



Università
Ca' Foscari
Venezia

Master's Degree programme in Economics, Finance
and Sustainability

Final Thesis

Sustainability and Intergenerational Equity in Italian Pensions

Retirement Patterns and Pension Outcomes Using SHIW Microdata

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Academic Year

2025 / 2026

CONTENTS

INTRODUCTION.....	2
1. FOUNDATIONS OF PENSION SYSTEMS: CONCEPTS, DESIGN AND MEASURES.....	4
1.1 Conceptual Framework and Key Indicators	4
1.2 Life Expectancy and Longevity Risk	5
2. THE ITALIAN PENSION SYSTEM.....	9
2.1 Basic social security	9
2.1.1 Introduction to the evolution of compulsory social security	11
2.2 Evolution of compulsory social security	15
2.3 Basic pension provision today, retributive system and contribution system ...	18
2.3.1 Retributive system	19
2.3.2 The contribution-based system	21
2.4 Pension fund	22
2.4.1 Introduction to the second pillar	22
2.4.2 What are they and what are the previous types?	24
2.4.3 Historical and regulatory development of pension funds.....	26
2.4.4 Advantages, including tax advantages and the current functioning of pension funds ...	31
2.5 Individual pension plan	33
2.5.1 PIP and pension funds compared	34
3. EMPIRICAL EVIDENCE FROM THE SHIW: RETIREMENT OUTCOMES ACROSS PENSION REGIMES.....	37
3.1 Methodology	37
3.2 Empirical Analysis: Descriptive Evidence and Regression Results.....	39
3.3 Conclusion	52
4. CONCLUSION.....	56
BIBLIOGRAFIA	60
SITOGRAFIA.....	61

INTRODUCTION

The aim of this thesis is to provide a clear and comprehensive overview of the Italian pension system, combining a historical perspective with an analysis of its current functioning. Particular attention is paid to the transition from a predominantly remunerative system, based on a defined-benefit model, to schemes increasingly tied to contributions and long-term financial sustainability. This transformation represents not only a technical change in calculation rules but also reflects a broader evolution of the Italian welfare state, influenced by demographic, macroeconomic and public finance constraints, as well as changes in the labour market.

To rigorously address these issues, the thesis follows a path from fundamental definitions to institutional reconstruction, culminating in an empirical analysis based on microdata. Chapter 1 introduces the concepts necessary to interpret a pension system and evaluate its performance: the main financing methods and benefit formulas, the pillar structure of pension provision and the role of the various social protection functions (such as social security, insurance and assistance) are reviewed. This chapter presents some key indicators used below, such as the replacement rate and demographic pressure indices, highlighting their economic significance and implications for adequacy and equity. A key aspect also concerns life expectancy and longevity risk: understanding how life expectancy is measured and why it impacts the sustainability of pay-as-you-go systems is essential to interpreting both the reforms and long-term trends observed in Italy.

Chapter 2 reconstructs the history of the Italian pension system, highlighting the main regulatory and institutional developments that have shaped its current structure. The analysis highlights the transition from a system characterized by a greater generosity and broader exit channels to a progressively more selective system, in which entry requirements and calculation rules become more stringent and more closely tied to contributory history. This historical reconstruction thus allows us to contextualize the various pension regimes that coexist within the system and to understand the economic and political reasons that have guided the reforms, up to the most recent phase.

Starting from the theoretical and institutional framework, Chapter 3 shifts focus to an empirical analysis based on microdata. Specifically, the research uses individual-level

information from the Bank of Italy's historical archive of the Survey on Italian Household Income and Wealth (SHIW), focusing on retirement outcomes and benefit adequacy. The analysis considers a selected set of variables describing year and age of retirement, gender and birth cohort, as well as indicators related to earned income and pension receipt. The objective of the empirical section is to document how retirement outcomes change over time and differ across groups, combining descriptive evidence, graphs and regression models to analyse both measures of relative adequacy, for example: replacement rate, and measures related to real pension levels.

Finally, Chapter 4 summarizes the main findings from the study and offers a comprehensive assessment of the Italian pension system, focusing on the structural challenges currently facing it: demographic aging and declining birth rates, spending sustainability constraints, inequalities generated by heterogeneous labour markets and discontinuous contributory careers and the growing role of supplementary pensions. The conclusion therefore aims to integrate historical analysis with empirical evidence, offering unified perspective on the trade-offs between sustainability, adequacy and equity that will continue to drive the pension debate in the coming years.

1. FOUNDATIONS OF PENSION SYSTEMS: CONCEPTS, DESIGN AND MEASURES

1.1 Conceptual Framework and Key Indicators

First of all, it is necessary to clarify the meaning of pension system and define its main characteristics.

A definition has been provided by Thomas P. Lemke, Gerald T. Lins (2010) “A pension is a fund into which amounts are paid regularly during an individual's working career, and from which periodic payments are made to support the person's retirement from work.”

This definition can be interpreted in a wide sense, including both public social security and the supplementary pension.

In general pensions and social security systems are described through a three-pillar structure: (i) compulsory public pensions / social security, (ii) occupational pensions, (iii) private voluntary annuities or personal pensions.

Pension systems are designed to cover three risks of the workers (old age and early retirement, disability and survivorship) through a combination of insurance, benefits linked to the occurrence of covered event, assistance, supports aimed at preventing poverty, and providence/saving, accumulation of contributions during the working career.

From an analytical perspective, a pension system can be described along two dimensions: the financing method and the benefit formula.

Focusing on the financing method the main distinction is between pay-as-you-go (PAYG), funded (capitalization) and virtually or notionally funded. In a PAYG method, benefits are financed mainly through contributions paid by current workers, but it is not enough also general taxes are used. Here there is no accumulation of financial assets because it relies on an implicit intergenerational pact, where active contributors finance pensions that are currently being paid. Workers are so considered *active contributors*. On the opposite side, there is the funded system where contributions are accumulated in individual or collective accounts and invested in financial markets. Future pensions are then paid using the assets built up over time. Once retired, the individuals receive not only the sum of contributions paid but also the returns generated by investment performance.

Between these two methods, there is the virtually or notionally funded scheme. Here individual contributions are recorded in *notional accounts* that are revalued according to an index even though the system remains financed on a PAYG basis and does not accumulate corresponding financial assets.

The benefit formula, instead, determines how contributions and career histories translate into pensions allowances. There are two main methods. In the defined contribution (DC) model, the contribution rate or amount is predetermined, while the final benefit depends on the accumulated value of contributions and returns, or notional revaluations. While with the defined benefit (DB) model the pension is determined by a rule (this is typically linked to a wage measure and years of contributions). The combination of financing methods and benefit formulas offer a clear way to categorize pension plans. This helps explain differences in generosity, redistribution, retirement incentives and sustainability.

There are two important indicators: the replacement rate is defined as the ratio between the pension benefit and a measure of pre-retirement earnings; it captures the adequacy of income protection in old age; the dependency ratio relates the elderly population to the working age population and summarized the demographic pressure on PAYG financing.

1.2 Life Expectancy and Longevity Risk

In the previous paragraph with the analyses of the different systems and their peculiarities were shown the differences. In this paragraph, however, we want to analyse a common theme: increasing life expectancy; all systems suffer from the increase in this measure.

There are many factors that influence the individual's life expectancy, for example age, health, profession, lifestyle and so on. The most important thing to note is the direct correlation between the theme of survival and mortality of an individual given a certain age X . To measure this measure, it is necessary to use mortality tables also called survival tables. These are mainly of two types: cohort tables and period tables. Mortality tables are an essential tool to describe the age-pattern of mortality in a population and to compute life expectancy. These are typically organized by age x in a synthetic cohort and include the number of survivors l_x , and the number of deaths d_x , defined as the expected

deaths between ages x and $x+1$, with $d_x = l_x - l_{x+1}$. Introducing the one-year probability of death q_x , the survival dynamics can be written as $l_{x+1} = l_x (1 - q_x)$. The table is usually closed at a limiting age ω , beyond which no survivors are recorded.

There are two main ways to construct these tables. *Cohort life tables* follow a real generation longitudinally, tracking survival year by year until the highest ages; they reflect the mortality experienced by that cohort, but it requires a very long period of observation to be completed. While the other construction is called *period life tables*, it adopts a cross-sectional approach meaning they estimate q_x using mortality rates observed in a given calendar year across different ages. This method provides timely and regularly updated tables but it implicitly treats current mortality conditions as representative, even if mortality changes over time.

Because mortality typically improves, statistical offices, ISTAT in Italy, update period tables frequently and it is often necessary to rely on projected life tables that incorporate expected future improvements in longevity. This is crucial for pension analysis because rising life expectancy increases the expected duration of benefit payments and therefore pressures pension finances, often requiring adjustments such as higher retirement ages or changes in benefit levels to preserve long-run sustainability.

It is important to define life expectancy and explain how it is computed. Following Treccani, life expectancy is “an indicator of the average remaining length of life from a given age and calculated using the biometric constants reported in mortality tables”. In these, the quantity L_x represents the average number of person years lived between ages x and $x+1$. Under the common approximation of a uniform distribution of deaths within the interval, it is computed as $L_x = (l_x + l_{x+1})/2$, $x=0, \dots, \omega$, where l_x denotes the number of survivors at age x .

The distinction between men and women is also important to consider. For a more accurate analysis of life expectancy, mortality tables are typically constructed separately by sex, since life expectancy at birth differs substantially across genders.

Life expectancy at birth can be interpreted as the average number of years a newborn is expected to live, given the mortality conditions assumed by life table. Life tables allow the computation of life expectancy at any age x ; the average number of remaining years of life for those who have survived to age x . Following the Swiss Federal Statistical Office

“life expectancy at birth represents the average length of life of a synthetic generation if it were subject, at each age, to the mortality conditions of the year under consideration”. This definition clarifies that expectancy is influenced by external conditions and evolves over time. Factors such as scientific and technological progress have contributed to sustained increases in longevity. For example, in Italy, life expectancy at birth increased from just under 74 years in 1992 to over 80 years in 2021.

These tables are not only used to compute life expectancy but also to perform a wide range of other calculations that are central to actuarial science and the insurance industry. For example, they drive the probability that an individual aged x dies at age $x+k$ or more generally the probability that an individual aged x dies within a given age interval.

It is important to say why pay-as-you-go pension systems are particularly exposed to rising life expectancy and to weak demographic growth. A PAYG schema relies on a delicate balance between the contributions paid by active workers and the resources required to pay current pensions. Since the pension of a single retiree cannot be financed by the contributions of a single worker the system requires a sufficiently large number of contributors per pensioner. In Italy, for example, there are just under 23 million workers and about 16 million pensioners (Brambilla Research and Social Security Centre, 2022). The global increase in life expectancy has forced many PAYG systems to be revised because longer lives imply a longer average duration of benefit payments, which increases pension spending unless the system adjusts. Example of adjustment is raising the retirement age, because individuals contribute for more years and draw benefits for fewer years, or reducing benefits levels so that a given amount of resource can be spread over longer retirement period.

In Italy this demographic pressure was linked with another problem related to the pension system before the reform: pensions were largely calculated under a defined benefit / earnings-related (retributive) method where benefits were relatively high.

From the government point of view, contribution-based schemes have different advantages. Because they depend on parameters such the conversion coefficient (used to transform accumulated contributions into an annuity), the system can be adjusted in response to demographic or macroeconomic shocks. In addition, this scheme is more transparent in intergenerational redistribution and strengthens the link between

contributions and benefits.

2. THE ITALIAN PENSION SYSTEM

As stated at the beginning of this work, the aim of the thesis is to identify the main challenges of the Italian pension system and consequently the specific case of Inarcassa. To achieve this objective, it is first necessary to clearly understand how the Italian pension system operates.

In general terms, the social security system can be defined as a system that distributes benefits in the presence of the requirements established by law to have access to individual treatments with which to benefit from a sum, also understood as an annuity, at the end of the work activity.

2.1 Basic social security

In Italy, retirement income protection is provided not only through the complementary system but also through a basic, mandatory, public system. This multi-layered architecture is common in most European countries and in many advanced economies.

In the Italian framework welfare and pension provision are divided into three pillars: the first, consisting of compulsory public social security; the second is based on occupational pension funds, both closed and open funds; and the third, consisting of individual pension plan. For analytical purposes, these pillars can be divided into two categories: the basic public system, first pillar, and the complementary, second and third pillar, since the latter provide similar solutions in terms of voluntary accumulation and capitalization.

The first pillar is grounded in art.38 of the Constitution, where *“Every citizen incapable of work and without the means necessary to live is entitled to maintenance and social assistance. Workers are entitled to provision and insurance of means appropriate to their living need in the event of accident, sickness, invalidity and old age, involuntary unemployment.*

The incapacitated and the disabled have the right to education and vocational training.

The tasks set out in this article are carried out by bodies and institutes set up or integrated by the state. Private assistance is free.”

The first and the second comma highlight the fact that this form of provision must be guaranteed and function properly thanks to the State, which can derogate these tasks to established institutions. So even if the State guarantee these functions, it must not respond with its own assets. In fact, in our country the basic social security is defined as compulsory as no worker can escape it, this since the payments of each taxpayer are functional in order to ensure the correct functioning of the social security system.

To better understand, the State, considered as an institution, does not have to provide pensions directly but simply ensure, through its own institutions, the proper functioning of the system.

Before analysing the institutions, in the article 38 of the Constitution it is clear that a welfare state system is present in which the insurance of workers' and citizens' social security in general corresponds to one of the primary functions of the State. However, this is not just pension-type social security, but social security in general, so considering also accidents, illnesses, unemployment and disability. Within the system, two key institutions are INPS¹ and INAIL². INPS manages compulsory social insurance for employees, the self-employed and certain special categories, with a central role in old-age and survivors' pensions. INAIL manages compulsory insurance against workplace accidents and occupational diseases.

As regarded pensions, the first pillar concerns the basic pension system, which is mandatory, since contributions are automatically deducted from workers' pay-checks and are then managed by the National Institute of Social Security. In Italy, the system is based on the PAYG method, that *"is based on the so-called intergenerational promise among workers, according to which pensions are currently paid through current income contributions paid by workers and, in addition, tax deductions."*

At the same time, the Italian system can be described as mixed in analytical terms: although financing is PAYG, the post-reform benefit calculation incorporates actuarial techniques and, in the contributory component, a notional accumulation mechanism. By contrast, complementary pension operates on a capitalization basis, since benefits depend on the assets accumulated in each member's position and on investment returns. Before

¹ Istituto Nazionale della Previdenza Sociale

² Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro

addressing these mechanisms in detail, the next section provides a historical overview of the development of the Italian public pension system and the main reforms that have shaped its current structure.

2.1.1 Introduction to the evolution of compulsory social security

Mandatory social security did not always exist. Its emergence can be linked to the rise of the Welfare State, understood not only as a historical development but also as an institutional and ideological framework in which workers progressively acquired greater protection against major social risks. In this prospective, social security reshaped the way societies interpret retirement and the end of working life, turning old-age income protection into a central component of modern public policy.

From a historical standpoint, the origins of compulsory social security are often traced to late 19th century in Germany, where Bismarck introduced social protection schemes aimed at providing income support in old age and in cases of incapacity for work. Over time, similar systems were gradually adopted across Europe, reflecting the increasing demand for stability and income continuity after retirement.

The economic rationale for compulsory schemes lies in the presence of market and behavioural imperfections: individuals may under-save due to short-term preferences and imperfect information and voluntary systems may be affected by adverse selection and moral hazard. Public intervention through mandatory contributions therefore developed as a mechanism to endure broad coverage and to pool risks at the population level.

In Italy, the first institutional step dates back to 1989 with the establishment of the CNAS³. This early arrangement was contributory and partially incentivised: workers set aside part of their earnings, the State provided a supplementary contribution and employers could add a voluntary share.

A decisive shift occurred in 1911, when participation became mandatory for the first time, extending the contributory principle to a much broader segment of workers. In 1933, CNAS evolved into INPS which became the main public body responsible for the administration of compulsory social insurance.

The constitutional consolidation of the Welfare State came with the entry into force of

³ Cassa Nazionale di Previdenza per l'invalidità e la Vecchiaia degli Operai

the Italian Constitution, on January 1, 1948, whose article 38 formally recognizes social security and social assistance as fundamental protections for citizens and workers.

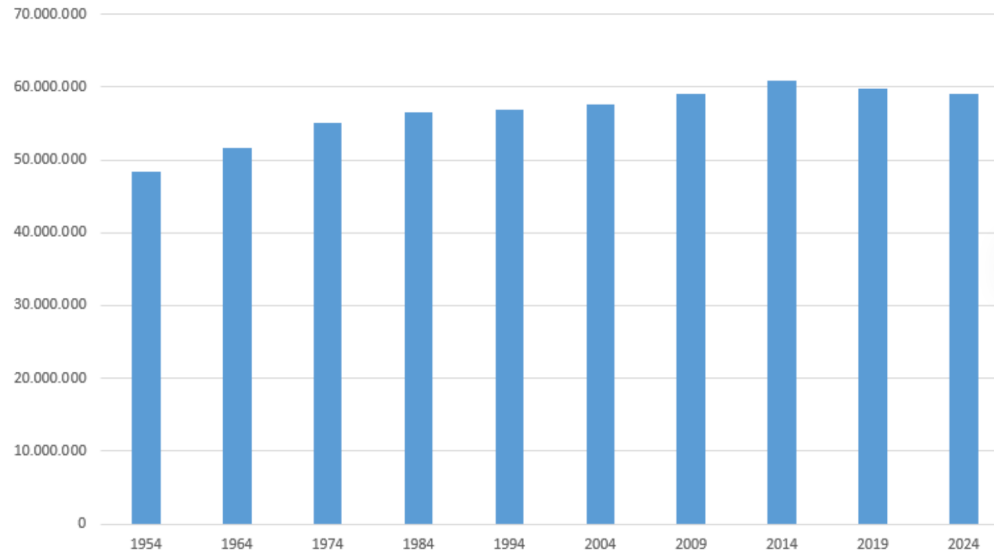
In the following decades, Italy progressively consolidated a PAYG framework for the main public pension pillar. This choice was reinforced by macroeconomic conditions: high inflation and financial instability especially during the 1970s undermined the real value of nominal returns and made long-term funded accumulation less reliable in practice. Moreover, given the relatively recent expansion of compulsory coverage a purely funded transition would have implied insufficient accumulated reserves for many cohorts. In the short run, PAYG appeared sustainable, particularly in the context of strong growth and favourable demographics. However, these conditions gradually changed. In addition, in 1973 the introduction of early-retirement provision, particularly in the public sector, further increased pension expenditure by allowing retirement with relatively limited years of contributions, in some cases even shorter requirements for women with children.

By the 1980s and early 1990s, many industrialised faced growing concerns about fiscal sustainability and began reducing public spending. In Italy, pensions reforms introduced from 1993 onward progressively modified eligibility rules and benefit calculation criteria with the aim of containing expenditure. These reforms were driven by the interaction of two structural pressures: weaker economic growth and unfavourable demographic trends, particularly rising life expectancy. Economic stagnation reduced contribution revenues and increased fiscal constraints, while demographic change raised the number of beneficiaries and the average duration of benefit payments. In addition, crises such as the oil shocks contributed to labour market disruptions and higher social spending reinforcing the need for fiscal rebalancing.

Regarding the second issue, that of birth/mortality, the situation has changed profoundly over time, and it is described by Chart 1 with ISTAT⁴ data.

⁴ Istituto Nazionale di Statistica

Chart 1: Italian population growth from 1954 to 2024



Trend in the Italian population from 1994 to 2024

Source: Istat

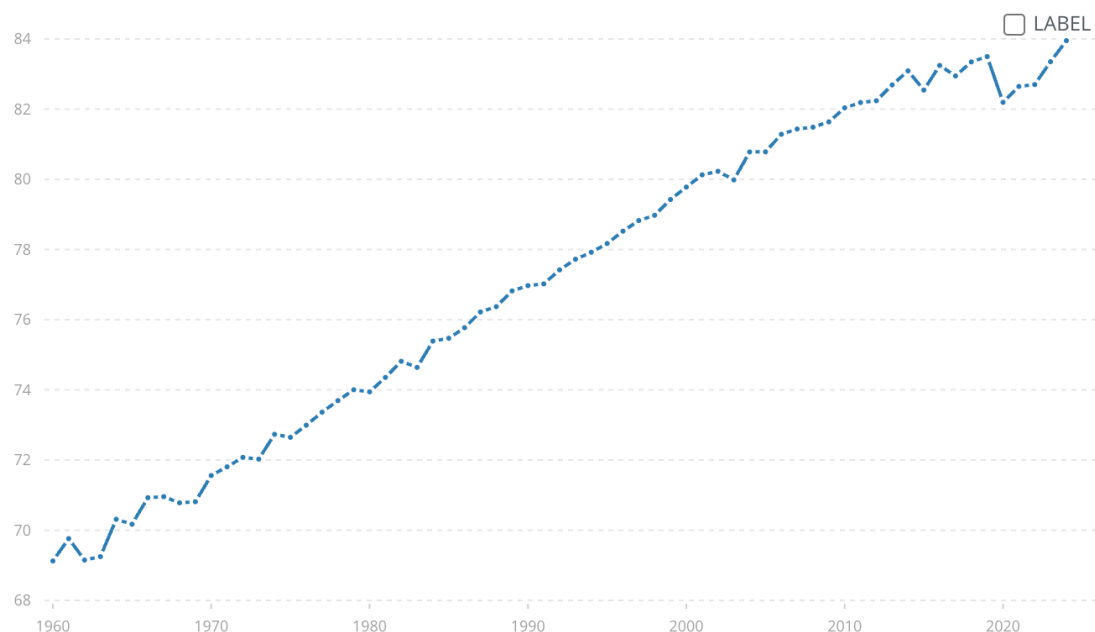
In 1954 the census reported a value of approximately 50 million, only 20 years later a higher value of over 5 million was recorded, reaching approximately 57 million in 1981, and today the value is around 60 million people.

In reality to be more specific the causes of population growth are not to be found in an increase in birth rate. In fact, while from the unification of Italy to 1960, the population grew at nearly constant rate of 0,6% per year from that date until 1990 the birth stabilized, except for a few special cases such as the baby boom period. The reason for population growth is therefore to be found in migration flows and life expectancy.

However, the birth taken as an end in itself can be misleading. Consider, for example, that in 1860 mortality in the first year of life accounted for almost half of all deaths, and four out of ten children did not survive beyond their fifth birthday. Conversely, among the causes of population growth was also the decrease in mortality, which in 1950 stood at around ten per thousand, a figure in line with the trend of those years. Furthermore, for few years, there was an increase in births, known as the “baby boom” this peak would be recorded in 1964.

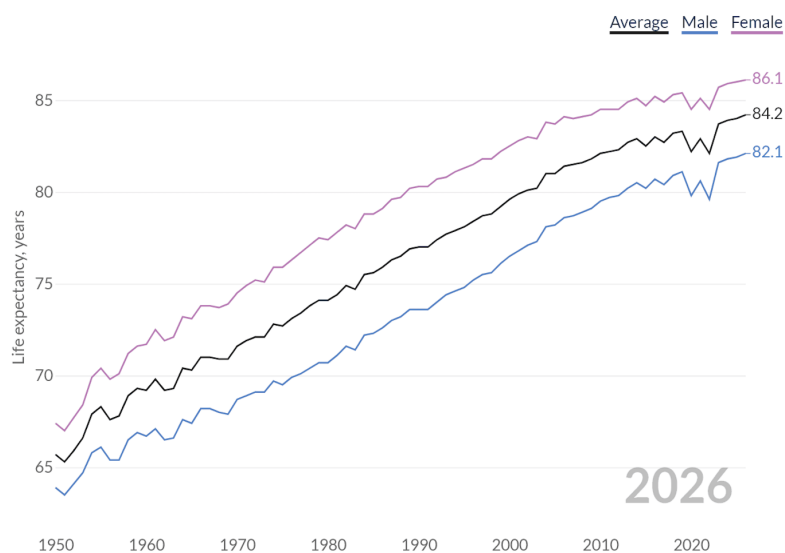
Finally, it should be noted that life expectancy has changed significantly over the years.

Chart 2: Italy life expectancy by year



We see that the total life expectancy, that is for men and women combined, in 1970 is 71,6 years, while in 2021 it was 82,9 years.

Chart 3: Italy life expectancy by year



Data sources: United Nations | World Population Prospects (1950–2026, retrieved 2026-03-10).
GeoRank.org/life-expectancy/italy | CC BY

The distinction between men and women also appears to be of interest; taking the same period as reference, differences can be seen if we consider the genders individually. Men

appear to have a lower life expectancy, starting in 1970 with a life expectancy of 68,7 years and reaching 2021 with expectancy of 79,6 years. For the women, however, the starting value was 74,5, reaching years in 2021 85,1.

It is also necessary specify what happened in 2020 with the global pandemic which slightly lowered life expectancy. In fact, in 2019 life expectancy was 81 years for men and 85,3 for women, thus slightly higher. This is important because it illustrates how single events can influence, in one direction or another, life expectancy or birth rate. These data are important because they provide a comprehensive overview through which we can better understand the causes of the trends and various changes in the Italian mandatory pension system.

2.2 Evolution of compulsory social security

We can now provide a concise overview of the Italian mandatory pension system, highlighting the main changes in benefit calculation, eligibility rules and indexation.

Until December 1992, the system was predominantly earnings-related (defined benefit / retributive). Pension benefits were linked to earnings in the final years of the career and were generally computed through an accrual mechanism of roughly 2% per year of contributions, up to a typical maximum of about forty years, which could generate replacement rates close to 80%. Eligibility was mainly based on two routes: the old-age pension, available at age 60 for men and 55 for women with at least 15 years of contributions; and the seniority early pension, which did not require a minimum age but required 35 years of contribution. Over the years, this type of pension, based on contributions. Benefits and accrued rights were indexed taking into account inflation and wage dynamics.

A first major shift occurred the Amato Law (Legislative Decree 503/1992). The statutory retirement age was gradually increased to 65 for men and 60 for women, while minimum contribution requirements were strengthened and the earnings reference period used to compute benefits was gradually extended beyond the final years, moving toward a broader portion of the working life.

The reform also eliminated particularly generous early-retirement arrangements in the public sector, “baby pension”. This was so-called because married women with children

could retire early after 14 years, 6 month and one day of contributions, this was the case in the Public Administration, while it was 20 years for other state employees and 25 for private employees. Furthermore, indexation of pensions in payment was progressively redirected toward price inflation, reducing the role of wage growth and accrual parameters were revised downward.

In parallel, the early 1990s marked the institutional strengthening of supplementary pensions. Legislative Decree 124/1993 provided an organic framework for occupational and open pension funds and contributed to a clearer distinction between the mandatory public pillar and voluntary complementary schemes, including individual pension products, such as PIP⁵, which are funded and based on individual accumulation.

A decisive reform of the public system came with the Dini Reform (Law 335/1995), which introduced a transition from the retributive logic to a contribution-based framework. Under the contributory approach, pensions depend on the contributions paid over the entire working life, accumulated in a notional account and converted into an annuity at retirement through conversion coefficients. The reform introduced a long transition, implying that for many cohorts the system remains mixed for decades. This shift was closely linked to fiscal sustainability objectives and to the need to stabilize pension expenditure in a context of demographic ageing.

Subsequent reforms further modified eligibility and strengthened complementary provision. The Maroni reform (Law 243/2004) introduced incentives to postpone retirement and played a key role in the treatment of TFR⁶, requiring workers to decide, within six months, whether to allocate TFR to a pension fund or leave it with the employer, a mechanism later implemented through secondary legislation.

Legislative Decree 252/2005 then replaced Decree 124/1993 and become the central regulatory framework for supplementary pensions. It also important to highlight the 2007 Prodi Reform, which introduced quotas for access to the old-age pension. These were calculated by adding the worker's age and the years of contributions accumulated by the worker. In 2009, the quota was 95 years but with at least 59 years of age, so a worker with 35 years of contributions would retire at 60. In 2011 the quota increased by one year,

⁵ Piano individuale Pensionistico

⁶ Trattamento di Fine Rapporto

while in 2013 it reached 97 years, with at least 61 years of age. Law 102 of 2009 further raised the retirement age, this time for female public sector workers to 65. During the Monti government the “Salva Italia” Decree, Legislative Decree 201/2011, established new eligibility requirements for old-age pensions. These measures were specifically proposed by then Minister of Labor Elsa Fornero. The first change affected all those who had already accrued 18 years of contribution in 1995; in fact starting in 2012, for them too, subsequent contributions were calculated using the contributory method, rather than the retributive method.

Furthermore, the requirements for old-age pensions have also changed: for workers in the private and public sectors and for female workers in the public sector only, the retirement age has increased by three months, reaching 66 years and three months in 2015 and has been further raised by four months since 2016.

For female workers in the private sector, the age limit rose to 62 years in 2012 and was raised to 63 years and 9 months just two years later. Finally, it reached 66 years and 7 months in 2018.

Another key element implemented by the Fornero Reform was the elimination of the old-age pension replaced by an early retirement pension. This will still allow early retirement as long as men have completed 42 years and 10 months of contributions and one year less for women. Furthermore, the necessary values for the old-age pension in 2027 are already foreseen which are 43 years for men and 42 years for women.

A sort of step backward, however, is a measure included in the 2017 budget law which includes two new experimental institutions: the voluntary APE⁷ and the social APE. It stands for a financial advance with pension as collateral. In practice, under the voluntary APE, private or public sector employees and self-employed workers insured with special funds or the INPS sperate fund, can obtain a financial loan. This, however, requires that they have accumulated at least 20 years of contributions, therefore 20 years of seniority, are over 63 years of age and meet within 3 years and 7 months of applying the requirement for access to an old-age pension.

The loan is provided by lenders and is also insured against the risk of the worker’s

⁷ Anticipo Pensionistico

premature death. The insurance companies that handle the issuance of these policies are those falling within the scope of framework agreements stipulated between the Minister of Economy and Finance, the Minister of Labor and Social Policies, the Italian Banking Association, the National Association of Insurance Companies and other lending insurance companies. Even in the event of the death of the insured the relationship will continue; the insurance company will assume the burden of compensating the bank and the heirs will be able to benefit from a full pension. Upon the retirement, the pension will be paid already deducted from financing, insurance and interest.

As for the social APE, this is also an experimental measure and is intended for workers deemed eligible by law, such as disabled workers, caregivers for the disabled and those employed in arduous work. To benefit, workers must have paid at least 30 years of contributions and be at least 63 years of age. The social APE is provided until the person reaches the retirement age, or until they receive a benefit received before the retirement age.

Finally, it should be noted that in 2019, the possibility of retiring with the so-called “quota 100” was introduced on an experimental basis. This system allowed access to a public pension if the sum of one’s age and years of contributions equalled at least 100. However, this system was not very successful, or rather, it was too generous compared to the financial resources that the Italia pension system could support. For this reason, it was decided to eliminate this option and opted, on a transitional basis, for one year, for “quota 102”. With this system, established by Law 234/2021, one could retire with 38 years of contributions and an age of 64.

2.3 Basic pension provision today, retributive system and contribution system

More than a decade after the entry into force of Legislative Decree 201/2011, the so-called Fornero Reform, the statutory requirements for the old-age pension have been further tightened and the age has effectively reached 67 years old age with a minimum of 20 years of contributions. The Fornero Reform represents the last major structural intervention on the Italian pension system: subsequent measures have mainly introduced temporary channels of flexibility or adjust eligibility thresholds while leaving the core benefit calculation framework essentially unchanged.

Since 2012, the contributory method applies to the accrual of pension rights for all workers for the periods falling after the reform, with different regimes depending on the individual contributory history. The current system can be summarised as follow:

- Full contributory: for individuals who entered the market after 1 January 1996 or who have no contributions prior to that date.
- Mixed system: for workers with contributions before 1 January 1996. In this case, pension entitlements accrued up to the relevant cut-off date are calculated under the retributive rules, while contributions accrued thereafter are calculated under the contributory rules. More precisely, for those with less than 18 years of contributions as of 31 December 1995 the retributive component applies up to 31 December 1995 and the contributory component applies from 1 January 1996 onwards; for those with at least 18 years of contributions as of 31 December 1995, retributive rules apply up to 31 December 2011, and contributory rules apply from 1 January 2012 onwards.

Given this structure, it is now necessary to explain clearly how pension benefits are computed under the retributive and contributory methods and how salary and contribution histories enter the calculation.

2.3.1 Retributive system

Under the earnings-related method, three core elements determine the pension amount: contribution length, so the number of years, months and weeks of contribution accrued, the pensionable earnings and the accrual rate. This preliminary clarification is important because both the accrual parameters and the revaluation coefficients used to update past earnings are defined annually and therefore depend on the year in which the pension is awarded.

Contribution seniority is measured in weeks of credited contributions. It includes not only ordinary contributions paid during the employment but also employer contributions, voluntary contributions and credited contributions for periods such as: illness, maternity, unemployment, as well as contributions recognised through redemption mechanism, for example university years of periods worked abroad.

In the retributive component, pensionable seniority is subject to a ceiling: for this method it is generally capped at 2080 weeks, 40 years, up to 31 December 2011, since

from 2012 onwards accrual is computed under contributory rules.

Pensionable earnings under the retributive method are traditionally calculated through two components, commonly referred to as Quota A and Quota B. Quota A is based on contributions accrued up to 31 December 1992, while Quota B refers to contributions accrued after that date, up to the end of the retributive / mixed period. For Quota B, an additional distinction applies depending on the worker's contribution history as of 31 December 1992: if the worker had less than 15 years of contributions at that date, pensionable earnings are computed using the five years, 260 weeks, immediately preceding retirement; if the worker had at least 15 years, the reference period becomes ten years, 520 weeks, preceding retirement. Legislative Decree 373/1993 mitigated potential distortions by allowing the exclusion of years in which earnings were significantly below the average of the reference period, subject to a maximum exclusion equal to 25% of the total contributory years considered.

A crucial step is the revaluation of past earnings to express them in current values. The earnings included in the reference period are multiplied by the revaluation coefficients published annually by ISTAT. Importantly, these coefficients are not applied only to the final year before retirement: they are defined each year for the entire set of past earnings years used in the calculation. As a consequence, two workers retiring in different years may obtain different revaluations even if their earnings histories are similar, because the set of coefficients applied to each year is determined by the retirement year and by the quota (A or B) under which the earnings are assessed.

In summary, the retributive calculation proceeds as follows: first, it is necessary to identify whether the pension component relates to Quota A or Quota B, since this determines both the reference period, five or ten years, and the applicable revaluation scheme. After revaluing each year's earnings with ISTAT coefficients, pensionable earnings are obtained by computing the relevant average and then applying the accrual parameters, which may be defined in brackets. The resulting amount is multiplied by contributory seniority, measured in weeks and limited according to the applicable quota, so that Quota A is based on weeks accrued up to 31/12/1992, while Quota B refers to weeks accrued after 31/12/1992, typically up to 31/12/2011 within the mixed framework. The total retributive pension is finally obtained by summing the two components.

One implication of the retributive logic is that it tends to favour workers whose earnings increase significantly toward the end of their careers: since the pension is based on the final years, rather than the full career, late-career wage growth can translate into a comparatively higher pension relative to a system that averages earnings over the entire working life.

Following the Dini Reform, Law 335/1995, Italy progressively transitioned toward a contributory calculation method. Under this approach, benefits depend on: the annual contribution base, the contribution rate applied each year, the accumulation of annual contributions in an individual account, revalued according to statutory parameters, and the conversion coefficient, which transforms the accumulated amount into an annuity and varies with the age at retirement.

2.3.2 The contribution-based system

The contributory (NDC) calculation system differs from the earnings-related approach because it is based not on the last wages but on the entire contribution history accumulated during the working life. Earnings remain relevant only insofar as they determine the annual contribution paid, through a statutory contribution rate, but they are no longer the direct reference for computing the pensionable salary. It should also be stressed that, in the Italian public system, this accumulation is notional: contributions are recorded in an individual notional account without the creation of a corresponding financial fund and the revaluation of the account is therefore also notional.

The contributory pension affect:

- those who, as of 31 December 1995 had less than eighteen years of contributions, for contributions made since 1 January 2012;
- those who, as of 31 December 1995 had more than eighteen years of contributions, for contributions made since 1 January 2012;
- those who began working and paying contributions on or after 1 January 1992;
- those who opt for the contributory pension system;
- those who avail themselves of the totalization scheme according to the provisions of Legislative Decree 42/2006 that is “those enrolled in two or more forms of compulsory insurance for disability, old age and survivors, or in substitute, exclusive and exempt forms of the same... are given the option of

combining non-coinciding insurance periods for the purpose of obtaining a single pension” (Legislative Decree 02/02/2006 no. 42).

Operationally, the contributory pension is obtained by transforming the notional account balance at retirement into an annuity. Let M_T denote the notional accumulated amount, the “Montante contributivo”, at retirement year T . the annual pension is then: $P_T = M_T \cdot \alpha_T(a)$, where $\alpha_T(a)$ is the conversation coefficient applicable in year T for retirement age a . The notional accumulated amount M_T is built in two steps. First, for each year t , the annual contribution is computed as: $c_t = \tau_t \cdot w_t$ where w_t is the contribution rate, which varies by category, employees, self-employed and other schemes. Second, annual contributions are accumulated and revalued using a statutory capitalization rate: $M_T = \sum_{t \leq T} c_t \prod_{k=t+1}^T (1 + g_k)$, where g_k is the annual capitalization factor. In the Italian NDC framework, g_k is linked to the average GDP growth over the previous five years and it is updated annually; revaluation is applied each year, typically at year-end, so the factors used for each contribution year change over time.

The final parameter is the conversation coefficient $\alpha_T(a)$ which depends on the retirement age and is linked to life expectancy: for a given age, higher life expectancy implies a lower coefficient because the same notional wealth must be spread over a longer expected benefit duration. Conversely, delaying retirement increases the coefficient, as the expected payment period shortens. In Italy the conversation coefficients were updated every three years up to 2019 and every two years from 2019 onwards. Finally, since pensions are typically paid in 13 instalments, the monthly amount can be approximated as $P_T/13$.

2.4 Pension fund

2.4.1 Introduction to the second pillar

As briefly mentioned above, Legislative Decree No.124 of 21 April 1993, provided the first comprehensive framework for supplementary pension regulations. The decree in question was tasked with regulating supplementary pension plans to ensure higher levels of social security coverage. Article 2 of Legislative Decree No. 124 of April 21, 1993, states that these supplementary pension plans can be established for both public and private workers, identified by belonging to the same category, sector, or grouping and

possibly distinguished by contractual type. Furthermore, the second comma notes that this also applies to groups of both self-employed workers and freelancers, even if organized by professional area and territory.

Three pillars were thus created: mandatory pension provision, collective supplementary pension provision and individual supplementary pension provision. In particular, there is a growing need for an alternative pension system to the first pillar, which alone is no longer able to guarantee adequate pension benefit, this refers to the non-adequacy of the replacement rate and so the ratio between the last wage received and the amount of the pension. The first of these pillars, namely the basic pension, has been discussed in the previous paragraphs. It now remains to analyse the second pillar characterized by pension funds, where membership is voluntary, collective and varies based on the type of fund chosen; and finally there is the third, and last, pillar also with voluntary membership, but of an individual supplementary nature, consisting of individual pension plans.

Over the last thirty years, many legislative reforms have been introduced in Italy, including those relating to pension funds. Before analysing this topic, however, it is necessary to once again focus on the Amato and Dini Reform. These, as already examined, were of fundamental importance in ensuring an initial reduction in public spending in the social security field.

The Dini Reform, however, has a major flaw: it shifts the burden of restructuring to future generations, since their pension benefits will be increasingly modest despite growing contributions. Therefore, over time, and particularly since the mid-1990s, the issue of supplementary pensions has become increasingly important.

A first example of this type of pension is pension funds, which aim to maintain constant replacement rate and therefore the ratio between the last salary received during working age and the pension amount.

In Italy, pension funds are part of the second pillar of social security which, together with the third pillar, consisting of PIPs, aim to create alternative pension plans to the first-tier system.

As for the second pillar, it can be considered a funded system that abandons the previously seen distribution logic. With this methodology, the issue of notional capital is

no longer addressed; this time, the capital and consequently the contributions, are real. These are invested by specialized financial operators according to precise rules and specific regulatory provisions and will contribute to the calculation of the final value.

It must be said that our country, compared to many other EU countries and beyond, developed a culture of supplementary pension provision late. Suffice it to say that in 2004, the assets of Italian pension funds corresponded to 2,6% of GDP while in Germany it was 3,8%, in Spain 9% and in Switzerland as much as 11,6%. This trend has continued over time, so much so that in 2020 pensions funds in Italy managed a sum equal to 9,8% of GDP compared to an OECD average of 63,5%.

In Italy, the establishment of pension funds, as discussed in the first chapter, dates back to the 1993 reform but even before this legislative measure, pension funds already existed: these are pre-existing funds which were collective funds intended for specific categories of workers. These funds are divided into two groups: the first called autonomous pre-existing funds, have legal personality and include unincorporated associations, recognized associations, foundations or legal entities. These funds have legal personality; while the second, called internal pre-existing pension funds, were located within banks or insurance companies. However, they constituted separate assets and were therefore unattackable by creditors and were reserved for company employees. It should also be added that with Decree 252/2005, these types of funds have increasingly adopted to new regulations.

2.4.2 What are they and what are the previous types?

Before describing the key steps that led to the development of the second pillar in its current form, it is useful to clarify the main types of pension funds. Excluding, for the moment, the preexisting ones, which, however, will be temporarily excluded, as they have already been examined. The Italian framework mainly distinguishes between closed (negotiated) pension funds and open pension funds. Closed funds are also called negotiated or category-based because membership is linked to belonging to a given contractual group, typically defined at sector level rather than at firm level. A common example is the pension fund for metalworkers. Negotiated funds may also be established for groups of self-employed workers and for members of production and labour cooperatives. In this sense, they are “closed” because access depends on belonging to the

relevant category and the rules are largely standardised, leaving limited margins of individual choice beyond optional ancillary services; for this reason, they are often described as a form of “contract of adhesion”.

The opposite case is represented by open pension fund, where participation remains voluntary, but access is not restricted by category. In general, any individual can join an open fund, regardless of sector or contractual affiliation.

However, the distinction between closed and open funds is not only about eligibility: it also concerns governance and management. Negotiated funds are typically established by the social partners, who define the access rules and select the entities responsible for operational management. Importantly, the fund does not manage assets entirely autonomously: it relies on specialized intermediaries, such as a custodian bank and, depending on the structure, insurance or other authorised providers. Open pension funds, instead, are offered directly by regulated financial institutions: banks, investment firms, asset management companies and insurance companies; so functions that negotiated funds must outsource may be internalised within the provider offering the fund.

Another relevant difference concerns the contribution profile. In negotiated funds contributions are usually defined by collective agreements: the worker may generally increase the contribution above the minimum but cannot reduce it below the level established by the contract. In open funds, instead, contributions are typically more flexible, especially for individual subscriptions, with the main practical constraint being the thresholds linked to tax incentives. This makes open funds more adaptable to heterogeneous saving capacities, while negotiated funds emphasise standardisation and collective rules.

A further classification, applicable to both closed and open funds, concerns the distinction between defined contribution (DC) and defined benefit (DB) schemes. In DC arrangements, the contributions are determined in advance while the final benefit is uncertain, because the funds invest contributions in financial markets and outcomes depend on returns and costs; therefore, at least the financial risk is borne primarily by the member. In DB schemes, by contrast, the benefit is predetermined by formula, while the contribution is required to finance it may vary. In Italy, however, DB pension arrangements have become increasingly limited: pursuant to Legislative Decree 124/1993

and subsequent provisions (including Law 144/1999), DB forms have been confined to specific categories and are no longer widely marketable, so contemporary supplementary pension provision is predominantly organised through defined contribution schemes.

2.4.3 Historical and regulatory development of pension funds

The key milestones concerning the birth and early developments of the second pillar, excluding pre-existing funds, largely coincide with the legislative interventions already discussed in connection with the broader evolution of the Italian pension system, notably the reforms of the early 1990s and the mid-1990s. It is therefore useful to retrace these steps, focusing specifically on the provisions that established and subsequently modified supplementary pension arrangements, which began to take a structured form from 1993 onward.

A first comprehensive framework was introduced by Legislative Decree 124/1993, which formally recognised two institutional forms of supplementary pensions: closed (negotiated) funds and open funds. This decree consolidated the distinction between collective, category-based schemes and funds offered by financial intermediaries and also defined the main benefit modalities at retirement, allowing the liquidation of part of the accumulated position as a lump sum (within limits), while the remaining portion was to be converted into an annuity. Access to benefits was linked to eligibility conditions consistent with the retirement framework of the first pillar: a minimum participation period, typically at least five years, was required and the age conditions for old-age benefits were aligned with statutory retirement rules, so that access to the complementary benefit remained closely related to access to the public pension.

Among the main strengths of these instruments was the introduction of a favourable tax regime for long-term participation. In particular, the taxable portion of the benefit was subject to a preferential rate that decreased with the length of membership, reflecting an explicit policy objective of encouraging long-term saving for retirement. More generally, the attractiveness of supplementary pensions was reinforced by several institutional features: voluntary participation, which allowed individuals to decide whether and how to complement mandatory provision; the possibility, especially in negotiated funds, of strengthening the link between membership and contractual affiliation and the flexibility of open funds, which allowed more individualised choices. Moreover, supplementary

pensions could be supported by employer contributions, which effectively increased total annual saving and improved the long-term accumulation profile. Finally, the regulatory framework also contemplated the possibility of advances on the accumulated position for specific events such as health expenses or the purchase of a first home, features that contributed to the perceived usefulness of these products beyond their strictly retirement purpose.

Subsequently, the Dini Reform (Law 335/1995) introduced further elements that indirectly affected supplementary pensions. Although the reform was primarily aimed at the first pillar and did not “reintroduce” new age limits for complementary benefits, it tightened mandatory retirement requirements over time and this had practical implications for supplementary schemes because access to the final benefit is often linked, explicitly or implicitly, to the retirement timing under mandatory social security. Moreover, the reform revised the fiscal framework: while earlier rules included a uniform taxation approach, the post-reform setting reinforced the role of tax deductibility of contributions up to specific thresholds, thereby strengthening the incentive to participate.

A further decisive step was represented by Ministerial Decree 703/1996, which introduced detailed rules for pension fund management, with particular emphasis on the principle of sound and prudent management and on investment constraints. This focus reflected the legal and economic need to protect members accumulated positions in funded schemes, where financial market exposure directly affects outcomes. Article 2 of the decree explicitly states that pension funds must manage assets “soundly and prudently”, pursuing objectives such as portfolio diversification, risk control, cost containment and the maximisation of net returns. The decree therefore defined not only general governance principles but also operational constraints, including eligible asset classes, investment limits and rules on conflicts of interest, which had become increasingly relevant as the sector expanded. This regulatory architecture remains central, as it expresses the legislator’s intention to ensure that supplementary pensions, while market-based, remain consistent with their social-security purpose.

During the late 1990s and early 2000s, policymakers increasingly perceived the need to strengthen participation in complementary pensions, given the delayed development of the second pillar in Italy compared to other European systems. Participation figures grew

relatively quickly: by 1999, several years after the introduction of the new framework, membership reached approximately 700,000 participants. A further increase occurred around 2000, with growth that can be associated with additional reforms aimed at improving fiscal incentives and encouraging the allocation of resources, especially severance pay, to supplementary pensions. Measures adopted between 1999 and 2000 expanded deductibility and extended tax benefits also to family members, thereby increasing the potential take-up base. Despite these improvements, participation remained modest compared to the potential catchment area, given the size of the workforce in the same period.

An important aspect of supplementary pensions concerns the taxation of investment performance and the benefit structure at retirement. Since pension funds invest members' contributions, the final value depends on both the contribution flow and the realised net returns. Investment income is generally subject to taxation although historically the applied rate differed from that of other financial products, reflecting the retirement purpose of these instruments; later reforms partially reduced this gap to avoid excessive preferential treatment relative to other assets. At retirement, the system also maintained a clear orientation toward annuitisation: in general, only a limited portion of the accumulated position could be withdrawn as a lump sum while the remainder was converted into an annuity. This structural feature implies an interaction between pension funds and insurance markets, since the provision of life annuities requires the management of biometric risk and is traditionally linked to insurance activity. In this respect, the regulatory framework emphasised that withdrawals unrelated to retirement purposes could trigger ordinary taxation, reinforcing the social-security nature of the instrument.

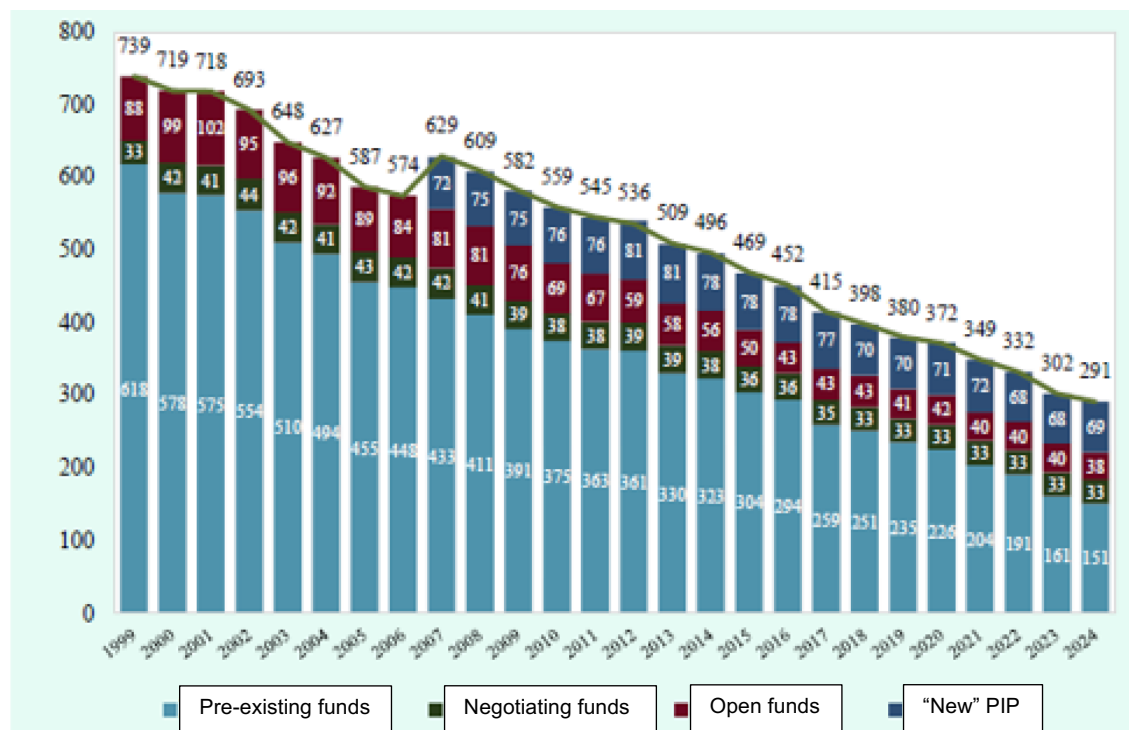
Despite the reforms described above, in the early 2000s the Italian supplementary pension system was still considered underdeveloped. Participation rates remained low relative to the employed population and policymakers aimed to support a gradual diversification away from exclusive dependence on the first pillar. This perspective helps to explain the relevance of reforms introduced in the mid-2000s. Legislative Decree 252/2005, often referred to as the “TFR reform”, reorganised supplementary pensions and introduced major innovations regarding severance pay. TFR is a deferred wage

component accrued annually and revalued according to a statutory rule, so fixed component plus a share of inflation. The reform allowed, and in practice encouraged through default mechanisms, the allocation of TFR flows to pension funds, thereby creating a stable and sizeable source of contributions for the second pillar. This represented a structural change because TFR had traditionally remained within firms and acted as a long-term liquidity buffer; the reform therefore required careful balancing between workers' interests and firms' financial needs. The gradual implementation, completed from 2007 onward, contributed to a significant increase in the inflow of resources into pension funds.

Subsequent interventions, including the Fornero reform, further tightened first-pillar generosity and increased retirement ages, indirectly increasing the relevance of complementary pensions as an instrument for maintaining adequate retirement income. In recent years, supplementary pensions have shown growth both in membership and in assets under management, alongside a reduction in the number of funds due to mergers, acquisitions and consolidation. This trend is consistent with a process of rationalisation: fewer operators but larger average fund size and potentially more efficient management. As illustrated in Chart 3, the overall number of supplementary pension plans declined markedly over the long horizon considered, reflecting concentration dynamics; pre-existing funds remain a major component but have also decreased over time, while negotiated and open funds have contracted more moderately and individual pension products have stabilised after initial expansions.

Chart 3: Complementary pension plans

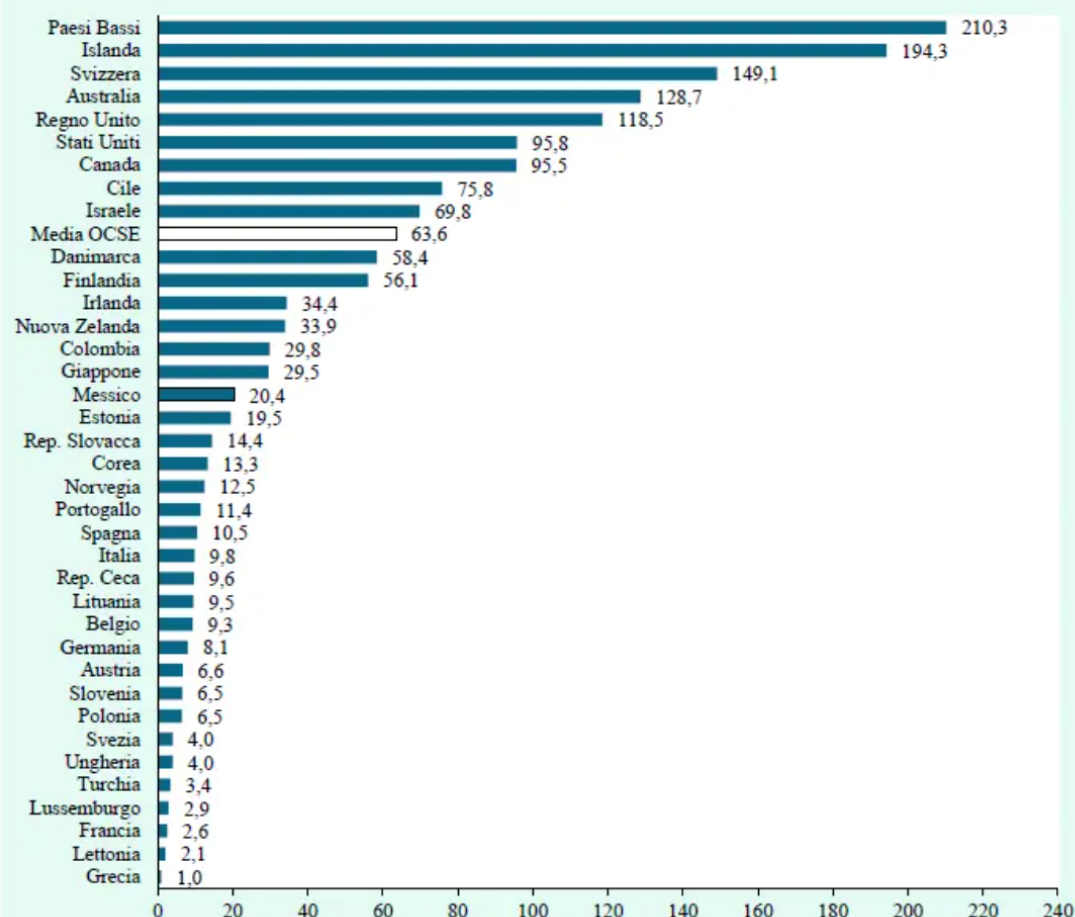
Supplementary pension forms – Number
(end of the year data)



Finally, international comparisons, as suggested by Chart 4, often place Italy among the countries with a relatively limited role for supplementary pensions compared to systems where occupational and personal schemes are more widespread. This confirms that, despite progress in participation and asset accumulation, the Italian second pillar still faces structural challenges, both in terms of coverage and in its capacity to contribute significantly to retirement income adequacy.

Chart 4: Pension funds in the OCSE countries

Pension funds in OECD countries – Assets relative to GDP
(preliminary data from the end of 2020; percentage values)



Source: OECD, Pension funds in Figures, 2021
The OECD average is weighted against GDP

2.4.4 Advantages, including tax advantages and the current functioning of pension funds

As discussed above, the development of the second pillar, and in particular of pension funds, has represented an important evolution in the Italian framework of social protection by offering an additional tool complement mandatory provision. The gradual diffusion of these instruments can be explained, above all, by their flexibility and by a tax treatment explicitly designed to encourage long-term retirement saving.

A first relevant element concerns the taxation of investment returns accrued within

pension funds. Historically, until 2014, the tax rate applied to financial income within these schemes was lower than that applied to many alternative investment vehicles, such as mutual funds. The regime has subsequently changed but it still remains favourable relative to standard financial investments: today, investment income within pension funds is taxed at 20%, compared with 12,5% on government bonds and 26% on most other financial returns. In addition, contributions paid into supplementary pension schemes are tax-deductible up to a yearly ceiling, currently €5.164,57, which represents a further incentive to participate and to contribute regularly.

Another key feature concerns taxation of benefits at retirement. As Quirici (2016) notes, “pension benefits paid in the form of lump sums and annuities constitute taxable income only for the portion that has not already been subject to taxation during the accumulation phase, therefore non-deducted contributions and already taxed income are excluded”. In practice, taxation applies only to the taxable share of the benefit, avoiding double taxation of components that were not deducted or that were already taxed during accumulation. The taxable portion is generally subject to a 15% substitute tax; however, this rate is reduced by 0,3% for each year of participation beyond the fifteenth, up to a maximum reduction of 6%. Consequently, the minimum achievable rate is 9% after 35 years of participation. By contrast, in the case of early redemption not justified by the legally permitted reasons, the taxable amount is typically subject to a higher rate, commonly 23%, which discourages withdrawals that undermine the long-term pension purpose of the instrument.

The regulatory framework also allows members to request advances on the accumulated position under specific conditions. In particular, up to 75% may be requested at any time to cover exceptional medical expenses for the member or close family members, spouse and children, related to serious health conditions. For other purposes, such as the purchase or renovation of a first home, advances are generally possible only after eight years of participation. Finally, it is important to note that, for the purpose of the 0,3% annual reduction in the tax rate, the relevant seniority is computed on the basis of effective participation years, net of any redemption periods; therefore, after a redemption, the reduction mechanism effectively restarts and the lower tax rate is reached only after a new fifteen-year period.

2.5 Individual pension plan

Although individual pension plans (PIPs) are formally classified as the third pillar of supplementary pension provision, in substantive terms they are very close to open pension funds, given the strong similarities in access, structure and fiscal treatment. Participation in PIPs is voluntary and exclusively individual: unlike negotiated (closed) funds, there is no link to a contractual category and membership does not arise from collective bargaining arrangements. A further distinctive element is that PIPs can be offered only by insurance companies, generally through separate management structures and they may also be subscribed by individuals without employment income or even without an employment contract.

The insurance nature of PIPs is reflected in their legal classification. In regulatory terms, insurance companies may offer PIPs as contracts falling within the life-insurance sector. In particular Branch VI of Article 2 of the Private Insurance Code includes “the management operations of collective funds established for the provision of benefits in the event of death, survival or in the event of cessation or reduction of employment” which confirms the compatibility between pension provision and life insurance activities. However, it is important to note that operating under Branch VI alone is not sufficient to qualify as an insurance undertaking: authorisation by IVASS requires that the company also performs typical insurance activities under other branches, notably Class I and/or Class III, since Branch VI, taken in isolation, does not involve a fully insurance-type risk transfer.

With reference to Class I, traditional life insurance, PIPs are often implemented through separate management, in which participants do not purchase “units” as in mutual fund but rather they join the management and receive annually the financial return generated by the underlying assets, net of the fee retained by the company for financial management. Class III, on the other hand, includes unit-linked and index-linked life insurance policies, whose value depends on the performance of investment funds or reference indexes. In unit-linked policies, premiums are used to purchase shares of investment funds; in index-linked policies, premiums are invested in instruments designed to replicate a given index.

Precisely because insurance companies perform a specific role, combining long-term

saving with elements of protection and guarantees, they are subject to strict regulatory constraints. In order not to be assimilated to purely investment-based intermediaries, insurers must, for certain lines, guarantee minimum returns or minimum benefits which implies that the company may be liable with its own assets to meet the promised threshold. Moreover, insurers are not free to invest without limits: they must comply with investment rules that ensure liquidity and solvency, and they are required to hold technical reserves and other prudential buffers to honour their commitments over time. These constraints reflect the broader objective of protecting policyholders and ensuring financial stability.

From the standpoint of taxation and benefit withdrawals, the similarities between PIPs and open pension funds remain substantial. Taxation of benefits is generally favourable with a rate that decreased from 15% to 9% depending on years of participation and annual contributions are deductible up to €5.164,57. The standard rule limiting lump-sum withdrawal to 50% of the accumulated position also applies, although it may be relaxed when the annuity that would be generated is below a threshold linked to the INPS minimum pension benefit. For example, in 2023 the INPS minimum benefit was €503,27; if the monthly annuity were below this amount, full redemption of the accumulated position could be allowed. Early advances follow a similar logic: for severe medical expenses, up to 75% can typically be withdrawn while maintaining favourable taxation; for other needs, withdrawals are generally limited (often 30% after eight years) and subject to higher taxation (e.g. 23%). Compared to open pension funds, a relevant difference is that PIPs do not always allow the same 75% advance for the purchase of a first home, which may fall instead under the broader category of “other expenses” and therefore be subject to the stricter limits. Finally, the taxation of investment returns follows the general framework, with differentiated rates for government bonds and other assets, consistent with the overall tax treatment of pension products.

2.5.1 PIP and pension funds compared

It is therefore natural to ask what the actual differences are between an individual pension plan (PIP) and an open pension fund (FPA). As noted above, the two instruments are largely comparable in terms of their supplementary pension purpose and several regulatory features. However, beyond the identity of the provider, the most relevant

differences concern the mode of participation and, in particular, the treatment of TFR.

About participation, a PIP can only be subscribed on an individual basis. Open pension funds, instead, may be joined either individually or through collective adhesion, for example via company agreements, collective bargaining arrangements or internal regulations. In the latter case, adhesion may also occur in a tacit form, silence-assent mechanism, although this channel is generally available only to private-sector employees. A further distinction concerns TFR allocation. In the case of FPAs joined through collective arrangements, the transfer of TFR to the fund is typically required at least for the minimum share specified by the agreement. By contrast, for PIPs and open funds joined individually, the decision to allocate TFR to the supplementary pension plan generally remains at the discretion of the member within the rules established by legislation.

An additional element that allows a more informed comparison across supplementary pension products is the ISC⁸, published by Covip⁹. This indicator is designed to provide a standardised measure of costs, computed under common assumptions to facilitate comparability across plans. As COVIP specifies, “the ISC calculation uses the standard costs applied by pension plans, without taking into account any benefits granted to particular categories of members”. The ISC is economically relevant because even small differences in annual costs can have large, long-run effects: over a 35-year accumulation horizon, an increase of one percentage point in the ISC may reduce the final accumulated capital by up to approximately 18%. As a stylised example, an ISC of 1% could lead to an accumulated position of €100.000, whereas an ISC of 2% could reduce it to around €82.000. For this reason, consulting COVIP’s comparative tables is essential to evaluate products consistently. In general, negotiated (closed) funds tend to display lower ISC values than open funds and PIPs.

This raises a further question: if PIPs are often associated with higher costs, what is their advantage? The answer lies in the “individual” nature of the product, which refers not only to the mode of membership but also to the possibility of building a more customised plan. In particular, PIPs typically allow the member to choose the contribution

⁸ Indicatore Sintetico di Costo

⁹ https://www.covip.it/isc_dinamico/

amount with high flexibility, often modifiable over time, and to select among different investment lines, guaranteed, bond, balanced or equity, with the possibility to switch line during the accumulation phase, a feature that is also present to some extent in open pension funds. Therefore, the distinction between PIPs and open pension funds is not always sharp in functional terms; nonetheless, the two products remain legally and institutionally distinct, since PIPs can be offered only by insurance companies, whereas open pension funds are established and managed by a broader range of regulated financial intermediaries.

3. EMPIRICAL EVIDENCE FROM THE SHIW: RETIREMENT OUTCOMES ACROSS PENSION REGIMES

This chapter presents the empirical analysis based on microdata released by the Bank of Italy through the Survey on Household Income and Wealth (SHIW). The dataset used in this thesis is drawn from the official historical archive, covering the period 1977–2022, and provides harmonized information at the individual level on demographic characteristics, labour-market status, and pension-related outcomes. Monetary variables are reported (or transformed) in a comparable unit of account, allowing consistent comparisons over time.

The list of variables and their definitions is composed by: *id* (unique individual panel identifier), *nquest*, *retired* (Retired dummy: 1 if *NONOC*==4 and *TIPO_PENS*==1), *Sesso*, *eta*, *nonoc*, *area3* (Macro-area), *staciv*, *anasc*, *qualp_harm* (main occupational status – harmonized), *anno_pens* (first year from which pension is received), *tipo_pens* (Type of pension), *quotape* (Ratio between first pension payment and last wage/salary), *rival* (Monetary revaluation coefficient to 2022 values), *tpens_2022* (*tpens* adjusted to 2022 values), *ytp1_2022* (Pension income, adjusted to 2022 values), *ym_2022* (Income from self-employment and business activities, adjusted to 2022 values), *etalav* (Age at first job), *acontrib* (Years of pension contributions), *etapension* (Age at old-age/seniority pension start; fallback to *ETAPEN*), *occupation_assnonoc* (Last occupation before retirement/unemployment), *cohort10* (Birth cohort, 10-years groups), *edulev* (Education level: 1-2 primary or less, 3 lower secondary, 4-6 upper secondary or more), *sector* (Sector of activity: *NACE2* if available, otherwise *NACE*), *reform* (Pension reforms), *log_pens* (Log of pension income, 2022 values). For this thesis, the analysis focuses on a restricted set of key variables—such as identifiers, year and age at retirement, gender and birth cohort, last earnings and first old-age pension benefit—together with derived indicators used to classify individuals by pension regime and to evaluate pension adequacy.

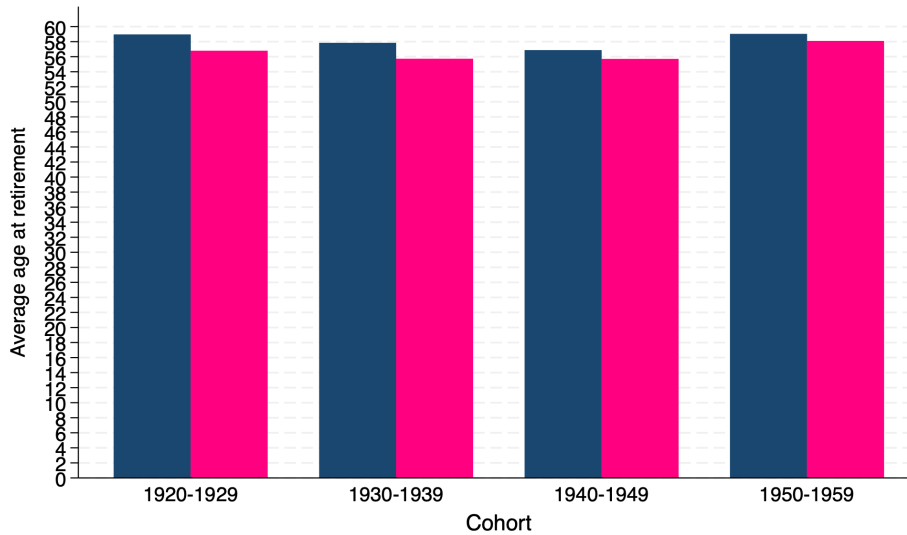
3.1 Methodology

The dataset used in the empirical chapter is constructed from the Bank of Italy Survey on Household Income and Wealth (SHIW) by extracting and harmonising information

from the historical archive and selected annual files. The starting point is the individual “components” archive (CARCOM) and related modules, which are merged consistently using the SHIW identifiers: NQUEST (household questionnaire ID) and NORD (within-household individual order), which are the standard keys to link individual information within a wave; for the panel component, the linkage across waves relies on NORDP (the individual’s previous-wave order number). An individual identifier (id) is then created to track each subject over time and to manage household–member relationships. To ensure comparability across years, occupational variables are harmonised (e.g., previous occupation codes and main occupational status) by mapping the different codings adopted in earlier and later waves into unified categories. Pension information is built by transforming the pensions file into an individual–year structure: pension start year (decor), pension amount (tpens), and pension type (tipop/tipop2) are cleaned and aggregated because some individuals report multiple pensions in the same year; pension types are unified into a single classification and then aggregated at the individual-year level. This pension block is merged back into the harmonised historical panel and complemented with individual income variables from the personal-income archive (RPER), including pension income components and labour/self-employment income. Monetary variables are converted to a common price level by merging the deflator file (one record per year) and applying the revaluation coefficient (rival) so that all income and pension amounts are expressed in real 2022 euros, improving intertemporal comparability. The construction proceeds wave-by-wave (1989–2022), linking individuals across waves through the panel keys, and retaining both “retired” and “not retired” observations to preserve the full pre- and post-retirement history. Finally, the dataset is cleaned by checking internal consistency of stable identifiers (e.g., sex and year of birth across waves) and by selecting the analytical sample relevant to the thesis (e.g., retirees and the pension start year variable). Given the complex survey design, the methodology also acknowledges the role of SHIW sampling weights—distinguishing cross-sectional and historical-comparability weights—when producing population-representative estimates.

3.2 Empirical Analysis: Descriptive Evidence and Regression Results

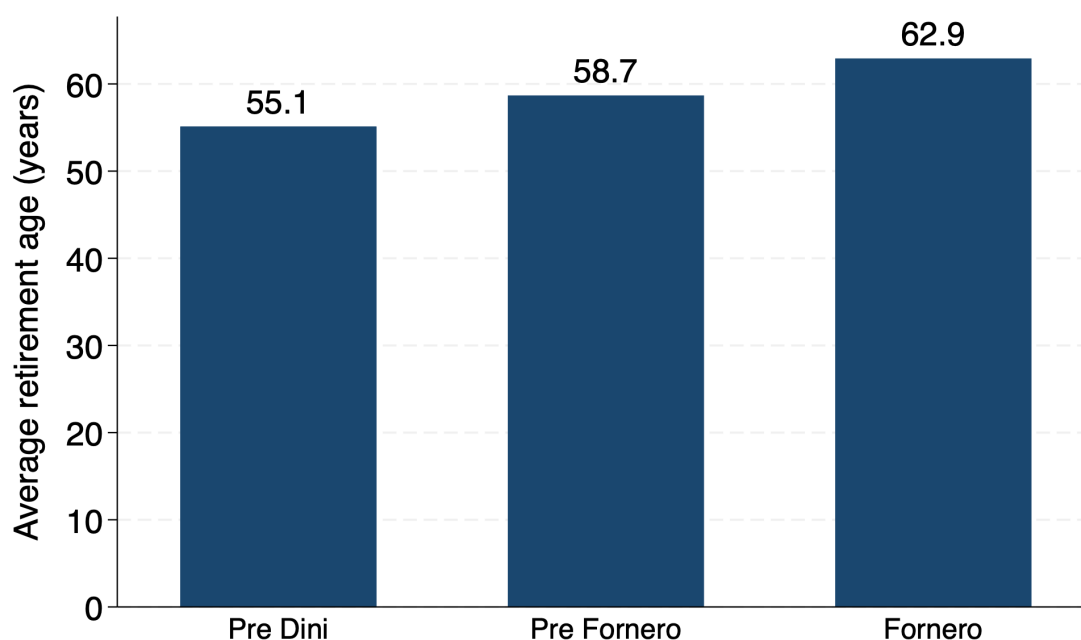
Figure 1: Average retirement age by birth cohort and gender



The figure reports the average retirement age by birth cohort (1920-29, 1930-39, 1940-49, 1950-59) distinguishing between men and women. Across all cohorts, a clear gender gap emerges men retire at a slightly older age than women. This pattern is consistent with the historical design of the Italian pension system, which for many years set more favourable statutory retirement ages for women and interacted with gender differences in career histories, for example more frequent career interruptions and different sectoral composition.

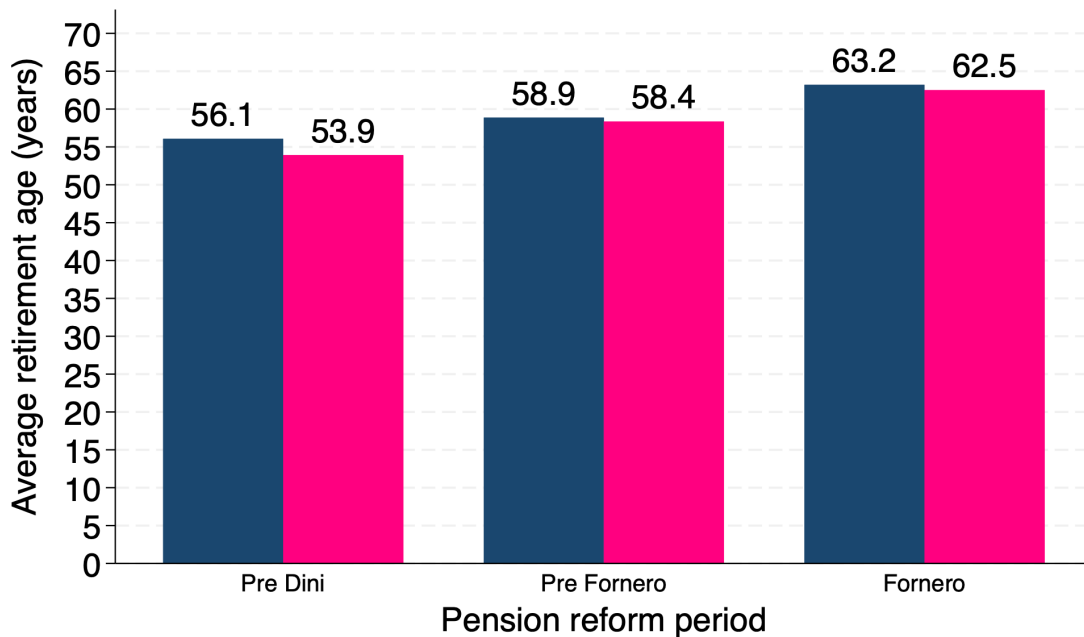
The cohort profile is not strictly monotonic. The average retirement age decreases from the earliest cohorts to the 1940-49 cohort and the increases again for the 1950-59 cohort. This should not be interpreted as an anomaly. Observed cohort averages reflect both institutional rules and the composition of retirements captured in the sample. In particular, cohorts differed in their exposure to early exit channels, for example seniority/early retirement, as well as in the macroeconomic and policy retirement in more recent years, when eligibility conditions have become progressively stricter and effective retirement ages tend to rise.

Figure 2 - Mean retirement age across pension reform regimes



This figure reports the average retirement age across the three institutional regimes considered (Pre-Dini, Pre-Fornero and Fornero). The pattern is clearly upward: the mean retirement age rises from about 55,1 years in Pre Dini period to 57,7 in the Pre Fornero period and reaches roughly 62,9 years under the Fornero regime. This evolution matches the historical narrative discussed in the thesis. Before the mid-1990s, retirement outcomes were shaped by a predominantly earning-related framework and by the widespread use of early-exit routes, especially seniority-based retirement, which allowed individuals to leave the labour market relatively early. During the 1990s, reforms gradually tightened eligibility and reduced the scope for early retirement, while the Dini reform (1995) introduced a progressive shift towards a more contribution-linked logic. The sharpest break appears in the Fornero period (2011) when access conditions were further tightened and effective retirement ages moved upward. Overall, the figure provides descriptive evidence that successive reforms have been associated with a systematic postponement of retirement, consistent with sustainability-oriented policy objectives.

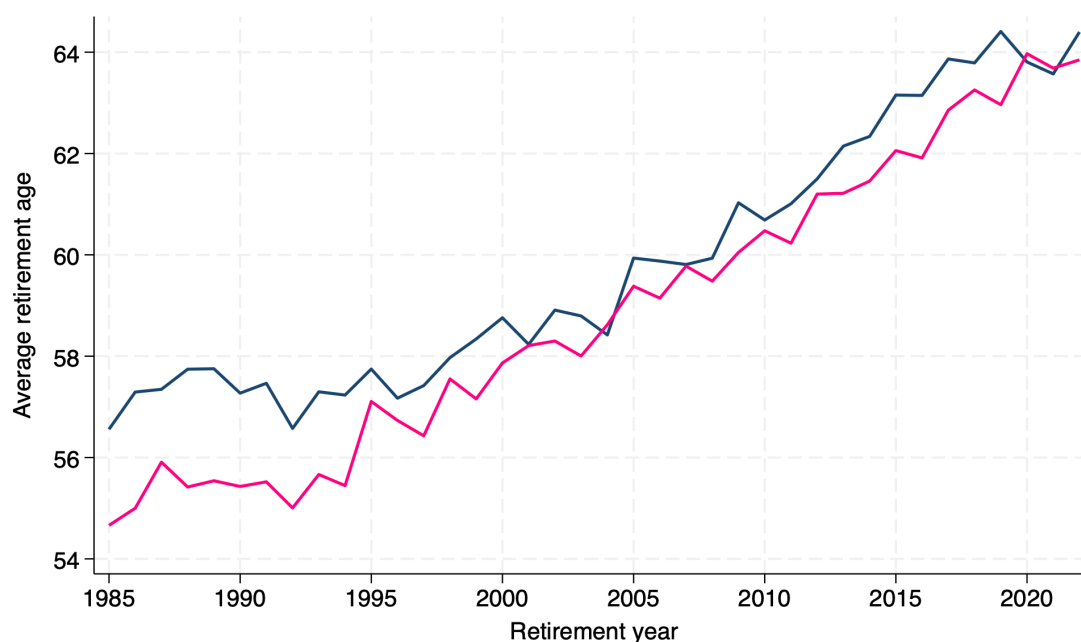
Figure 3 - Mean retirement age across pension reform regimes, by gender



The second figure repeats the comparison across reform periods but splits the results by gender. As in the aggregate chart, the average retirement age increases moving from the pre-Dini regime to the pre-Fornero phase and then to the Fornero period, for both men and women. At the same time, the figure highlights a clear distributional pattern. In the pre-Dini regime the gender gap is sizeable: men retire at about 56,1 years on average while women retire at around 53,9. The difference is consistent with the institutional setting of the time, more favourable statutory ages for women and broader access to early-exit pathways, together with gender-specific employment histories and career interruptions.

The gap then shrinks sharply in the pre-Fornero period, approximately 58,9 for men versus 58,5 for women, and remains small under the Fornero regime, so 63,2 vs 62,5. This convergence is in line with the gradual harmonisation retirement conditions across genders and with the overall tightening of eligibility rules, which reduced the scope for group-specific retirement timing. Taken together, the two figures suggest that reforms have not only shifted retirement to later ages but have also contributed to narrowing gender differences in the timing of labour-market exit.

Figure 4 - Trends in mean retirement age over time, by gender



The figure plots the average retirement age, on the y-axis, against the retirement year, on the x-axis, distinguishing men, in blue line, and women, in pink line, from 1985 onward. A clear long-run pattern emerges: the average retirement ages rises steadily for both genders increasing from roughly 56-58 years in the second half of the 1980s to around 64-65 years in the most recent period. This upward trajectory is consistent with the evolution of the Italian pension system where successive reforms gradually tightened eligibility conditions, through higher age and contribution requirements and a progressive restriction of early-exit channels, thereby shifting effective retirement behaviour toward later ages.

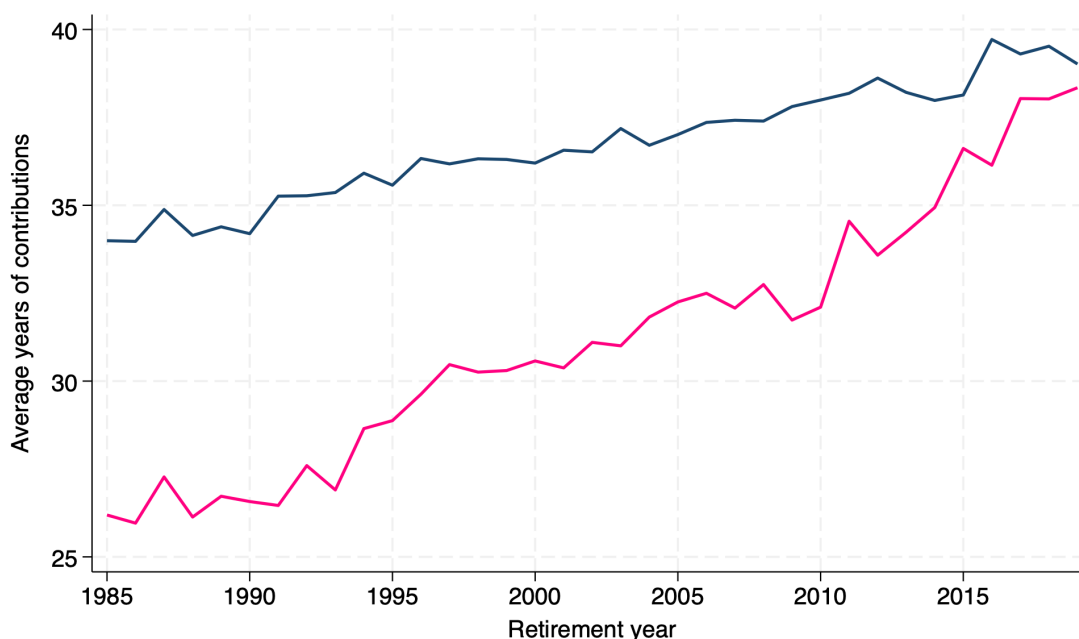
A second result is the presence of a persistent gender gap. Throughout most of the sample period, men retire at a slightly older age than women, with the difference being more pronounced in the late 1980s and early 1990s, approximately 1-2 years. Over time, the gap narrows substantially and the two series converge in the most recent years, sometimes approaching near overlap. This convergence is consistent with the gradual harmonization of retirement rules across genders and with the reduction of institutional differences that historically allowed women to retire earlier.

From a dynamic perspective, the figure suggests three broad phases. In the late 1980s to mid-1990s, average retirement ages are relatively stable, with limited fluctuations and

a lower profile for women. From the late 1990s to the mid-2000s, the trend becomes more clearly upward bringing average retirement ages close to 59-60 years. From around 2008 onward the increase accelerates pushing average retirement ages above 61-62 years and eventually stabilizing around 64 in the most recent period. Overall, this pattern is consistent with a progressively stricter institutional environment and with long-run sustainability concerns associated with population ageing.

Finally, small year-to-year fluctuations, especially in the earlier part of the series, should be interpreted cautiously, as annual means may also reflect the composition of retirees observed in each year, for example: changes in sample size, cohort mix or retirement pathways included in the underlying retirement-age measure. Nevertheless the core message is robust: the effective retirement age increases substantially over time and gender differences in retirement timing diminish, indicating a gradual convergence toward later and more uniform retirement outcomes.

Figure 5 - Trends in contribution histories at retirement, by gender



The figure plots the average number of contributions year, on the y-axis, against the retirement year, on the x-axis, distinguishing between men, in blue line, and women, in pink line. A clear long-run pattern emerges: the average contribution history at retirement increases over time for both groups. In the mid-1980s, men retire with roughly 34-35

years of contributions on average, while women retire with around 26-28 years. Over subsequent decades, both series trend upward, suggesting that retirement in more recent years is increasingly associated with longer contribution careers. This evolution is consistent with the gradual tightening of eligibility conditions and the reduced scope for accrued contributions.

The graph also highlights a persistent gender differential. Throughout most of the period, men display higher average contribution years at retirement than women, reflecting historically more continuous employment paths and higher labour-market attachment. At the same time, the female series increases more rapidly, particularly from the mid 1990s onward, indicating a gradual narrowing of the gap. This convergence is consistent with rising female labour-force participation and longer, less interrupted contribution histories among later cohorts, although a difference remains visible over the full sample.

From a time-series perspective, the male profile rises relatively steadily and reaches values close to 37-39 years in the most recent part of the sample. The female profile starts from substantially lower levels but shows stronger growth, exceeding 30 years by the late 1990s and approaching higher values thereafter. Short-run fluctuations should be interpreted cautiously, as yearly averages may also reflect changes in the composition of retirees observed in each year, taking into account differences in career patterns, employment sectors or sample size. Overall, however, the figure provides descriptive evidence of a long-term shift toward longer contribution careers at retirement, together with a gradual reduction, though not elimination, of gender differences in contribution histories.

Table X – Determinants of the Pension Replacement Rate (quotape): Baseline vs Extended Specifications

	(1) Baseline	(2) Extended (+sector,+occupation)		
Male	0 (.)	0 (.)		
Female	-2.859*** (0.288)	-4.357*** (0.304)		
North	0 (.)	0 (.)		
Centre	2.183*** (0.363)	1.587*** (0.344)	Real estate activities	-1.932 (4.110)
South and Islands	0.384 (0.328)	-0.564* (0.323)	Professional, scientific and technical activities	-2.105* (1.275)
Primary education	0 (.)	0 (.)	Administrative and support service activities	0.977 (1.121)
Lower secondary	2.750*** (0.367)	-0.163 (0.380)	Public administration and defence; compulsory social security	5.165*** (0.688)
Upper secondary or above	6.004*** (0.360)	-1.170** (0.525)	Education	5.947*** (0.870)
1920-1929	0 (.)	0 (.)	Human health and social work activities	3.797*** (0.758)
1930-1939	-0.00637 (0.605)	-0.0509 (0.569)	Arts, entertainment and recreation	-4.803 (3.523)
1940-1949	0.949 (0.699)	0.287 (0.656)	Other service activities	0.108 (0.743)
1950-1959	3.598*** (0.823)	2.270*** (0.770)	Households as employers / own-use production	-1.346 (1.535)
1960-1969	5.381*** (1.372)	3.949*** (1.303)	Activities of extraterritorial organizations and bodies	-1.766 (2.610)
Age at old-age/seniority pension start; fallback to ETAPEN	-0.115*** (0.0298)	0.0116 (0.0280)	Other	1.003 (1.146)
Pre Dini	0 (.)	0 (.)	Factory worker or similar / Other	0 (.)
Pre Fornero	-1.336*** (0.478)	-0.579 (0.450)	Employee	3.936*** (0.460)
Fornero	-2.607*** (0.753)	-1.266* (0.703)	Teacher	5.124*** (0.883)
Agriculture, forestry and fishing	0 (.)		Manager	3.798*** (0.616)
Mining and quarrying	-0.868 (1.540)		Liberal professional	-9.595*** (1.251)
Manufacturing	1.318** (0.566)		Self-employed	-10.60*** (0.465)
Electricity, gas, steam and air conditioning supply	2.488** (1.165)		Constant	77.61*** 73.06*** (1.823) (1.770)
Water supply; sewerage, waste management and remediation activities	3.594* (1.960)		Observations	15291 15291
Construction	-2.973*** (0.766)		R ²	0.036 0.149
Wholesale and retail trade; repair of motor vehicles and motorcycles	0.0872 (0.683)		Standard errors in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01	
Transportation and storage	3.290*** (0.725)			
Accommodation and food service activities	-1.775 (1.188)			
Information and communication	2.883*** (1.080)			
Financial and insurance activities	0.688 (0.924)			

To analyse the determinants of the replacement rate, I estimated two linear regressions with the dependent variable *quotape*, ratio between first pension and last earned income. Table X reports two specifications: column (1) (“Baseline”) includes demographic and institutional controls (gender, macro-region, education, birth, cohort, age at retirement and reform period), while column (2) (“Extended”) adds two variables that more directly describe the working career: economic sector and occupation before retirement. Both regressions are estimated with the robust standard errors number of observations ($N=15.291$), so that the comparison between columns can effectively be interpreted as the effect of adding controls and not as a change in sample.

A first significant result is that the inclusion of sector and occupation significantly increases the explanatory power of the model: the R^2 increases from 0,036 in the parsimonious specification to 0,149 in the full model. This shift is informative: it indicates that a significant portion of the variability in the replacement rate is linked to career characteristics and labour market segmentation that, in the baseline model, remained “under the radar”. In other words, the replacement rate does not depend solely on the regulatory context or general individual characteristics but is strongly influenced by the type of job held and the sector in which one worked, because these dimensions determine both the dynamics of final wages (the denominator of the ratio) and, indirectly, the regularity of contributions and the structure of benefits.

Looking at the coefficients, the gender gap appears large and robust. In column (1), women a replacement rate approximately 2,86 point lower than men; in the extended model, the difference becomes even more marked (-4,36 points, still highly significant). The increase in absolute value when switching to the full specification is an important interpretative element: it suggests that, once the type of sector and occupation are held constant, a clearer residual gap emerges between men and women. This may reflect unobserved differences in employment history (interruptions, part-time work, different wage profiles over the life cycle) that affect the pension/final salary ratio even when the observed “macro-career” (sector/occupation) remains the same.

Regional differences also change slightly but remain significant. Compared to the North, the Centre shows a higher ratio in both columns (approximately +2,18 in the baseline and +1,59 in the extended model). For the South and Islands, however, the

coefficient changes from slightly positive not significant (+0,38) to negative and weakly significant in the full model (-0,59). This change in sign is plausible: when controlling for occupation and sector, part of the regional “composition” is absorbed and the residual difference realigns. In any case, it should be remembered that the replacement rate is a ratio: it can be high even in the presence of modest pensions if the final salary is relatively low; Thus, regional differences may reflect both career and wage heterogeneity and, in part, redistributive mechanism within the system (for example, a greater relative weighting of minimum performance or careers with lower final wages).

A crucial point, which clearly illustrates the value of the extended specification, concerns the role of education. In the parsimonious model, compared to “Primary education”, higher replacement rate (+2,75 for “Lower secondary” and +6,00 for “Upper secondary or above”). However, once occupation and sector are introduced, these effects are dramatically reduced and also reverse sign: “Lower secondary” becomes essentially zero and non-significant (-0,16), while “Upper secondary or above” becomes negative (-1,17 significant). This is a highly interpretable result: in the basic model, education also captures the fact that the more educated end up in different occupations/sectors; Once controlled for these channels, “pure” education tends to reduce the replacement rate because, given the same pension, or rules, those with higher final wages tend to have a lower pension-to-wage ratio.

Regarding cohorts, in the baseline, younger cohorts show higher replacement rates (for e.g. +3,6 for 1950-59 and +5,38 for 1960-69 compared to the 1920-29 cohort). In the extended model, the effects remain positive but attenuate (about +2,27 and +3,95, respectively), indicating that part of the “generational” effect on the replacement rate also reflects changes in the occupational and sectoral composition of the more recent cohorts. It is also interesting that the effect of retirement age changes: in the baseline model, it is negative and significant (-0,115), while in the extended model it becomes almost zero and non-significant (+0,012). This suggests that the association between age and quotate in the baseline was partly mediated by labour composition (sector/occupation), i.e. by the fact that retiring earlier or later is correlated with career type.

On the institutional front, the coefficients of the reforms are consistent with the idea of a progressive reduction in “relative generosity”. In the parsimonious model, both the

“Pre-Fornero” and “Fornero” periods are associated with a lower replacement rate than the Per-Dini period (-1,34 and -2,61). In the extended model, the effect attenuates: “Pre-Fornero” loses significance (-0,58) while “Fornero” remains negative and significant (-1,27). This difference between columns is informative: part of the “reform” effect on the replacement rate appears to operate through the different composition of the labour market and careers in subsequent periods: however, in the Fornero period, a residual effect remains consistent with the stronger link between contributions/benefits and the narrowing of exit channels.

Finally, the extended model reveals very strong effects related to sectors and occupations. For example, sectors such as public administration, education and healthcare replacement rates (approximately +5,27, +5,95 and +3,80, respectively, compared to the base sector), while sectors such as construction are associated with lower values (approximately -2,97). In terms of employment, compared to the reference category (“Factory worker or similar / Other”), replacement rates are higher for employees, teachers and managers (+3,94, +5,12, +3,80), while freelancers and especially self-employed workers show much lower values (approximately -9,60 and -10,60). These results are consistent with structural differences in wage profiles and contribution compliance: all else being equal, some categories (particularly self-employed workers) appear to have a less favourable pension/last income ratio.

In summary, Table X shows that quotate is determined by the interaction between institutions and careers: the base model captures “large” differences by gender, region, cohort and reforms; adding sector and occupation, the explanatory power increases significantly and some coefficients change (education, age, reforms), suggesting that part of the observed differentials is mediated by the composition of the labour market. This result naturally motivates the move to the next section, in which we no longer analyse a ratio (pension/final salary) but the level of the pension in real terms, estimating regressions with the dependent variable `log_pens` and replicating the same “baseline vs extended” logic to verify whether the determinants of relative adequacy coincide with those of the pension level.

Table Y – Determinants of Real Pension Income (log_pens): Baseline vs Extended Specifications

	(1) Baseline	(2) Extended (+sector,+occupation)		(0.108)
Male	0 (.)	0 (.)	Professional, scientific and technical activities	0.211*** (0.0305)
Female	-0.288*** (0.00701)	-0.253*** (0.00703)	Administrative and support service activities	0.177*** (0.0267)
North	0 (.)	0 (.)	Public administration and defence; compulsory social security	0.285*** (0.0152)
Centre	-0.0130 (0.00891)	-0.0162** (0.00797)	Education	0.269*** (0.0205)
South and Islands	-0.111*** (0.00779)	-0.0996*** (0.00703)	Human health and social work activities	0.329*** (0.0172)
Primary education	0 (.)	0 (.)	Arts, entertainment and recreation	0.0591 (0.0651)
Lower secondary	0.200*** (0.00823)	0.0721*** (0.00823)	Other service activities	0.126*** (0.0161)
Upper secondary or above	0.619*** (0.00885)	0.228*** (0.0127)	Households as employers / own-use production	-0.0465 (0.0328)
1920-1929	0 (.)	0 (.)	Activities of extraterritorial organizations and bodies	0.333*** (0.0888)
1930-1939	-0.0181 (0.0138)	-0.0252** (0.0125)	Other	0.190*** (0.0269)
1940-1949	-0.00781 (0.0162)	-0.0233 (0.0146)	Factory worker or similar / Other	0 (.)
1950-1959	0.00616 (0.0193)	-0.00353 (0.0173)	Employee	0.136*** (0.0112)
1960-1969	-0.0428 (0.0358)	-0.0146 (0.0319)	Teacher	0.225*** (0.0219)
Age at old-age/seniority pension start; fallback to ETAPEN	-0.00155** (0.000737)	-0.000169 (0.000674)	Manager	0.557*** (0.0158)
Pre Dini	0 (.)	0 (.)	Liberal professional	0.269*** (0.0325)
Pre Fornero	-0.0125 (0.0111)	0.00107 (0.00996)	Self-employed	-0.0905*** (0.0101)
Fornero	-0.00743 (0.0183)	0.00270 (0.0162)	Constant	9.694*** (0.0448)
Agriculture, forestry and fishing		0 (.)		9.480*** (0.0416)
Mining and quarrying		0.223*** (0.0311)	Observations	15299
Manufacturing		0.180*** (0.0116)	R ²	0.344
Electricity, gas, steam and air conditioning supply		0.316*** (0.0297)		0.478
Water supply; sewerage, waste management and remediation activities		0.242*** (0.0309)	Standard errors in parentheses	
Construction		0.101*** (0.0147)	* p < 0.10, ** p < 0.05, *** p < 0.01	
Wholesale and retail trade; repair of motor vehicles and motorcycles		0.114*** (0.0141)		
Transportation and storage		0.254*** (0.0158)		
Accommodation and food service activities		0.113*** (0.0254)		
Information and communication		0.241*** (0.0254)		
Financial and insurance activities		0.365*** (0.0230)		
Real estate activities		-0.0249		

Table Y reports the results of two regressions in which the dependent variable is

log_pens, the logarithm of pension income in real values. Column (1) presents a baseline specification that includes socio-demographic and institutional controls: gender, macro-region, education, birth cohort, age at retirement and reform period. Column (2) extends the model by adding two variables that directly capture the dimension of the working career: economic sector and occupation before retirement. Both regressions are estimated on the same number of observations and with a robust standard error, making the comparison between columns interpretable as the effect of adding career controls and not as the effect of a change in sample.

From the point of view of goodness of fit, the addition of sector and occupation leads to a marked improvement: the R^2 goes from 0,344 in the baseline model to 0,478 in the extended model. This increase is consistent with the regression objective: unlike a relative indicator, we are explaining pension levels here; consequently variables describing labour market position, sector and occupation, capture a very large component of differences in pension levels. Since the dependent variable is logarithmic, the coefficients can be interpreted as percentage differences in pension levels.

A very robust result concerns gender. In column (1) the “female” dummy is negative and highly significant (-0,288) and remains negative even in the extended model (-0,253). In economic terms, this implies a large gap: given the same area, education, cohort, age, reform and, in column (2), even given the same sector and occupation, women have a lower average pension level. The fact that the coefficient only partially decreases when switching to the extended specification indicates that part of the gap is explained by the different distribution of men and women across sectors and occupations but a significant gap remains that may reflect unobserved differences in employment dynamic, for example: interruptions, part-time work, lower wage progression, different contribution continuity.

The territorial variables also show clear results, especially for the South. Compared to the North, the coefficient for the South and Islands is negative and highly significant in both columns (-0,111 in the baseline and -0,0996 in the extended specifications). This indicates that, controlling for a broad set of individual and career characteristics, the average pension level in the South remains lower. The Centre, however, has a small coefficient: in the baseline, it is not significant while in the extended specification, it

becomes slightly negative and significant (-0,0162). Overall, the reading is that the region has a robust impact on pension levels, consistent with structural differences in the labour market, wage distribution and employment continuity.

Regarding education, a positive gradient in pension level is observed, but the magnitude of the effect varies significantly between the two specifications. In the baseline model, compared to the “Primary education” category, “Lower secondary” is associated with a higher pension level (0,200) and the “Upper secondary or above” category has a very high coefficient (0,619). When sector and occupation are added, the coefficients remain positive and significant but decrease significantly (0,072 and 0,228). This reduction can be interpreted naturally: part of the education “premium” in the baseline model reflects the greater probability for more educated individuals to find employment in higher-paying sectors and occupations; once these channels are controlled for, the residual effect of education attenuates but remains positive.

Cohort effects are generally small and often insignificant. Some cohorts show slightly negative coefficients but no strong and systematic generational gradient emerges in pension levels once education, area, sector and occupation are controlled for. This suggests that generational differences in pension levels are mediated primarily by changes in socioeconomic composition and employment trajectories, rather than by a direct “cohort effect”.

An additional factor is retirement age: in the baseline model, the coefficient is very small and negatively significant (-0,00155) while in the extended model, it becomes virtually zero and insignificant (0,000169). Essentially, once we controlled for sector and occupation, retirement age does not provide further explanatory power on pension levels, suggesting that pension levels are more closely linked to career profiles than to retirement timing alone.

From an institutional perspective, the coefficients associated with the reform periods (“Pre-Fornero” and “Fornero” compared to “Pre-Dini”) are small and not statistically significant in both specifications. This result should not be interpreted as “irrelevance of the reforms” but rather as an indication that, once controlled for socioeconomic and career composition (especially in the extended column), no net average differential in pension levels attributable to the regulatory regime emerges in the observed sample. In other

words, the effect of reforms on pension levels may be strongly mediated by the composition of retirees and career characteristics, which change over time.

Finally, column (2) shows large and highly significant coefficients for numerous sectors and occupations, confirming that these dimensions are among the main drivers of pension levels. Compared to the base sector (agriculture), many sectors show significant positive differentials, including finance and insurance (0,365), public administration (0,285), education (0,269) and healthcare (0,329) consistent with more stable careers on average and/or higher wages. On the occupational side, compared to the reference category (“Factory worker or similar / Other”), positive premiums are found for “Employee” (0,136), “Teacher” (0,225), “Manager” (0,557) and “Liberal professional” (0,269) while “Self-employed” is negative (-0,0905). The order of magnitude of these coefficients is economically relevant and explains why, moving from column (1) to column (2), the R^2 increases so markedly: the level of pension is highly stratified along sector and occupation lines and the inclusion of these variables allows us to capture this stratification.

Overall, Table B shows that the level of pension (in log) is significantly explained by socioeconomic and career variables: large differences persist by gender and region, education maintains a positive premium but is partly mediated by sector/occupation, while the inclusion of career controls substantially increases the model’s explanatory power. This “per se” reading of Table B provides the basis for the comparison that will be developed in the chapter’s conclusion with Table A and the descriptive evidence from the graphs.

3.3 Conclusion

This chapter has constructed an empirical framework of labour market exit and pension outcomes using harmonized SHIW microdata (Bank of Italy) reported in real terms. The descriptive section has shown, first of all, a clear increase in the effective average retirement age as the “rigidity” of the regulatory regime increases: in the transition from pre-Dini regimes to more recent ones and more markedly during the Fornero period, the average retirement age tends to shift upward. This dynamic is consistent with the institutional evolution discussed in previous chapters and with the progressive tightening of entry requirements, especially after 2011. Furthermore, the graphs by cohort and

gender highlight a gap between men and women (men on average slightly late), accompanied over time by a gradual narrowing of the gap, a sign of convergence of exit rules and behaviours. Finally, the series on years of contributions associated with retirement over time, with a more marked recovery among women, consistent with a progressively grater permanence in the labour market, though a gap remains.

On this descriptive basis, the econometric analysis was set up in parallel using two families of regressions, “Baseline” and “Extended”. Table A estimates the determinants of the replacement rate (quotape) an indicator of relative adequacy (initial pension compared to final salary) while Table B estimates the determinants of the real pension level using log_pens (absolute adequacy). This distinction is crucial because the two indicators do not measure the same thing: quotape incorporates final income in the denominator and is therefore directly affected by the wage structure and regional and occupational differences in final wages; log_pens, on the other hand, measures the pension level and allows for a more direct interpretation of inequalities in benefits.

The results confirm that career-related controls (sector and occupation) are crucial. In Table A, adding sector and occupation_asnonoc increases the R^2 from 0,036 to 0,149 indicating that a significant portion of the variability in the replacement rate depends on labour market segmentation and career type. In Table B, the effect is even more pronounced: the R^2 increases from 0,344 to 0,478 confirming that, when accounting for pension levels, sector and occupation capture a very large share of heterogeneity because they synthesize persistent differences in earnings and contribution profiles. This point is also important from a methodological perspective: the “Extended” specification is not simple enrichment but serves to separate the “institutional” effect from the compositional effect, who retires and with what occupational profile.

A joint reading of the two tables also clarifies some results that, when viewed in isolation, may seem counterintuitive. The most relevant case is the territorial one. In the regression on the replacement rate (Table A), the coefficient for the South and the Islands is positive and non-significant in the baseline (+0,384) and in the extended model it becomes negative and weakly significant (-0,564). Taken alone, this evidence might lead one to believe that pension adequacy in the South is “better” or at least not worse than in the North. Table B clarifies the mechanism: in terms of pension levels, the South and the

Islands are consistently and significantly penalized, with coefficients around -0,111 (baseline) and -0,0996 (extended) which correspond to a lower pension level even with the same observed characteristics. This is precisely the point emphasized by the rapporteur: a relatively high replacement rate may be compatible with lower absolute pensions when the final salary (the denominator) is on average lower. Furthermore, in the presence of careers and low wages, it is plausible that redistributive mechanisms (for example supplements linked to minimum benefits) come into play more frequently, “raising” the pension relative to the final salary and therefore increasing the pension ratio. From this perspective, a non-penalizing pension ratio in Southern Italy does not imply higher pensions but it may signal a more frequent redistributive component: lower wages and pensions supported downward through protection mechanisms produce a relatively higher pension/wage ratio.

A similar reasoning helps interpret the gender issue. In Table B, the “female” coefficient is consistently negative and highly significant (ranging from -0,288 to -0,253) indicating a robust gap in pension levels even after controlling for sector and occupation. In Table A, however, the gender effect remains negative and significant and tends to widen when switching to the extended specification (from -2,859 to -4,357). However, the comparison between outcomes remains conceptually useful: the fact that the gap is very large in pension levels is consistent with more discontinuous careers on average and lower wages; at the same time, in a relative indicator such as *quotape*, the presence of very low final wages and fragmented careers can increase the likelihood that the actual pension is supported by minimum protection instruments, attenuating, in some contexts or subgroups, the decline in the pension/wage ratio. In summary, the results suggest that the system does not eliminate gender inequalities in level but can impact the relative measure through protective and redistributive components.

Overall, this chapter leads to two operational conclusions that pave the way for the next section. First, the regulatory transition and the tightening of requirements are consistent with the increase in the effective retirement age and longer contribution periods, as shown in the graphs. Second, pension adequacy must be interpreted on two distinct levels: the replacement rate responds sensitively to the denominator and therefore can generate apparently “positive” results in areas or groups characterized by low final

wages; the pension level, on the other hand, highlights structural differences more clearly, confirming regional disadvantages, particularly in the South and Islands, and a persistent gender gap.

4. CONCLUSION

This thesis reconstructed the evolution of the Italian pension system and discussed its main economic and distributional implications, aiming to connect institutional rules to observable outcomes for individuals and families. The historical evolution has revealed a well-established trajectory: Italy has progressively moved from a more generous, pay-as-you-go system to one that strengthens the link between contributions and benefits and aims to make spending dynamics more predictable over the long term. This transformation was largely a response to the sustainability constraints typical of a pay-as-you-go system: when the expected duration of a pension increases and the contribution base grows less rapidly it becomes inevitable to adjust the retirement age, contribution requirements or benefit levels.

Demographic factors are now the main external force shaping the system. Italy has been experiencing a decline in births and rapid aging for years: in 2024 resident births totalled fewer than 370.000 and the average number of children per woman fell to 1,18; a record low that makes stabilizing the population's age structure particularly challenging. In a pay-as-you-go system, this phenomenon is not neutral: fewer births today mean fewer workers tomorrow, thus creating a more fragile balance between contribution revenues and benefits, precisely as longevity increases and age-related welfare needs, healthcare and long-term care, grow. In other words, the pension problem cannot be separated from the demographic problem: financial sustainability also depends on the country's ability to maintain a large and dynamic employment base.

In this context, public discussion often tends to focus on “bridge measures” or flexible exit channels. However, the general direction of recent policies suggests that flexibility be managed selectively, while the core architecture remains that of ordinary requirements and automatic mechanisms. A crucial issue concerns the adjustment of requirements to life expectancy in the two-year period 2027-2028 with the possibility of sterilizations or exclusions for certain groups, especially those working in arduous/weary jobs. At the same time, the Budget Law continues to navigate a delicate balance: on the one hand, containing spending and reducing general advance payment channels, while on the other, maintaining targeted tools for vulnerable groups or specific working conditions. In short,

the prevailing orientation is to preserve the sustainability framework allowing for flexibility, especially conditional ones.

These choices respond to an inevitable trade-off. Raising the effective retirement age and limiting advance payment channels is one of the most immediate levers for moderating spending growth and spreading the expected duration of benefits over more years. At the same time, tightening requirements risks amplifying inequalities already present in the labour market: those with long and continuous careers tend to adapt more easily; Those with discontinuous careers, low wages, periods of inactivity or greater exposure to physically demanding jobs risk incurring higher costs in terms of access and adequacy. Therefore, sustainability is not just an accounting objective: it is also an issue of equity, as it determines who is able to retire, when and with what level of protection.

A second critical point concerns the adequacy of benefits and the overall coherence of redistributive mechanism. Over time, instruments protecting lower incomes have played an important role; however, the interaction between equalization, taxation and exemption thresholds can produce “staircase” effects and outcomes perceived as unfair, especially in the lower-middle brackets: nominal increases that are partially absorbed by taxation or net differences between those receiving supplements and those just above certain thresholds. The issue is delicate because it concerns the boundary between social security and assistance: it is rational for the system to protect against poverty in old age but if minimum protection becomes too dominant over the contributory logic, the risk is that it sends a distorted signal in terms of incentives and perception of fairness.

This leads to a methodological point that this thesis has sought to highlight to truly understand the adequacy of the system, it’s not enough to look at a single indicator. The replacement rate is a useful measure but it can be high even when the pension is low if the last salary was even lower. Conversely, the real pension level highlights regional and gender disparities. A comprehensive analysis must therefore consider sustainability, absolute levels, relative adequacy and redistributive mechanisms.

Looking at future policies, the answer cannot be reduced to the retirement age alone. If demographics are the long-term constraint, the strategy must be multi-pillar: addressing the labour supply side (female employment, youth stability, wage quality), productivity (growth) and, in parallel, the development of supplementary pension instruments that

reduce exclusive dependence of the first pillar. From this perspective, supplementary pension provision and pension education are not an “accessory” issue but a strategic component: the public system can remain the foundation but for younger generations it is important to be able to build a transparent and affordable supplementary component.

Some countries are experimenting, precisely in this direction, with tools that encourage young people to accumulate pensions from childhood. In Germany, for example, the Ministry of Finance has introduced the *Frühstart-Rente*, which provides a monthly public contribution of 10€ for children and young people (6-18 years old) to be allocated to an individual private pension “deposit”, with a long-term objective. In the United States, initiatives such as the “Trump Account” provide a public seed of \$1.000 for children born between 2025 and 2028, invested in an index fund, with the possibility of additional contributions and time limits on its use. While these models differ from the Italian context, the underlying message is clear: complementing the first pillar with long-term investable savings instruments can contribute both to improving the pension resilience of younger generations and to spreading financial awareness.

The comparison with Italy highlights another aspect: the regulatory and operational framework can facilitate or hinder the spread of savings instruments for young people. In Italy, for example, investing a minor’s capital requires authorization from a guardianship judge and refers to “restricted” investment categories established by the Civil Code. This framework makes it more complex, or at least more bureaucratic, to develop simple and widespread long-term investment solutions for minors. Without turning this point into a regulatory discussion, it is sufficient to note that, if the goal is to strengthen the second pillar and encourage early savings, simplifying the operating conditions and increasing the supply of efficient instruments can become significant levers.

In conclusion, the Italian pension system currently finds itself at the centre of three converging pressures: unfavourable demographics, public finance constraints and a segmented labour market that produces highly diverse career paths and thus unequal pension outcomes. Recent measure and the debate on life expectancy adjustments demonstrate that the prevailing direction is to preserve the sustainability framework, granting margins of flexibility primarily to specific groups rather than as a generalized channel. The challenge in the coming years will be to manage the transition without

transforming sustainability into a simple shift of risk onto individuals: the goal must be to maintain a financially credible, yet socially legitimate, system capable of specifically protecting those most exposed and offering understandable and stable rules to younger generations, who today perceive retirement as an increasingly uncertain prospect.

BIBLIOGRAFIA

- Olivieri A. Pitacco E. (2011) Introduction to Insurance Mathematics, Springer-Verlag, Berlino
- Quirici M.C. (2016) La previdenza complementare in Italia, FrancoAngeli, Milano.
- Pitacco E. (2000) Matematica e Tecnica Attuariale delle Assicurazioni sulla Durata di Vita, Editoriale Associati, Trieste
- Del Prete R. (2022) Compendio di diritto del lavoro sindacale e previdenza sociale, Nel diritto editore, Molfetta.
- Centro studi fiscali Seac (2022) Manuale della previdenza italiana, Seac, Trento.
- Cazzola G. (2021) La guerra dei cinquant'anni. Storia delle riforme e controriforme del sistema pensionistico, IBL Libri, Milano
- Marinelli N. (2012) I fondi pensione in Italia, FrancoAngeli, Milano.
- Trudda A. (2012) Sostenibilità ed adeguatezza. Il trade-off del sistema previdenziale italiano. Un modello di analisi dei rischi per le casse dei liberi professionisti, Giappichelli Editore, Torino.
- Thomas P. Lemke, Gerald T. Lins (2010). ERISA for Money Managers. Thomson Reuters.
- Cazzola G. (2005) Guida ai fondi pensione 2005, Bancaria editrice, Roma.
- Gremigni P. (2022) Guida pratica pensioni, Gruppo 24 ore, Milano.
- Tursi A. (2011) Le fonti normative e negoziali della previdenza complementare in Europa, Giappichelli Editore, Torino.

SITOGRAFIA

- <https://ultimora.zanichelli.it/geografia/ultimora-geografia-popolazione/la-crisi-demografica-italiana/>
- <https://www.worldometers.info/world-population/italy-population/>
- <https://data.worldbank.org/indicator/SP.DYN.LE00.IN?locations=IT>
- <https://www.nber.org/system/files/chapters/c15369/c15369.pdf>
- <https://www.nber.org/sites/default/files/2023-06/NB19-14%20ISS%20Coile%2C%20Boersch-Supan%20et%20al-VD.pdf>
- <https://art.torvergata.it/retrieve/e291c0d3-69a6-cddb-e053-3a05fe0aa144/178.pdf>
- <https://www.istat.it/it/files/2019/01/evoluzione-demografica-1861-2018-testo.pdf>
- <https://www.fondotelemaco.it/2022/09/22/tassazione-fondi-pensione/>
- <https://www.comitatoeducazionefinanziaria.gov.it/home/index.html>
- <https://europa.today.it/economia/paghetta-stato-10-euro-mese-bambini-pensioni-germania.html>
- <https://www.milanofinanza.it/news/trump-vuole-regalare-a-ogni-neonato-americano-un-fondo-da-1-000-dollari-funzionera-202506121635331843>
- <https://www.documentazione.info/troppi-pensionati-rispetto-ai-lavoratori-in-italia#:~:text=Il%20rapporto%20tra%20lavoratori%20e,sono%2016%20milioni%20e%2098mila>
- <https://www.pensionioggi.it/dizionario/sistema-a-ripartizione>
- https://www.rgs.mef.gov.it/VERSIONE-I/attivita_istituzionali/monitoraggio/spesa_pensionistica/
- <https://www.tidona.com/pepp-un-nuovo-strumento-di-previdenza-complementare/>
- <https://www.propensione.it/news/la-previdenza-integrativa-all'estero-e-l'arrivo-dei-pepp-52711/>