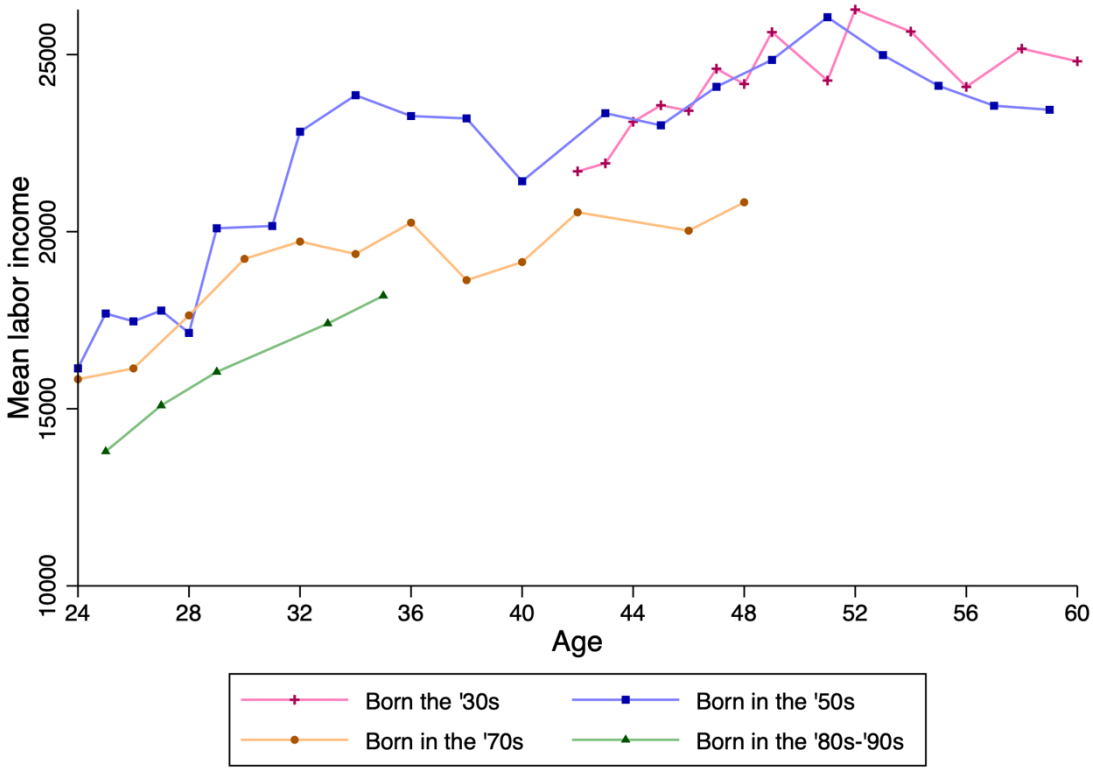


Figure 3. Mean labor income by birth cohort at the same age.
Source: Personal elaboration based on SHIW-HA data

Income trajectories for younger cohorts are lower than those observed for older cohorts at the same age, due to lower entry wages which reflect growing generational disparities in the labor market. In contrast to what was observed in *Figure 2*, the generational trend presented here appears to be reversed: labor incomes for newer cohorts are consistently lower than those of their predecessors. This is particularly evident when looking at individuals born in the 1980s–1990s and 1970s, respectively. These cohorts exhibit systematically lower income levels than those born in the 1950s, 1930s, and earlier. Consistent with the findings of Rosolia

and Torrini (2007), the cohort born in the 1970s shows a marked decline in entry-level earnings, which translates into lower earnings. The youngest cohort, comprising individuals born in the 1980s and 1990s, displays the lowest average income levels across the observed age range, falling short even when compared to the 1970s cohort. However, it remains uncertain whether their lifetime labor income will eventually converge with or overcome that of the '1970s cohort, suggesting that subsequent career developments may still play a crucial role in shaping their long-term earnings profiles. In contrast, the two oldest cohorts display relatively similar income trajectories, especially beyond age 40. This suggests that, in earlier periods, the labor market enabled rapid catch-up in earnings through accelerated career progression. By contrast, for the younger cohorts—those born in the 1970s, 1980s, and 1990s—who entered the labor market in the aftermath of major institutional reforms and the currency crisis, income gaps relative to older cohorts have remained substantial and persistent. No clear process of convergence appears to have occurred, as the younger groups have not managed to close the income gap with their predecessors over time.

In this section, we have discussed some of the underlying factors driving the diverging trajectories of pension benefits and labor income. In the next section, we conduct a sensitivity analysis to assess how this ratio evolves under alternative definitions of the income concept, reference population, and by incorporating distributional indicators.

Section 4 – Deepening the understanding of the trends

To extend our analysis, we are interested in assessing how the ratio of pensioners-to-workers benefits changes when considering different sources of incomes as well as different reference units. We consider separately the impacts of income sources and household composition. *Figure 4* compares the relative income position for pensioners with respect to workers comparing two ratios, respectively, based on pension and labor incomes and individual disposable incomes (IDI)[9]. While the general pattern for the ratios is similar, as they both show a steeply increasing pattern, some differences emerge in terms of intensity.
Specifically, the *aggregate replacement rate*, i.e. the ratio of the mean pension income to the mean labor income shows a continuously increasing pattern, peaking in 2020[10].

Figure 4. Pensioner's and workers' relative earnings according to different income sources.
Source: Personal elaboration based on SHIW-HA data.

Although in the first years the values of the two indicators do not differ much, starting from the late 1980s, the two lines diverge significantly. To better understand this, we break down individual disposable incomes for the two groups into three components: labor income, retirement income and capital income. For retirees, pensions still make up the largest share of the total income, accounting for 88 to 78% of the individual disposable income in the

[9] Disposable income is defined as the sum of all the different kinds of incomes the individual owns. It sums up labor income, pension income, capital income, and other social transfers income.
[10] Its value rises from 40% in 1977 to 90% in 2020.

reference period. However, capital income gains importance especially from the late 1980s[11]. This is also when pensioners' disposable income begins to rise more sharply comparing to pension income alone, as shown by the line marked with squares in *Figure 4*. Among workers, by contrast, capital income remains a smaller contributor, as about 90% of their total disposable income on average comes from labor. *Figure 5* highlights this divergence, showing the share of capital income to individual disposable income for both groups and its evolution.

Figure 5. Pensioner's and workers' share of capital income to individual disposable incomes.
Source: Personal elaboration based on SHIW-HA data.

While both face increases (from 7% to 12% for workers and from 11% to 20% for pensioners), it is immediately noticeable that the weight of capital income on disposable income is stronger among pensioners. A key reason lies in housing wealth: capital income in our dataset is largely driven by imputed rents on owned houses. This is not surprising, as older cohorts entered the housing market under more favorable conditions[12]. In fact, older generations were able to purchase property when real estate prices were lower, credit conditions were more favorable, and labor markets offered greater stability. Conversely, younger workers have faced rising housing costs, more precarious employment, and limited access to mortgages, making it more difficult to achieve homeownership.

[11] Labor income has negligible weight, as it represents less than 1% of retirees' disposable income. This shows that the labor market is currently uncapable of keeping the elderly in.
[12] As noted by Berloffa and Villa (2010), who analyze cohort differences in Italy using SHIW data, the share of households owning their primary residence in 2004 was approximately 68% overall. However, homeownership rates varied sharply by birth cohort: over 80% of households headed by individuals born before 1940 owned their home, compared to less than 50% among those born after 1960.

Household composition also plays a role. We expand our focus by jointly considering income and household composition. Specifically, in *Figure 6*, we compare the evolution of per capita household disposable income (HDI) with that of equivalized disposable income[13] (EDI), which adjusts for differences in household size and composition using an equivalence scale. This comparison allows us to assess the extent to which household structure affects measured income levels. The gap between the two indicators here considered is particularly relevant in the early years of the observation period.

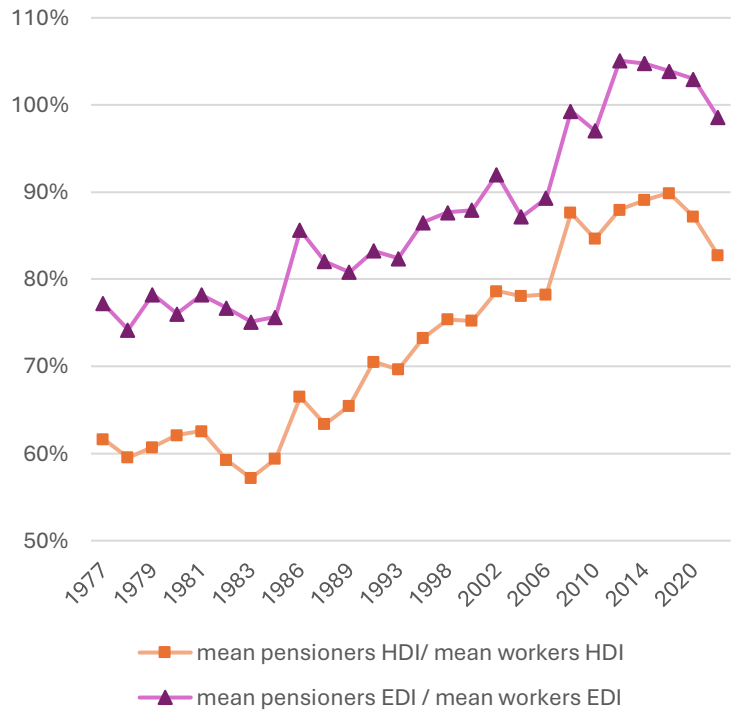


Figure 6. Pensioner's and workers' relative earnings according to different reference units. Source: Personal elaboration based on SHIW-HA data.

The line marked with squares, reflecting the ratio between the average disposable income of pensioners' households and that of workers' households, shows noticeably higher values in the early years with respect to the individual indicators we analyzed in *Figure 5*. However, from the late 1980s onwards, the values converge to those assessed at the individual level. Finally, the line marked with triangles - related to household equivalent disposable incomes- highlights the impacts of both income composition and household structure, accounting for economies of scale and household numerosity. According to this definition, the

[13] The modified-OECD equivalence scale weighs household disposable income by allocating it to the different individuals that make-up the household, taking together household numerosity and economies of scale. The weights assigned are 1 for the household head, 0.5 for each member older than 14 and 0.3 for each member younger than 14.

improvement in pensioners' relative position is even greater, so much that the average income levels for the two groups converge around 2008. From 2010 on, the ratio favors retirees. Here, the interaction of income and household composition combines and amplifies the effects already highlighted when looking at each aspect separately. More specifically, comparing to the orange line, the purple one shows how numerosity in households is a key factor shaping their relative position. In fact, on average, working households[14] are larger than retired ones (3,5 average members versus 2,5), which increases financial pressure—especially when children are present. Pensioner households, by contrast, tend to be smaller, and often have multiple sources of income[15].

Although each measure offers a different lens, all four perspectives reveal a broadly consistent picture: the income gap between retirees and workers has narrowed over time.

We proceed by expanding the scope of the analysis to indicators employing other measures than the ratio of the means. We consider individuals as the reference unit and different income measures. To grasp some more insights, we look at the distributional characteristics of the two reference groups.

First, we look at the quintile-based decomposition for pensioners. *Figure 7* further presents the share of pensioners and workers belonging to different quintiles of the total equivalent disposable income distribution.

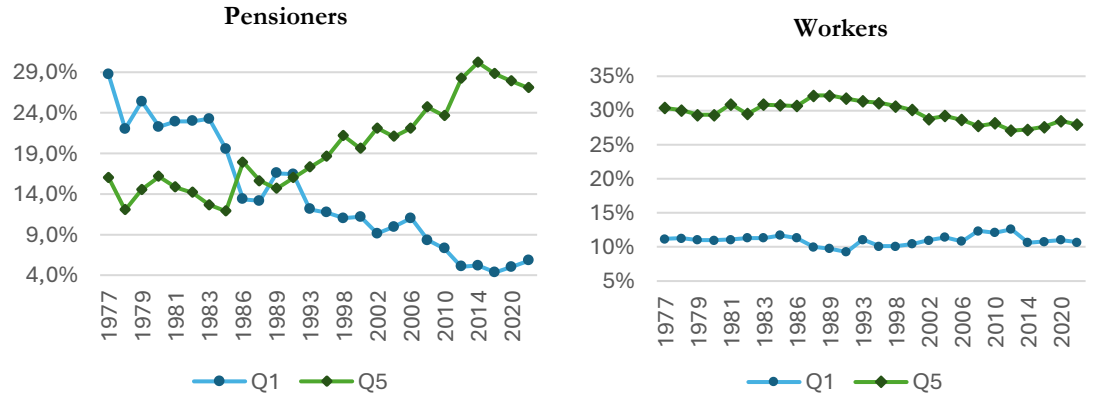


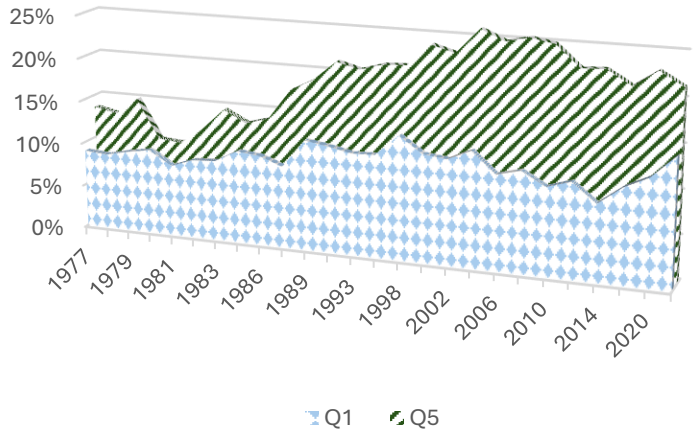
Figure 7. Share of pensioners and workers for Q1 and Q5of equivalent disposable household income quintile distribution. Source: Personal elaboration based on SHIW-HA data.

[14] Here working household are defined as households whose head is a worker. The same definition is used for retired ones.

[15] However, this advantage may be partially offset by higher healthcare costs, which can place a financial burden on retirees.

Notably, the share of pensioners in the first quintile (represented in the left graph) declined steeply over time, while in the fifth quintile it increased significantly. This downward trend in the bottom quintile is particularly significant also when considering that the overall number of pensioners has grown substantially over the period. In other words, the reduction in the proportion of retirees in the lowest income group occurred despite an expansion of the pensioner population, which suggests not just a statistical dilution effect[16] but a genuine relative improvement in the income position of retirees. A structurally different trend is observed among workers, as the shares of workers in both quintiles remained substantially unchanged during the observation period, reflecting the structural wage stagnation[17].

We are now interested in further investigating the composition of retirees' and workers' income in different parts of the distribution. Capital incomes, as already discussed, play a significant role in determining the total available resources for pensioners, especially in the last years of the study. More specifically, we wonder whether this phenomenon affects all retirees uniformly or whether it is rather correlated with income level. We focus on Q1 and Q5 to grasp the capital income share changes at the extremes of the individual disposable income distribution. *Figure 8* shows the share of capital income for each quintile.



[16] A decline in the share of individuals within a specific income quintile does not necessarily imply a real improvement in their economic condition. In some cases, this shift may be driven by a statistical dilution effect, whereby the total population increases while the absolute number in the group remains constant or decreases only marginally. As a result, the relative share drops mechanically, without reflecting substantive changes in income levels or living standards.

[17] As also confirmed by Brandolini et al. (2019), the differential evolution of workers' and retirees' incomes has influenced the distributional structure: between 1988 and 2014, the number of retirees in Q4 and Q5 increased by 3.3 million individuals, while the number in Q1 and Q2 declined by 350,000 individuals. Similarly, in our sample, the number of pensioners in Q1 fell by 820,000 people, while those in Q4 and Q5 rose by 2.2 and 2.6 million respectively over the reference period.

Figure 8. Shares of capital incomes for different parts of the retirees' individual disposable income distribution. Source: Personal elaboration based on SHIW-HA data.

In Q1, capital income plays a marginal role, as lower quintile retirees' capital income account for 7% of the individual disposable income on average. However, retirees in Q5 display significantly higher reliance on capital income, reaching 20-25% in the last years. Such a growing weight is consistent with the increase in homeownership among retirees in recent decades. These patterns suggest that lower-income retirees are more dependent on public pension benefits, while those at the top of the distribution benefit more from additional income sources. This distinction is crucial when assessing adequacy, as any tightening of pension provisions would likely affect lower-income retirees more severely.

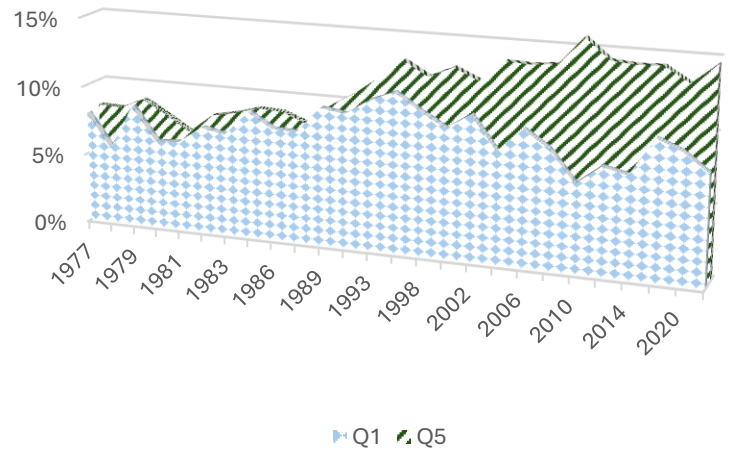


Figure 9. Shares of capital incomes for different parts of the workers' individual disposable income distribution. Source: Personal elaboration based on SHIW-HA data.

For workers, capital income contributes less to overall disposable income, as their earnings primarily come from labor. Nonetheless, the distribution of capital income across the bottom (Q1) and top (Q5) quintiles appears more balanced than it does among pensioners.

Figure 10 shows the trends of the Gini coefficient computed separately for pension income and labor income. The Gini index is used here to track how pensions and labor earnings evolve over time in terms of internal concentration. This approach allows us to assess how distribution within each source has changed.

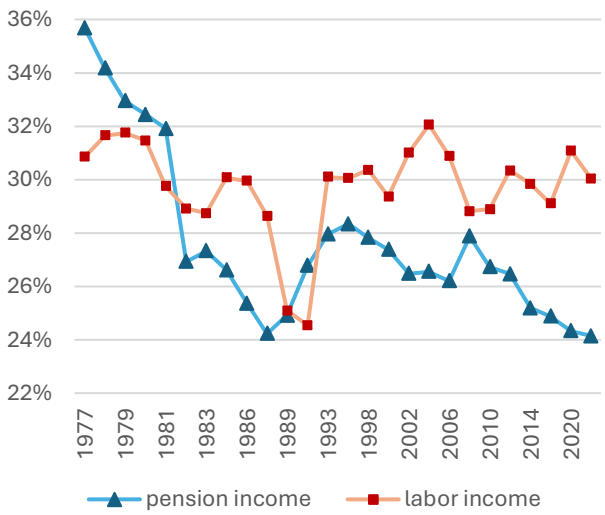


Figure 10. Gini for pension income and labor income.
Source: Personal elaboration based on SHIW-HA data.

The graph shows a clear and consistent trend: since the early 1980s, pension income inequality has steadily declined, falling from over 32% in the late 1970s to just above 22% in recent years. This reduction was gradual but more pronounced during two key periods: the early 1980s to early 2000s. The initial decline likely reflects the full implementation of generous defined benefit rules and expanded access to minimum pensions, which raised the incomes of lower-tier retirees. A further drop in the late 1990s and early 2000s may be linked to pension reforms (1992–1995), as many workers opted for early retirement under more favorable rules before the changes fully took effect. In contrast, labor income inequality has faced a significant drop from the early '70s to 1982, driven by an "egalitarian" phase which began with the Hot Autumn of 1969. During this period, workers were favored by the introduction of wage indexation mechanisms which helped compressing labor income distribution (Erickson & Ichino, 1995; Brandolini, 2000). The early 1980s marked a turning point, as unions' bargaining power began to weaken and inequality started rising sharply, culminating with the period 1992-93, when inequality levels were back to the 1980's levels. Since then, labor income inequality remained higher and persistent—between 27% and 30%— despite labor market and welfare state changes (Brandolini, 2009; Brandolini et al., 2019) .[18].

[18] Over the observed period, some fluctuations in the Gini coefficient may be at least partially attributed to methodological changes rather than actual shifts in income distribution. Specifically, during the late 1970s and early 1980s, the inclusion of new income components—such as imputed rents (1973) and, later, interest and dividends (1973 and 1982)—may have artificially increased measured inequality by widening the gap between households with and without capital income. Additionally, the over-sampling of high-income households in 1987 may have temporarily raised the Gini by increasing the weight of top earners in the sample. In contrast, the 1986 revision of the sampling design, which improved the representation of poorer areas of the country,

The widening gap between pension and labor income inequality signals a deeper structural shift. While the pension system became more internally equal, the labor market moved in the opposite direction—driven by deregulation and the rise of a dual labor market. This divergence highlights how younger generations have been increasingly disadvantaged, facing more inequality and weaker income prospects than retirees.

Finally, we conclude our analysis by looking at poverty rates using the Eurostat relative poverty indicator. We define individuals as poor if they have an equivalent disposable income below 60% of the national median one. *Figure 11* presents the indicator values for our reference groups.

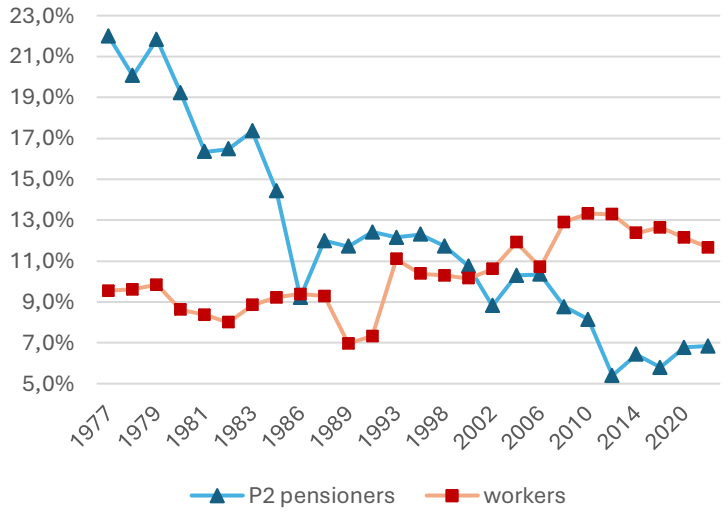


Figure 11. Eurostat-60 individual poverty rates.
Source: Personal elaboration based on SHIW-HA data.

While poverty rates for retirees decreased from 22% in 1977 to 6,8% in 2022, they increased for workers, rising from 9,5% to 12% over the same period. It is interesting to note that in the considered timespan, the trend reversed. In fact, until 2000, pensioners were on average poorer than workers. However, a steep increase in workers' poverty rates is observed in the last 20 years, while poverty among retirees has steadily declined. Such a trend has been widely documented across developed economies.

may have contributed to a reduction or stabilization of estimated inequality. These methodological adjustments, concentrated in the first two decades of the series, suggest caution when interpreting Gini fluctuations during the early phase of the period under analysis (Brandolini, 1998).

The indicators presented in this section substantially confirm what already inferred in *Section 1*. In the last section, we will discuss the relevance and implications of such trends, particularly for assessing adequacy of Social Security systems.

Section 5 – Policy implications

Recent demographic developments are expected to reshape population composition in most of developed countries, progressively leading to ageing societies, where welfare for the elderly is sustained by less and less young workers. Alongside with that, current macroeconomic trends are less favorable for individuals and economic systems than before, as economic growth is struggling, welfare state is becoming unsustainable, and employment quality is deteriorating. Given this, it is unlikely that such a positive trend for the elderly will show a consistent pattern soon, as younger generations, who are currently on the labor market, look heavily more exposed to fragility than the previous ones. In fact, while income levels usually increased across cohorts, moving from older to younger ones, for those born since 1970s, the trend seem to reverse (OECD, 2017). It is still not clear whether such a pattern will be consistent for the following cohorts of workers too; however, some issues for future retirees are outlined. In fact, for almost all OECD countries, pensioners' income inequality is closely linked to overall inequality: in countries like Italy, about 85% of the inequality on the labor market is converted in pension inequality (OECD, 2017). The same happens for poverty rates, as it is frequent that poor workers end up being poor pensioners. In many OECD countries, starting from the 1980s, poverty risk is shifting towards younger people. Vulnerability is particularly related to career instability: for instance, the impact for retirees of a 10-year break in unemployment combined with a 5-year delayed entry into the labor market is estimated at a 30 percent reduction in benefit in countries such as Italy, where contributions and benefits are closely linked (OECD, 2017). In fact, future elderly are projected to experience more varied careers than previous generations, as to undergo unemployment periods will be quite common. Among the factors that shape the profile of the inequality of ageing, we must also consider access to healthcare, education and social position, as well as demographic trends: in fact, as the population ages, the effects of the worsening of elderly conditions are amplified (Corna, 2013). Current inequality levels show that workers and younger cohorts are experiencing higher inequality than the previous ones, thus signaling a strong risk for it to increase for future pensioners. In such a context, as suggested by OECD (2016; 2017) some policy responses are needed, both on labor market and social security side. As for the former, limiting long-term unemployment by providing equal opportunities for workers to upgrade their skills and improving employment through providing adequate wage levels, work-place security and adequate stability are the main tools needed. To strengthen the pension system's protection for the most vulnerable people and

boost its distributivity, as well as to better assist workers who are most vulnerable to job discontinuities, such women, improvements may be made to the minimum supplementation mechanisms (RGS, 2023). Incentives for voluntary pension funds would also be useful to increase retirees' replacement rates. However, they must be taken carefully, as they tend to be regressive, as richer people have access to higher subsidies than poorer ones.

The transition to NDC undoubtedly poses some issues concerning adequacy, as it is designed to favor those with long and stable contributory histories and provides benefits substantially equivalent to paid contributions. In a context of rising instability for workers, with low wage levels, widespread atypical employment and fragility, especially for young people and women, we may wonder if the system still provides adequate benefits. Particularly, as NDC systems are linked to structurally lower replacement rates, we may ask if such a measure is still capable to represent pension system's adequacy, or whether correctives or new measures should be implemented. Further research should focus on updating and rethinking current adequacy measures, considering the different inequality and poverty profile emerging for future pension benefiters, trying to keep together financial sustainability and adequacy. In fact, recent pension reforms, who designed a brand-new system having in mind the need to rationalize public expenditure, require an improvement in workers' conditions, as they need continuous and stable contributory histories. From our analysis, which is inserted in a widespread debate on the relative position of older and younger generations, a net worsening of younger generations' position emerges. This makes it crucial to consider the potential correctives needed to protect the weaker segments of the population without undermining the benefits in terms of financial sustainability that the reforms of the 1990s brought.

Conclusion

This paper has examined the long-term evolution of the relative income position of retirees and workers in Italy over the 1977–2022 period. Our findings confirm the growing divergence between the two groups already outlined in literature: while pensioners have experienced steady gains in income levels, reduced inequality, and declining poverty rates, workers—particularly younger cohorts—have faced stagnating earnings, greater income dispersion, and a rising risk of poverty. These trends reflect deeper institutional and socioeconomic shifts, including the maturation of generous defined-benefit (DB) pension schemes and the increasing precarity of labor market trajectories.

By adopting an income-based classification of workers and pensioners, our analysis improves upon conventional age-based approaches, enabling a more accurate and policy-relevant

understanding of the economic roles individuals occupy over time. Moreover, by exploring income dynamics not only through averages but also across household composition, income components, and distributional measures, we offer a more nuanced picture of the shifting intergenerational balance. Our results underscore the importance of considering both labor market and pension system reforms together, as their effects are tightly interconnected.

However, several limitations must be acknowledged. This study does not include a formal econometric assessment of the underlying causal mechanisms driving the observed trends. While we can hypothesize existing correlations between policy shifts, demographic change, and income outcomes, further quantitative evaluation would be necessary to disentangle the magnitude and direction of each factor's contribution. Additionally, while our focus on the Italian case allows for an in-depth national analysis, broader comparative insights would be valuable to place Italy's experience in the context of other welfare regimes facing similar pressures.

Given the ongoing transition to NDC pensions and the persistent instability in the labor market, especially for younger and more vulnerable workers, future research should aim at assessing the adequacy of pension outcomes under evolving conditions and refine existing measures of intergenerational equity. Policy efforts should be directed toward improving employment quality and stability, reinforcing redistributive mechanisms within the pension system, and ensuring that future retirees are not disproportionately penalized by fragmented careers and income insecurity. Ultimately, our findings raise important questions about the sustainability and fairness of the social contract between generations. As demographic aging accelerates and labor market risks deepen, safeguarding both financial sustainability and social adequacy will be critical to maintaining the legitimacy and resilience of the welfare state.

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Appendix – Labor market and social security policies between 1977 and 2022

In this section we proceed to draw the institutional and historical framework in which our observations will be inserted. To properly assess the relative position of retirees and workers, we must provide an outlook of the successive events and reforms who involved both labor market and the pension system.

The Italian Social Security system was born in 1898 as a voluntary scheme, becoming compulsory in 1919[19], managed by INPS (*Istituto Nazionale della Previdenza Sociale*). The benefits were provided based on contributions, being quite favorable for those who had shorter contribution periods and lower earnings especially in the early phases of the development (Franco, 2002). Until the 1950s the Italian SS system was a funded system: contributions for each worker were invested on financial markets, so that the stream of pension income they received depended on the returns of the financial investments. In such a system, financial risks were entirely tolerated by workers and benefits were not guaranteed, as they depended on the capital accumulated by each individual and on the market interest rate. Also, it was less able to protect individuals, contributing to enhance inequalities, as people who could afford higher contributions had also access to the most profitable investments (Brugiavini, Galasso, 2004). Furthermore, the war had destroyed the productive system and caused hyperinflation, so that it was impossible for the state to finance pensions through capitalization (Ferrera et al, 2012). In 1952 the system shifted to PAYGO, where pension benefits were directly financed through workers' contributions, making the public sector able to sustain pensions payments. In the following years the coverage of the system expanded, reaching progressively almost all the workers. Minimum contributory periods were established both from public and private sector workers, as well as the self-employed[20] (Franco, 2022). In 1969, early retirement for workers with at least 35 years of contribution was introduced with the "*Brodolini reform*", through the 153/1969 law (Ferrera et al, 2012). In the early 70s an indexation mechanism was introduced, and the social assistance functions were extended with the introduction of the social pension and the disability pensions[21]. The

[19] A SS system, to work effectively, must be compulsory, as individuals may not be forward-looking or financially literate enough to save autonomously during their working life, but also to prevent morally hazardous behaviors, as the welfare system would still sustain income for people who are poor because they did not save enough (Spataro, 2024).

[20] 25 and 20 years respectively for male and female workers in the public sector and 35 years for those in the private sector (Brugiavini, Galasso, 2004).

[21] Disability pensions grew, ending up representing 40% of the pensions paid to the private sector and the 70% of those paid to the self-employed. They were improperly used as unemployment benefits, creating significant distortions (Giubboni, 2017).

indexation mechanism linked social security benefits both to inflation and to labor income growth exceeding the inflation rate. In a changing demographic context as the one outlined above, Social Security system reforms were needed both to ensure financial sustainability and to strengthen the balance between older and younger generations. In fact, pension expenditure started to grow steeply during the late '80s, with a continuously increasing rate of the number of retirees over workers. It became clear that the SS system, as it was initially conceived, was no longer suitable to the context. The reforms adopted in that period aimed at raising the retirement age and linking more closely benefits to social contributions to reduce the pressure on the system (Brugiavini, Galasso, 2004).

The first reforming steps were taken from the beginning of the '80s, when stricter means-testing mechanisms were introduced, and the indexation mechanism was perfectioned[22]. In such a context, characterized by frequent small changes, inequality among pensioners was striking; it was not rare that individuals with similar contributory histories, but who retired in different years ended up having very different pension treatments (Franco, 2002).

As the currency crisis erupted, 1992 represented the first turning point in the SS reform process. The projected expenditure trends, the implicit incentives to early retirement, the turmoil on the labor market and the uneven rates of returns on contribution implied in the defined-benefit computing rule[23] made a radical change of paradigm necessary. The first big reformation step was the *Amato reform* (1992), which provided the following changes: the retirement age was progressively raised up to 65 years for men and 60 for women, as well as the minimum number of years of contributions to have access to early retirement. Furthermore, the reference period for the calculation of pensionable earnings was augmented to 10 years for private dependent employees (15 for the self-employed, da controllare per I pubblici), while for those who had less than 15 years of contributions in 1992, it was extended to the whole working life (Brugiavini, Galasso, 2004). The indexation mechanism was also reformed, ending the link of benefits to real labor income growth and keeping the adjustment only to price increases. As it soon became evident that such changes were not sufficient to curb the expenditure, in 1995 a new reform was designed. The focus of the *Dini reform* (1995) was to link more closely contributions and benefits to ensure the financial sustainability of

[22] Since 1984, indexation coefficients were adjusted to the size of the pension: for pensions lower or equals to twice the minimum guaranteed pension benefit the adjustment was in line with inflation, while for higher benefits the adjustment was 90% or 75% of the inflation rate. Moreover, an additional indexation mechanism was added, linking the growth of the pension benefits to that of real labor incomes (Franco, 2002).

[23] Pension benefits were computed based on the pensionable earnings which corresponded to the last paycheck for public sector employees and to the average salary of the last 5 years of working life for private sector ones (Brugiavini, Galasso, 2004).

the system and to make it more equal, by removing favorable treatments towards workers with shorter contributory patterns (Franco, 2002; Franco, Tommasino, 2021). The first and the most impactful change of the reform was the shift from a defined-benefit (DB) system to a notional defined contribution (NDC) system, where pension benefits are computed exclusively based on the whole working life contributions. They depend on the seniority at retirement, on the past GDP growth and on the life expectancy at retirement through the conversion coefficient, based on an actuarial discount[24]. Moreover, the retirement age eligible for old age pensions was put between 57 and 65 years if the pension benefit was at least 1,2 times higher the minimum level. The minimum number of years of contribution necessary to receive an old age pension was put to 5 years and the guaranteed minimum pension level was abolished (Franco, 2002; Giubboni, 2017). The reform was adopted considering actuarial factors, which had never been considered before. An entirely new formula was introduced to make the pension computation more efficient, although the reform was extremely slow to implement, as it applied only to individuals leaving labor market after 1995[25]. Alongside the introduction of reforms, 1990s were significant also for the development of supplementary pension provisions. As the new DC system was expected to reduce replacement rates, particularly if the retirement age was to be below the age of 62, a second pillar for the SS system was needed[26]. The development of pension funds was led by the modification of the allocation of severance pay contributions and via the tax deduction of extra contributions. However, the slow implementation of the reforms delayed the development of private funds, as most of the pension treatments, who were computed following the DB rule, or the pro-rata regime at most, still provided adequate living standards and pension replacement rates remain among the highest of the EU area (Franco, 2002; Franco, Tommasino, 2021). The years following these two reforms were characterized by adjustments concerning seniority pension: with the *Maroni reform* (2004), an extra benefit was provided for those who chose to delay their retirement, as well as the eligibility age for both old-age and seniority pension was raised. Furthermore, the basis for a supplementary pension system reform was created. The following steps (*Prodi reform*, 2007) introduced the system of the quotas for seniority, based on the sum of the years of age and contributions (quota 95

[24] The whole amount of the career contributions is capitalized using a 5-year moving average of the GDP growth rate, with a proportionality rate increasing with the age at retirement. The payroll tax rate is 33% (Brugiavini, Galasso, 2004).

[25] For those who had at least 18 years of contributions in 1995 nothing changed, while for those who contributed for less than 18 years a pro-rata regime was introduced: contributions paid before 1995 are computed following the DB scheme, while those paid after 1995 follow the DC formula (Franco, 2002).

[26] The italian SS system relies on three pillars: (i) a mandatory PAYGO old age scheme, (ii) pension funds for employees and (iii) individual pension plans (Spataro, 2024).

with at least 59 years of age, quota 96 with at least 60, quota 97 with at least 61). The last big reform step was taken in 2011 with the *Fornero reform*, in the framework of the "*manovra Salva Italia*", by the Monti government. The reform provided two significant changes: on the one hand, the pro-rata regime was extended, for contributions paid after 2011, also to those who had 18 years of contributions or more in 1995, while on the other hand progressive increases in the retirement age were planned, subject to at least 20 years of contributions, until reaching 66 years and 7 months in 2018. Age increases, thanks to Sacconi's contribution with the law 122/2010, are being anchored to life expectancy. From 2019, the age requirement is 67 for everyone. The years following the 2011 reform were devoted to deepening its implementation and to provide policy corrections to the collateral damages caused by a reform that was undoubtedly necessary, but rigid (Giubboni, 2017).

As we can see, the reform trends aimed at ensuring the sustainability of the system, linking more closely contributions and benefits. The transition to an NDC system, theoretically, is a powerful tool in this sense. However, it is still difficult to evaluate the effectiveness of such a reform to present days, as most of the pension benefits are still computed following the pro-rata rule. Furthermore, NDC systems, while ensuring a higher level of actuarial fairness and better balancing the overlapping generations' positions with respect to a DB scheme, are still sensitive to macroeconomic and demographic shocks (Franco, 2002). In fact, if the demographic balance between workers and retirees does not hold and GDP stagnates, the pension scheme becomes hard to sustain. Specifically, such a system is closely linked to the dependency ratio, so that increases in life expectancy automatically reduce pension benefits (Brugiavini, Galasso, 2004). In a macroeconomic and demographic scenario as the one we are currently facing, where population ageing combines with low GDP growth rates, serious concerns about the ability of the system to continue providing adequate benefit rise. It is important to stress that the permanent GDP stagnation or an unfavorable demographic dynamic do not affect pensions already awarded, impacting only the new pension benefits. According to Giubboni (2017), even if the reforms contributed to the stabilization of the pension expenditure, they shifted the focus on actuarial approaches, leaving out the safeguard of future retirees' social needs. In this sense, an actuarial-based system, although more efficient, may provide less protection against poverty and social fragility. This raises concerns especially about the situation of future retirees, whose benefits will be entirely computed based on the NDC rule.

While the SS system was facing the reforms we just discussed, several policy modifications involved also the labor market. First, some interesting trends were observed during the reference period: labor force participation for women increased significantly, from 48% in 1985 to 67% in 2016, while it decreased for men, from 95% to 88% in the same time span (Hoffman et al, 2022). Moreover, until the early '90s, labor market was characterized by rising incomes and labor productivity. When the currency crisis erupted in 1992, a combination of political and institutional factors contributed to foster the need for reforms. In fact, the imbalances of public finances made it almost impossible to meet the Maastricht's commitments and a strong fiscal consolidation was necessary (Brandolini et al, 2018). In such a context, unemployment started rising, especially among young people and women, so that the labor market reforms that followed aimed at sustaining employment growth, trying to make the labor market more flexible and stimulate competitiveness (Hoffman et al, 2022). The unemployment rate in 2014 was 42,7% for youth aged 15-24, 48,3% for those aged 25-29, comparing with 28,8% in EU (Naticchioni et al, 2016). The structure of the employment, during those years, changed significantly, with an increasing number of atypical contracts and the creation of a dual labor market. The first reformation tool was the *Patto per l'Italia (2002)*, through which the collective bargaining system was reformed and the "*scala mobile*", the price-indexation mechanism for labor incomes, was eliminated (Naticchioni, 2015). It was followed by the *Treu reform* (1997), who opened to the possibility to use fixed-term contract for workers and liberalized entry level labor incomes (Hoffman et al, 2022). The following *Biagi reform* (2003) exacerbated this trend, introducing on-call jobs, job sharing and occasional employment, thus fostering the diffusion of atypical contracts. The *Fornero reform* (2012) followed a similar pattern, trying to reduce the use and duration of such employment forms, while at the same time widening its range of applicability. In contrast, the *Poletti decree* (2014) returned on the previous track, removing any obligation of justifying the use of atypical work for firms, provided that the ratio of fixed-term contracts to open-ended ones remained lower than 20% (Hoffman et al, 2022). The *Jobs Act* (2014) was the last step of a reformation process moving towards labor market flexibilization as it introduced intermediate employment contracts (*contratti a tutele crescenti*). The aim was smoothing the transition from open-ended to fixed contracts, while changing the structure of the former ones by reducing protection against dismissals (Hoffman et al, 2022). As a result, part-time work and temporary contracts expanded, reducing significantly employment quality, especially for younger cohorts (Rosolia, Torrini, 2016; Castellano et al, 2019). This led to the creation of a dual labor market, were both fixed-term and open-ended contract existed, creating huge

disparities especially concerning temporary workers. In fact, open-ended employment comes with large protection, while the atypical one does not benefit from such safeguards (Adamopoulou et al, 2016).

Alongside with that, worrying macroeconomic trends manifested, and the Italian economy since '90s gradually weakened compared to other G7 economies. This concerns especially labor productivity, which more than halved in Italy in the period 1996-2015, comparing to G7 average: in 2021 the gap between Italian labor productivity growth and average G7 was the widest ever observed, reaching 25% (Inapp, 2023). This is linked to different factors: on the one hand, the increase of temporary contracts limited the accumulation of experience and human capital, on the other hand the strong presence of small businesses, who find it difficult to keep up with innovation and development, has worsened Italian position with respect to countries where the economic background is characterized by bigger firms with greater innovation capacity (Hoffman et al, 2022; Rosolia, 2018). Consequently, labor income stagnation became a reality since the middle '90s, together with a decrease in the share of labor income with respect to GDP. The average real labor income for Italy, in fact, is substantially lower comparing to EU countries as Germany and France: real labor incomes grew by 1% between 1991 and 2022, comparing with an average 32,5% growth in the OECD area (Pariboni, Meloni, 2022; Inapp, 2023). The creation of a dual labor market led to the worsening of the relative position of younger workers vis à vis older ones, as the latter benefit from more stable employment and higher salaries, while the former have more unstable contributory histories and are generally more exposed to poverty (Rosolia, Torrini, 2016). Therefore, such reforms have consequences also for the social security system, as contributions are smaller for open-ended contracts and are insufficient to finance the high amount of benefits the system faces. Moreover, as labor market and pension system are closely linked together, this poses some issues also about the position of future retirees, whose benefit will be based on low-quality labor income (Adamopoulou et al, 2016).
As we have discussed, the current economic and demographic context is rising concerns about the ability of the welfare system to protect people from poverty. We are interested both in assessing current retirees' conditions and the position of workers. After the SS system reforms, pension benefits and contributions have been closely linked. Therefore, we are particularly interested in keeping these two dimensions together, as the current situation on the labor market can help us to predict future developments of the pension system. In the next section we will present data and methodologies we used to perform our analysis.