UNIVERSITA' DEGLI STUDI DI PADOVA

DEPARTMENT OF ECONOMICS AND MANAGEMENT

"MARCO FANNO"

MASTER'S DEGREE IN ECONOMICS AND FINANCE

"The Fornero Reform and Its Effects on Household Financial Behavior and Retirement Planning"

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A.Y. 2024 – 2025.

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Contents

Abstract

How does an exogenous and unanticipated increase in the retirement age generate forward-looking effects on household saving behavior?

This thesis addresses this question by exploiting the 2011 Italian pension reform (the Fornero reform) as a quasi-natural experiment. Using micro-level data from the Bank of Italy's Survey on Household Income and Wealth (SHIW), the analysis constructs a treatment variable that captures the increase in retirement age and estimates its effects on financial outcomes through a difference-in-differences (DiD) strategy with an event-study extension.

The results show no significant response in household consumption, suggesting that families smooth consumption despite retirement-related shocks. Moreover, savings decrease when the retirement age increases for the main earner, consistent with a reduced need for precautionary accumulation. In contrast, household savings rise when the secondary earner faces a delay, suggesting a compensatory adjustment to coordinate retirement timing. Gender-specific patterns emerge: women are more likely to invest in complementary pensions and, to a lesser extent, in death insurance. Additionally, main earners display a higher propensity to purchase both life and death insurance, pointing to differentiated financial protection strategies within the household.

1 Introduction

Over the past two decades, the financial sustainability of public pension systems has become a central concern in many advanced economies. In Italy, the 2011 pension reform, known as the Fornero Reform, marked a turning point in retirement policy by tightening eligibility requirements and significantly raising the statutory retirement age. This reform, introduced with minimal advance notice and broad population coverage, offers a unique setting to investigate how individuals adjust their financial behavior in anticipation of future pension constraints.

This thesis explores the forward-looking effects of the Fornero Reform, focusing on how households respond to an exogenous and unexpected increase in retirement age, even when retirement is still distant. Specifically, the analysis examines whether individuals, once informed of a longer working horizon, begin to adjust their saving, investment, and retirement planning strategies well before approaching retirement eligibility.

The research question is addressed using data from the Survey on Household Income and Wealth (SHIW), a repeated cross-sectional dataset collected by the Bank of Italy that provides detailed information on Italian households' economic and financial conditions. The empirical analysis focuses on the 2008–2016 period, comparing two waves before the reform (2008 and 2010) with three waves after its implementation (2012, 2014, and 2016). The sample is restricted to partnered households in which both members were born between 1954 and 1972, not yet retired, and had accumulated at least five years of social security contributions at the time of observation.

To estimate the causal effects of the reform, the thesis constructs a continuous treatment variable called *delay*, which measures—at the individual level—the number of years by which retirement eligibility was postponed due to the reform. This measure is computed for each individual by comparing pre- and post-reform retirement eligibility rules, taking into account their gender, employment sector, and the number of contribution years and age they would have reached in 2010, under the assumption of continuous contributions throughout the observation period. The calculation also incorporates adjustments linked to changes in life expectancy.

Because the SHIW is a repeated cross-sectional dataset and does not follow the same individuals over time, the analysis compares different individuals across waves. To ensure comparability, observations are grouped into comparable cells defined by birth cohort, gender, contribution class, and employment category. By applying fixed effects at the cell level and clustering standard errors accordingly, the approach controls for all time-invariant unobserved heterogeneity across cells and accounts for within-cell correlation, thereby improving the credibility of causal inference.

The identification of causal effects relies on the assumption that, in the absence of the reform, households with different levels of exposure to the delay would have followed parallel trends in their financial behavior. The plausibility of this assumption is supported by the exogeneity of the reform and the absence of significant behavioral differences between groups before 2010.

To address both intra-household roles and gender-related differences, the thesis introduces two complementary specifications. The main specification distinguishes spouses as main and second earners, emphasizing their economic roles within the household. In contrast, the alternative specification, detailed in the appendix, categorizes individuals by gender. This dual framework allows for a nuanced analysis of financial responses to the reform from both a household and gender perspective, while avoiding redundancy in classification.

The empirical findings reveal no significant change in household consumption, suggesting that families smooth their consumption over time even when facing future pension shocks. However, saving behavior shows more differentiated responses. The main earner tends to reduce savings following the reform, in line with a reduced need for precautionary accumulation due to a longer working horizon. In contrast, the secondary earner appears to increase savings, potentially to offset the partner's delay and maintain intertemporal balance within the household. Gender-based specifications further confirm that women are more likely to react to the reform by increasing participation in complementary pension schemes and, to a lesser extent, death insurance policies.

Finally, this thesis contributes to the literature by examining household saving responses to pension reforms—an area that has received limited attention compared to labor market outcomes. Most existing studies on the Fornero Reform focus on employment or sick leave effects, whereas this work investigates forward-looking financial behavior, a perspective typically explored in labor supply research. By shifting the focus to savings and financial planning, the study offers a new angle that confirms key implications of the life-cycle model and provides relevant insights for policy design. Additionally, it lays the groundwork for future research relying on more detailed data.

The thesis is organized as follows. Chapter 2 presents a review of the existing literature, focusing on both theoretical foundations and empirical studies of behavioral responses to pension reforms, especially those with a forward-looking perspective. Chapter 3 describes the institutional setting of the Fornero Reform and highlights its policy relevance. Chapter 4 introduces the SHIW dataset, outlines the sample selection, and explains the construction of key variables. Chapter 5 details the empirical strategy, including the definition of the treatment variable and the implementation of the Difference-in-Differences approach with an event-study extension. Chapter 6 reports the main empirical findings and discusses their interpretation in light of economic theory and policy implications. Chapter 7 concludes the thesis and suggests directions for future research. Supplementary analyses and supporting material are provided in the appendices.

2 Literature Review

The modern concept of pensions has emerged as an institutional response to the need to ensure economic security in old age, representing a relatively recent innovation within the landscape of social policies. The first systematic form of public pension was introduced in 1889 in Germany under the leadership of Chancellor Otto von Bismarck. The objective was to provide financial support to workers who, due to age or disability, were no longer able to work, while simultaneously intensifying the bond between the State and its citizens within a political context of growing social mobilization [(Verbon, 1988), (Blundell et al., 2016)].

The German system provided for the payment of a monthly benefit financed through mandatory contributions from both workers and employers, thus establishing a pioneering example of a Pay-As-You-Go scheme. Following the German example, other countries adopted similar systems: in 1909, the United Kingdom introduced its own old-age pension system, followed in 1935 by the United States with the Social Security Act, thereby marking the international expansion of the public pension model (Daminato and Padula, 2020).

Initially, the pensionable age was set at 70, a threshold significantly higher than the average individual's life expectancy at the time, implying that only a small portion of the population could actually reach that age and benefit from the pension. Over the course of the 20th century, the pensionable age was progressively reduced, stabilizing around 65 in most industrialized countries (Diamond and Barr, 2006). In parallel, increases in life expectancy have made it more likely that most workers would reach the pension threshold, as well as extended the duration of the retirement phase itself, thus transforming retirement into an expected and planned phase of life (Blundell et al., 2016).

As a result of these historical transformations, modern pension systems are characterized by a variety of legal and administrative configurations. The structure can vary significantly from country to country, but two main methods of financing public pensions generally stand out: *Pay-As-You-Go* (PAYG) systems, in which current pensions are financed by the contributions of active workers, and *Fully Funded* (FF) systems, where each worker accumulates resources in an individual account that will finance their future pension. In parallel, pension entitlements are classified as either *Defined Contribution* (DC) schemes, in which the amount contributed is fixed and the pension benefit depends on investment returns, or *Defined Benefit* (DB) schemes, where a fixed pension level is guaranteed, usually calculated based on the last salary and years of contributions.

Over time, *hybrid systems* have also emerged, combining elements of the standard models mentioned above. As noted by Börsch-Supan et al. (2016), these hybrid systems reflect a structured response to the uncertainty surrounding demographic and economic developments, as well as the diverse social preferences regarding risk distribution. These systems integrate both PAYG and FF components, as well as DB and DC elements, with the aim of reducing overall exposure to specific risks: demographic risks in PAYG systems, market and expropriation risks in FF systems, and political risks in both cases. The combination of these models also responds to a logic of portfolio diversification, improving the resilience and sustainability of the system in the long term.

This link between institutional configuration and risk profiles naturally introduces the economic functions of pensions. Pensions are not merely technical instruments; they serve specific economic purposes that derive from structural risks related to old age and the life cycle of individuals. As illustrated by Diamond and Barr (2006), the *three fundamental economic objectives* of retirement are: facilitating intertemporal consumption, promoting redistribution, and providing insurance against age-related risks. These objectives remain constant regardless of the institutional configurations adopted and they are complementary.

The first concerns intertemporal consumption: pensions allow individuals to transfer resources from periods in which they are working and earning income (working age) to those in which they no longer generate earnings (old age), thereby ensuring stable consumption throughout the life cycle.

Furthermore, pensions perform a *redistributive function*: they allow for the transfer of resources both between generations and within the same cohort, with the goal of correcting economic inequalities and ensuring a minimum income even for those who have not been able to accumulate sufficient savings or contributions during their working lives.

Finally, the third objective is of an *insurance nature*: the pension system acts as a protection mechanism against non-diversifiable risks that become particularly relevant in old age. As described by Fang (2016), these non-diversifiable risks include:

- **Income risks**: Income instability due to unemployment, layoffs, or forced transitions to part-time work, are phenomena that particularly affect older workers and make the transition to retirement more difficult. In addition, volatility in capital income can undermine the effectiveness of individual savings for old age, especially during financial crises. Real estate wealth, often used as a form of retirement savings, is subject to risks of devaluation and illiquidity. Moreover, the gradual phasing out of defined benefit (DB) pension plans in the private sector has shifted financial risks from employers to individuals, increasing economic uncertainty during the retirement transition.

- **Health and healthcare risks**: Ageing is often accompanied by an increase in healthcare needs. However, access to quality care is hindered by high costs, uncertainty regarding the evolution of individual health status, and shortcomings in private insurance mechanisms, which tend to exclude or penalize at-risk individuals. Unexpected healthcare expenses can absorb a significant portion of household income, negatively affecting quality of life and the financial sustainability of retirement.

- **Longevity and mortality risks**: While increasing life expectancy is a social achievement, it also generates significant uncertainty in individual planning. The risk of outliving one's assets (that is, living longer than the resources accumulated can support) represents a crucial challenge in the design of a secure retirement. The lack of widespread insurance instruments against longevity risk further exacerbates this problem.

- **Morbidity and long-term care risks**: Old age is associated with a high probability of developing chronic conditions, disabilities, and ongoing care needs. Long-term care requires substantial resources, both financial and familial, and private insurance markets are often unable to offer accessible and sustainable solutions. In many cases, the only alternatives remain public intervention or reliance on family networks, with unequal distributive effects.

The variety and intensity of these risks make it particularly challenging for individuals to plan their retirement independently. Although private insurance instruments are available to which workers may resort, these do not guarantee effective or accessible coverage for everyone, leaving large segments of the population exposed to economic and health vulnerabilities in old

age. This structural market inefficiency arises from various market failures: problems of adverse selection, information asymmetries, behavioral myopia, and limited financial literacy all undermine individuals' ability to access comprehensive and economically sustainable insurance instruments. Moreover, the positive externalities generated by a public pension system, such as macroeconomic stability, social cohesion, and poverty prevention, are not internalized by the market, making public intervention even more essential.
Public pensions, integrated with healthcare and long-term care systems, thus constitute an essential component of the social protection system against such vulnerabilities (Fang, 2016).

The Challenge of Population Ageing

Demographic change represents one of the main challenges for modern policymakers in various respects. As highlighted by Bloom and Luca (2016), population ageing is the dominant demographic phenomenon of the 21st century, driven by a combination of a sharp decline in fertility, a significant increase in longevity, and the transition of large cohorts into older age.

The causes of population ageing are not symmetric in their effects: the decline in fertility has a greater impact on the age structure than the increase in longevity and constitutes the main driver of the rise in the *dependency ratio* [1]. Moreover, while an increase in life expectancy can be partially offset by improved health and productivity among older people, a decline in birth rates generates persistent and hard-to-reverse effects on future working-age cohorts.

According to OECD projections, the proportion of people aged 65 and over per 100 working-age people (aged 20–64) increased on average from 21 in 1994 to 33 in 2024 in OECD countries, and is expected to rise to 55 by 2054. This profound shift in the population age structure is unprecedented in human history and has significant impacts not only on employment, savings, consumption, economic growth, asset values, and public finances, but also represents one of the main challenges to public pension systems, as it deeply undermines their sustainability.

How do pension systems respond to demographic ageing? Not all pension systems are equally affected, and this largely depends on their structure. As noted by Casamatta and Batté (2016), PAYG systems are particularly vulnerable to demographic dynamics because their sustainability relies on the balance between the number of active contributors and the number of pensioners. A shrinking contribution base relative to the growth in the elderly population can lead to persistent structural imbalances. In contrast, fully funded systems are less exposed to

[1] The *dependency ratio* is a demographic indicator that measures the ratio between the non-working-age population (0-14 years and 65+ years) and the working-age population (15-64 years). It helps estimate the economic burden on workers to support the dependent population.

demographic risk because they do not directly depend on the ratio between workers and retirees. However, the increase in the average age of the population can still amplify certain market risks, such as the volatility of pension fund returns, and exacerbate distributional inequalities among individuals with different saving capacities and access to financial markets.

Over time, as further discussed by Casamatta and Batté (2016), the PAYG system has been adopted and maintained by many States for several reasons. First, it is a politically appealing model because it allows immediate benefits to be paid to the retired population without waiting decades to accumulate funds as in fully funded systems. Moreover, PAYG systems are more compatible with redistributive and universalistic objectives, aligning them with the goals of public welfare and contributing to their social legitimacy. As a result, States that have historically favored PAYG systems now find themselves in a more vulnerable position in the face of demographic ageing. To contain the pressure on the system, they are called upon to identify structural and sustainable solutions.

In response to this challenge, many countries have introduced *parametric reforms*. The most emblematic example is the increase in the statutory retirement age, which does not alter the institutional model of the system (unlike *structural reforms* that transform a system from PAYG to fully funded, or from DB to DC), but instead intervenes in the eligibility conditions and benefit calculation methods. As emphasized by Casamatta and Batté (2016), these reforms are not neutral in their impact on individual behavior: the expectation of a later retirement can influence saving and investment decisions during working life. Indeed, in a context where longevity is increasing and working life is extending, individuals have both the time and the incentive to adjust their financial decisions in order to maintain their standard of living in retirement.

However, these reforms also raise questions regarding their equity and their broader economic effects. It is therefore essential to study these effects to understand the mechanisms they trigger and how they influence individual life choices. In this regard, two main levels of analysis can be distinguished: a macroeconomic level and a microeconomic level. While the macroeconomic analysis provides a general overview of financial balances and aggregate effects, it is primarily the microeconomic analysis — focusing on individual responses in terms of saving, investment, and labor force participation — that offers the most valuable tools to understand the adaptive choices of individuals in a context of postponed retirement.
It is on the latter that the analysis in this thesis will focus.

2.1 Theoretical Background

Situating pension reforms within a solid theoretical framework is essential for understanding the behavioral responses we can expect from individuals in reaction to changes in system parameters. Indeed, the empirical analysis of reforms derives its interpretative strength from the underlying economic theory, which allows us to formulate testable hypotheses and to identify the decision-making mechanisms at the heart of the choices observed.

This section focuses primarily on microeconomic models, and in particular on the *Life-Cycle Model*, which allows us to analyze how households react to institutional changes in their savings, consumption, and labor supply planning. Unlike macroeconomic models, such as the Overlapping Generations Model (OLG), useful for studying the aggregate implications of reforms and intergenerational dynamics, the microeconomic approach enables us to focus on the optimal decisions of individual agents and on their heterogeneous responses to changes in expectations.

The Life-Cycle Model

Developed by Modigliani and Brumberg (1954), the Life-Cycle Model is one of the fundamental theoretical frameworks for analyzing individuals' consumption and saving behavior over their entire lifetime. At the core of the model is the assumption that rational individuals maximize their intertemporal utility by planning their expenditures in a way that ensures stable consumption over time, despite income fluctuations across the various stages of life.

The representative agent considers a life horizon divided into two main phases: a **working phase** and a **retirement phase**. The key variables in the model are: current and future consumption (c_t), income (y_t), savings (s_t), initial wealth (a_t), the interest rate (r), and the durations of the working life (N) and retirement (M), summing to a total of $L = N + M$ years. The agent maximizes the utility function:

$$U = (c_t, c_{t+1}, ..., c_L, a_{L+1})$$

which depends on the consumption profile and the residual wealth at the end of his life. This maximization is subject to an intertemporal budget constraint that accounts for disposable income, savings, and the returns on owned assets. The constraint can be expressed as:

$$a_t + \sum_{\tau=t}^{N} \frac{y_\tau}{(1+r)^{\tau+1-t}} = \frac{a_{L+1}}{(1+r)^{L+1-t}} + \sum_{\tau=t}^{L} \frac{c_\tau}{(1+r)^{\tau+1-t}}$$

where the left-hand side represents initial wealth plus the present value of labor income during the working phase , while the right-hand side represents the present value of the potential be-

quest and the consumption during the entire economic life.
An important implication of the model, known as the **consumption smoothing hypothesis**, is that consumption does not strictly depend on current income but is the outcome of a long-term plan that takes into account the total expected resources over the life cycle. This insight represents a break from the traditional Keynesian approach and has important empirical implications, for example in evaluating the marginal propensity to consume.

The model distinguishes four main motives for saving: *consumption smoothing*, accumulation for old age, intergenerational bequest, and the management of durable goods (e.g., housing and family business assets). Moreover, in the original formulation, uncertainty is not explicitly incorporated, but it is important to emphasize that the authors acknowledge its relevance, stating that its inclusion would introduce additional motives for saving, such as *precautionary saving*.

Then, according to the basic version of the Life-Cycle Model, consumption and saving decisions depend on several key variables:

- **Expected permanent income**: individuals do not consume based on current income but rather on the average income expected over their entire working and retirement phases (*Permanent Income Hypothesis* (PIH)).

- **Initial wealth**: the wealth held at the start of the planning horizon contributes to determining the sustainable level of consumption.

- **Real interest rate**: influences the incentive to postpone consumption, making it more or less advantageous to save today to consume tomorrow.

- **Life expectancy**: the remaining lifetime and expectations regarding longevity affect the consumption profile and the need for saving.

- **Intertemporal preferences**: expressed through the subjective discount rate and the utility function, they influence the degree of impatience and the desire for stable consumption over time.

Combined, these elements guide individuals' optimal choices in a deterministic context and form the basis for the subsequent empirical analysis.

This model is particularly well-suited for analyzing the effects of pension reforms, such as the increase in the retirement age, on individual decisions regarding saving, consumption, and investment. Following the model, an extension of the working life duration (i.e., an increase in N) implies that individuals will have more years to earn income, and thus a longer accumulation horizon. This can translate into a lower annual saving rate required to maintain a given consumption profile during retirement. In other words, for a given consumption target, an increase in N tends to reduce the saving pressure in each working period. Moreover, the model suggests that an increase in the retirement age can also potentially influence labor supply, expectations about future income, and the length of the retirement period, and even investments in human capital or variables that affect its accumulation, such as health status and fertility.

The model's predictions are also supported by recent evidence obtained using structural approaches. For example, Daminato and Padula (2020) estimate a dynamic Life-Cycle Model to evaluate the effects of Italian pension reforms, particularly those introduced in the 1990s. These include the shift from a defined benefit (DB) to a notional defined contribution (NDC) system, creating a more direct link between contributions paid and future benefits, and the gradual increase in the retirement age, particularly the rise in the minimum age for early retirement. The authors show that individual responses in terms of consumption and savings align with the mechanisms predicted by the theoretical framework. In particular, the increase in the minimum age for early retirement leads to higher consumption among wealthier workers, while the reduction in benefit generosity generates more uniform effects and results in widespread welfare losses. Their model also highlights how the possibility to adjust labor supply near retirement represents an important self-insurance channel against pension shocks.
In the following section, the empirical evidence available in the literature supporting the model's predictions will be discussed in detail.

2.2 Empirical Evidence

Empirical analysis represents a crucial step in assessing whether and to what extent theoretical predictions align with observed reality. Indeed, reality may deviate from these predictions: the magnitude of the expected effects may be weaker, heterogeneous, or not significant. It is therefore essential to observe how individuals actually respond to changes in key variables in order to refine existing models and provide more effective tools for ex-post evaluation of reforms and for ex-ante design of future interventions.

As highlighted by Giorgio Brunello et al. (2023), a pension reform that raises the retirement age can affect different categories of individuals:

- **Those who would have retired in the absence of the reform**, namely workers approaching retirement age who are directly affected by the change in exit rules from the labor market. It is important to study these individuals because they are the most exposed to changes in pension regulations and often lack the time or flexibility to adjust their consumption, savings, or investment decisions, thus representing a key group for evaluating the direct effects of the reforms (Carta and De Philippis, 2023).

- **Employers**, whose workforce management strategies can be influenced by reforms that alter the age composition of their employees. Firms may respond to these changes by adjusting labor demand, internal organization, and wage costs, with important implications both for employment and for workers' productivity and well-being. These effects represent an indirect dimension of the pension reform, as they emerge as a consequence of firms' adjustments to the new pension rules rather than as a direct effect on individual workers.

- **Individuals who are far from retirement**, who have time to adjust their decisions regarding savings, consumption, and labor market participation. This refers to so-called *forward-looking effects*, that is the anticipatory behavioral responses of individuals to future changes. Understanding these effects allows to analyze how individuals respond to changes in retirement rules and to predict their long-term economic reactions, thus offering policymakers and economists a more comprehensive picture of the potential effects of the reforms.

2.2.1 Forward-looking effects and labor market participation

Studies on the forward-looking effects of increasing the retirement age focus extensively on labor market participation. The analysis of these effects can address both the *extensive margin* (variations in the number of individuals participating in the labor market and therefore the overall size of the labor force) and the *intensive margin* (variations in the amount of labor supplied by individuals already employed) (Giorgio Brunello et al., 2023).

For example, in the first case, Gohl (2023) examines the effect of an increase in the retirement age in Germany and finds that it raises expectations of a longer working horizon and increases the probability of employment, particularly for young people and for those engaged in less physically demanding jobs. In particular, there is an increase in job search probability among the young, but the aggregate effect on employment is mainly driven by individuals in less physically intensive occupations. This study therefore highlights how the overall effect on the labor market depends on the sectoral composition and the type of employment of individuals.

Regarding variations in the amount of labor supplied by individuals already employed, Giorgio Brunello et al. (2023) analyze how an increase in the retirement age may induce women to take more sick leave days, interpreting this as a response of intertemporal substitution of leisure to adjust the consumption of free time over the life cycle. The paper highlights that this effect is driven by gender norms and firm wage structures: women with lower wages are more likely to engage in strategic absenteeism to balance work and family care responsibilities. For men, on the other hand, the effect is negative, probably due to fears of dismissal and increased work pressure. Carta and De Philippis (2023) further highlight that the increase in the retirement age may also have significant effects on partners' decisions: the 2011 Italian reform led to increased labor market participation among middle-aged women, particularly the older ones, with positive spillovers also on husbands' employment.

This body of evidence also demonstrates the importance of jointly analyzing behavioral responses within the same family to better understand the long-term effects of pension reforms on both household and individual decisions, such as retirement, as well as consumption, investment, and savings choices. The studies by Atalay et al. (2019) and Hospido and Zamarro (2014) clearly highlight this aspect, showing that retirement decisions and partners' labor market participation are strongly correlated and can amplify the overall effects of pension reforms.

2.2.2 Forward-looking effects and human capital

The empirical literature highlights how an increase in the retirement age can affect not only employment decisions but also the human capital component of workers, defined as the set of skills, knowledge, and psycho-physical conditions that determine individual productivity. Longer labor market participation (resulting from pension reforms) entails greater exposure to stressful working conditions and occupational risks, making it essential to analyze the effects on mental health and professional training.

In this context, Bertoni et al. (2023) show that an increase in the retirement age can have negative effects on the mental health of middle-aged workers, particularly increasing the probability of depressive symptoms. This effect is more pronounced among workers exposed to high automation risk, who, perceiving greater job uncertainty, must endure a risk of unemployment for a longer period. This result is confirmed by the contributions of De Grip et al. (2012) and Carrino et al. (2020), who respectively show in the Netherlands (with an analysis of male public sector workers) and in the United Kingdom (focusing on female workers) an increase in depressive symptoms following a reduction in pension benefits and an increase in the retirement age. However, Carrino et al. (2020) emphasize that these effects may vary by country, empirical strategy adopted, and the definition of health outcomes considered.

In line with these studies, Bloemen et al. (2017) highlight that a reduction in the retirement age is associated with a decrease in mortality, presumably due to reduced work-related stress and lifestyle changes associated with leaving the labor market. However, other studies, such as that by Bertoni et al. (2018), show a heterogeneous effect: the impact of retirement on health varies across occupational categories, being negative for male manual workers (blue-collar) and positive in the short term for white-collar workers.

Regarding investment in human capital, Brunello and Comi (2015) show that an increase in the retirement age in Italy has led to greater participation in training among private sector workers aged 40 to 54. This result diverges from some theoretical evidence and from findings in other studies, such as that by Fouarge and Schils (2009), who argue that older workers have less incentive to invest in their human capital due to shorter working horizons and decreasing returns.

These findings, although heterogeneous, suggest that the retirement age is a key factor not only for workers' mental health but also for their willingness to invest in skills, highlighting the relevance of forward-looking effects as an essential analytical dimension for assessing the effectiveness of pension reforms in human capital accumulation.

2.2.3 Forward-looking effects and savings behaviour

As seen before, theory suggests that individual savings respond to the expected working horizon and pension prospects. However, the empirical literature remains scarce regarding the study of individual and family responses to pension reform on savings.

An important contribution in this field is provided by Attanasio and Brugiavini (2003), who analyze the effect of the 1992 Italian pension reform on household saving behaviour. Using a difference-in-differences approach, the authors show that a reduction in expected pension wealth generates an increase in savings rates, thus confirming the validity of the PIH. In particular, the study highlights that the substitutability between pension wealth and private savings is particularly high for individuals aged 35 to 45, underscoring a significant forward-looking effect.

The contribution of Attanasio and Brugiavini (2003) is also crucial from a methodological standpoint: their life-cycle model allows the isolation of savers' behavioural responses to exogenous changes in the pension regime. Their analysis highlights the importance of considering individual heterogeneity in responses to reforms and confirms the validity of the life-cycle model in interpreting savings decisions.

Another relevant contribution is offered by Etgeton et al. (2023), who analyze the impact of the increase in the retirement age on the saving decisions of German households. The study shows a reduction in savings rates, especially for families with married women, since the increase in the expected working horizon implies an increase in future labor income, leading to higher consumption spending and a reduction in precautionary savings. This result reinforces the idea that households, anticipating an increase in permanent income, react by reducing current savings, in line with the PIH. This behaviour is explained by the fact that the reform induces a restructuring of the life-cycle of work and consumption, with heterogeneous effects related to socio-demographic variables such as education and family composition, showing that families with more educated women are more likely to reduce their savings, and that homeowners are more likely to reduce their savings.

Moreover, the literature suggests a possible *portfolio effect*, highlighting how pension reforms affect not only the overall level of savings but also the composition of assets held. For example, Bottazzi et al. (2011) demonstrate that, following the pension reforms in Italy in the 1990s, households increased their share of real estate wealth at the expense of financial assets. In particular, Bottazzi et al. (2011) find that, following a reduction in social security wealth, the demand for private pension plans is higher among the self-employed, in Northern Italy, and increases with income and education. Furthermore, the paper discusses how greater awareness of pension rules reinforces the household response to the reform.

These findings contribute to the debate on the role of pension reforms as drivers of behavioural changes and portfolio choices, as also suggested by Feldstein (1974), Lachowska and Myck (2018), and Cesari et al. (2007). The latter suggest that the poor development of the third pillar in Italy is a consequence of high social security contribution rates, while Bottazzi et al. (2011) refer to a lack of financial education. These arguments are also echoed by Fornaro and Monticone (2011), who state that greater financial literacy is associated with a higher probability of participating in complementary pension plans.

These findings provide the basis for the empirical analysis developed in this thesis, which focuses on the savings responses of Italian households after the Fornero reform and aims to expand the existing literature.

3 The Fornero Reform: Policy Framework and Implications

The Fornero Law is one of the most significant reforms that have marked the evolution of the Italian pension system. It is named after Elsa Fornero, who served as Minister of Labor and Social Policies during the technical government of Mario Monti (2011-2013).
The reform is contained in Article 24 of Decree-Law No. 201 of December 6, 2011, known as the *"Save Italy Decree"* (*Decreto Salva Italia*).

As the name suggests, the decree was introduced in an extremely unstable economic context, not only for Italy but for the entire Western world. The 2008 financial crisis, which originated in the United States, had already had significant repercussions in Europe, while the sovereign debt crisis threatened to overwhelm the major economies of the continent. By the end of 2011, Italy was under pressure from the markets and faced a growing risk of default, prompting European authorities to demand structural reforms to contain public debt and stabilize the economy.

To fully understand the necessity of the Fornero Law and the *Save Italy Decree*, it is essential to analyze the context of the sovereign debt crisis, its impact on the Italian economy, and the reasons that made an intervention in the pension system indispensable.

3.1 The Necessity of the Fornero Reform

The magnitude of Italy's public debt has been a well-known issue since before the Maastricht Treaty (1993). However, it was with the treaty and the shared ambition to join the European monetary system that Italy initiated a series of reforms to curb its growth. Fearing exclusion from the Monetary Union and its potential consequences, such as downward speculation on the lira and negative market reactions, successive governments adopted measures to cut public spending and launched privatizations to quickly raise resources (Castronovo, 2021). These measures effectively reduced the debt-to-GDP ratio, which remained stable at around 107% throughout the period leading up to the Great Recession (1996–2007) (UPB, 2017).

Although Italy did not fully meet all the Maastricht criteria, it joined the European Monetary Union in May 1998, with the commitment to continue implementing measures to maintain a large primary surplus, ensure sustainable debt growth, and reduce the gap with other European partners in terms of investments, public administration, and privatizations.

However, subsequent governments, driven by the enthusiasm for the new monetary union and its economic benefits, overlooked the need to ensure public debt sustainability. As a result, when the Great Recession hit, Italy lacked a long-term strategy to curb its growth. The 2008 crisis quickly turned into a systemic crisis that, originating in the U.S. financial market, spread to Europe and evolved into a public debt crisis for many countries. The first to suffer severe consequences was Greece, which, burdened by heavy debt, found itself unable to avoid default.

The fear that a Eurozone country might default extended to other nations with high debt, including Italy, which was simultaneously facing a growing contraction in GDP and an inevitable increase in public spending to support the struggling economy. The concern over a possible default affected Italian government bonds, pushing the spread to its historical peak of 570 basis points (Bank of Italy, 2012). The risk of a financial solvency crisis and the lack of credibility of the then-government in the eyes of major Italian and international authorities led to its resignation and the appointment of a technical government led by Mario Monti, starting on November 16, 2011 (Castronovo, 2021).

The primary mission of the technical government was to structurally review public finances, identify the most significant expenditure items, and reduce their costs. The urgency of the situation is reflected in the text of the decree-law issued on December 6, 2011, which opens by emphasizing the ”*extraordinary need and urgency to enact provisions for the consolidation of public finances to ensure the economic-financial stability of the country*”[1] (Italy, 2011) .
In the context of an international crisis, the measure not only aimed to rebalance the accounts but also sought to introduce ”*measures aimed at fostering growth, development, and competitiveness*”[1] (Italy, 2011) to strengthen long-term economic sustainability.

Among the main expenditure items that weighed heavily on the budget, the pension system

[1] Decree-Law of December 6, 2011, No. 201; Original in Italian: ”la straordinaria necessità ed urgenza di emanare disposizioni per il consolidamento dei conti pubblici, al fine di garantire la stabilità economico-finanziaria del Paese” and also ”misure dirette a favorire la crescita, lo sviluppo e la competitività”

was the one that raised the most concern. Its costs were not only higher than those of other European countries, but they also could not be considered sustainable in the long term (Castronovo, 2021). This was due to several factors: on the one hand, the high aging index of the population, which was constantly increasing (in 2011, the population over 65 represented 33% of the working-age population, compared to the OECD average of 23.6% (OECD, 2011)); on the other hand, a series of welfare policies developed in the 1960s and 1970s, which led to growing and unsustainable costs.

According to data reported by OECD (2011), the pensionable age for men in Italy underwent significant changes during the second half of the 20th century and the early 21st century. In 1949, the retirement age was set at 60, slightly below the European average. However, while many OECD countries maintained or gradually increased the retirement age, Italy saw a reduction to 55 years between 1971 and 1993, only to gradually raise it again between 1999 and 2010.

The Fornero Reform, introduced through *Save Italy Decree*, marked a turning point in this evolution, representing one of the most significant interventions in the history of the Italian pension system.

3.2 Key Features of the Fornero Reform

A pension system traditionally relies on three distinct pillars:

- The first pillar concerns the mandatory public system, which guarantees a basic pension for all workers;
- The second pillar represents the private system, which can be mandatory or incentivized by the State, and includes instruments such as company pension funds and complementary pension funds;
- The third pillar concerns voluntary pension savings by citizens, specifically, the part of individual savings intended for retirement.

In Italy, the pension system is primarily based on the first pillar, while the second and third pillars are still in development, thanks to fiscal incentives introduced in recent decades to encourage participation in private funds (OECD, 2011).

The first pillar can be financed in two main ways:

- *Fully funded system*: in this system, the contributions paid by workers are accumulated in a fund managed by the State, and once the pension threshold is reached, they are returned along with accumulated returns;

- *Pay-as-you-go system*: this is the most common system, in which the contributions of current workers finance the pensions of current retirees.

Moreover, pension benefits can be calculated according to the following systems:

- The defined benefit system, where the pension amount is determined by a pre-established formula based on years of contribution and final salaries;
- The defined contribution system, where the pension depends solely on the contributions paid;
- Mixed systems that combine features of both of the above-mentioned techniques (Bianchi et al., 2021).

In Italy, the *PAYG* system has been in place since the inception of the public pension system, while the adoption of the defined contribution system was expanded by the Fornero Reform.

Although European countries adopt different, and sometimes mixed, pension structures, they all face common challenges. The increasing average age of the population, for example, has been identified as one of the most relevant challenges for Europe since the early 2000s. On one hand, the growing pensionable population, and on the other, the decrease in births and the active population, puts both *PAYG* and *fully funded* systems under strain (European Commission, 2012). Additionally, the economic crises of recent years have further exacerbated future prospects, making pension systems more vulnerable (INPS, 2012).

To ensure the balance of pension systems, several measures have been adopted over time, such as increasing the retirement age, limiting early retirement regimes, adjusting the retirement age based on life expectancy growth, and strengthening the balance between contributions paid and benefits received (INPS, 2012). It is with this broader European trend that the Fornero Reform was introduced in Italy.

Following this approach, the Fornero Reform represented a structural reform of the Italian pension system, aiming to ensure its financial sustainability, simplify its structure, and improve its efficiency. Among its key measures, the reform notably raised the retirement age to 66 for all male workers in both the public and private sectors. It also mandated the equalization of the female retirement age with that of men in the private sector by 2018, taking into account changes in life expectancy. In the public sector, the female retirement age was immediately aligned with that of men, as it had already been raised to 65 in 2010 with Law No. 122. These changes resulted in a gradual increase in the retirement age for all workers, which reached 67 years in 2019.

Furthermore, the reform generalized the contributory method, abolishing the ”quota” system. As a result, pension benefits were limited to the standard old-age pension and early retirement pension, which replaced the seniority pension. The eligibility requirements for early retirement were increased to 42 years and 1 month of contributions for men and 41 years and 1 month for women. Additionally, a reduction in pension benefits was introduced for those opting for early retirement, serving as a clear disincentive.

In line with its goal of simplification, the reform established INPS as the sole national institution for mandatory social security, incorporating other national bodies such as INPDAP and ENPALS (INPS, 2012).

Finally, the reform included certain exceptions to its application. The new provisions did not apply to individuals who had already reached the pension eligibility requirements by December 31, 2011. Additionally, so-called ”*safeguard measures*”[2] were later introduced to protect specific categories of workers, such as those in ordinary mobility or recipients of extraordinary benefits, who would have otherwise been left without work or a pension due to the sudden regulatory changes.

The main measures of the reform, already described in detail, are summarized in the Figure 3.1.

3.3 Research Relevance of the Fornero Reform

The Fornero Reform, as highlighted in several studies analyzing its effects, exhibits the typical characteristics of a natural experiment. Specifically, it introduced a significant exogenous change in the labor market, involved a broad group of individuals, and, due to its unexpected nature, minimized the potential for ex-ante strategic behaviors (Bianchi et al., 2021).

Significant Increase in the Retirement Age

As previously mentioned, the Fornero Reform had an impact on a wide section of the population. Its effects affected all major categories (public and private employees, self-employed workers), but the extent of these effects varied depending on factors such as cohort, category and gender. For example, as discussed earlier, female workers in the private sector, in contrast to their public-sector counterparts, experienced a gradual increase in the retirement age, which helped mitigate

[2] ”*Clausole di salvaguardia*”

	Measures differing by sector and gender			
	Public Sector		Private Sector	
	Women	Men	Women	Men
Ordinary old-age pension	66 years of age	66 years of age	62 years and 63 years and six months for self-employed women (adjustment to 66 years by 2018)	66 years of age
Early retirement pension…	41 years and 1 month of seniority	42 years and 1 month of seniority	41 years and 1 month of seniority	42 years and 1 month of seniority
….disincentive to early retirement	Access is possible from the age of 62, but retiring before 62 results in percentage reductions on the wage-based portion of the pension: 1% for each of the last two years before 62, and 2% for each year under 60			
Adjustments linked to life expectancy (+3 months from 2013)	✓	✓	✓	✓

	Measures common to all
Seniority pension	Abolished for all
Minimum contribution years required for access to old-age pension	20 years of contributions paid
Method for pension calculation	Pro-rata contribution method: the pension is calculated with the retributive system for contributions paid until 31/12/1995, and with the contributive system for those paid from 1/01/1996
Flexibility range for pension access (incentive to continue working)	Age range between 66 and 70 years in which the worker can choose to access the pension, with the pension amount varying based on the retirement age.

Figure 3.1: Overview of the key provisions of the Fornero Reform.

inequalities among individuals with similar characteristics.
To illustrate these differences, consider two female workers in the private sector, Alice and Beatrice:

- Alice was born in 1951 and met the retirement requirements by December 31, 2011, with 20 years of contributions. Under the pre-reform rules, she is eligible to access her old-age pension at 60, without having to wait for any further increase in the retirement age.

- Beatrice, born in 1952, also has the same number of years of contributions as Alice. However, due to the reform, the retirement age for women in the private sector is raised starting from January 1, 2012. As a result, Beatrice can not access her pension at 60 but must wait until the terms set by the new law.

If the increase in the retirement age had been immediate, rather than gradual until the age of 67, Beatrice would have faced an even greater disparity compared to Alice. Instead, the gradual mechanism introduced by the reform helped to reduce the gap by spreading the increase in retirement age over time.

This example provides two significant insights for research: on the one hand, the Fornero

Reform represents an ideal policy for studying the effects of increasing the retirement age, as it allows the creation of two groups of individuals, one treated and one not treated, who share similar characteristics. On the other hand, it highlights that, within the treated group, composed of those affected by the increase in the retirement age, the extent of the shock, which varies between two and seven years, is not uniform but varies based on factors such as gender and other demographic characteristics (Carta and De Philippis, 2023).

To fully comprehend the scope of the reform's impact, it is therefore essential to analyze the heterogeneity of its effects and gender plays a crucial role in determining the extent of the pension shock.

Women As previously remarked, the shock for women depended not only on the sector in which they worked, but also on the continuity of their careers and the contributions they had paid. A more stable career path allowed for the accumulation of a higher number of contributions, therefore increasing the chances of accessing early retirement even under the post-reform rules, thus mitigating the impact of the shock. However, historical data, particularly from the early 2000s, show that women's careers are often more discontinuous compared to men's.

The 2011 Annual Report by Bank of Italy (2012) highlights that, in Italy, the employment rate for women in the 15-64 age range was 46.5%, 21 percentage points lower than that of men. In the past, the gap was even more pronounced, reaching a difference of 31 percentage points in 1993. Moreover, female employment was often characterized by less stable jobs and sectors with lower pay, which suggests lower and more discontinuous contributions.

The gap was further intensified when comparing the northern and southern regions of Italy, where the gender differential was even more pronounced.

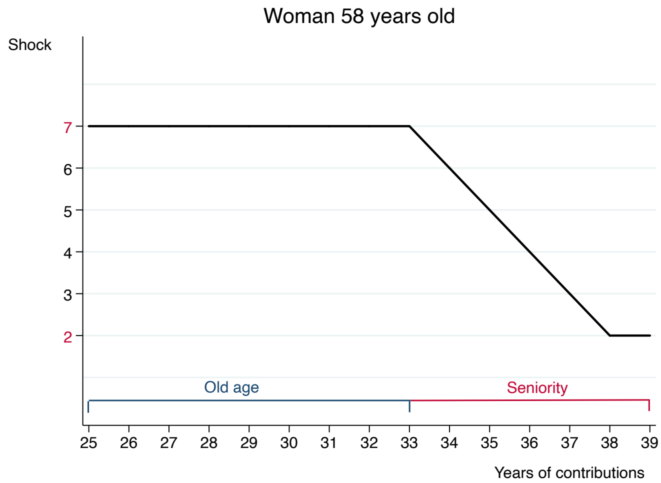
Men For men, on the other hand, the shock mainly depended on the number of contributions accumulated. Those who accumulated fewer years of contributions throughout their working life experienced a less significant shock, as even without the reform, they would have only been able to access the pension at the age of 65 and post-reform at the age of 67, with an increase of just two years.

Conversely, those who had accumulated a higher number of contributions by January 1, 2012, experienced a greater shock, as, without the reform, they would have been able to access retirement before the age of 65 through systems such as the "quota" system [3] However, this effect

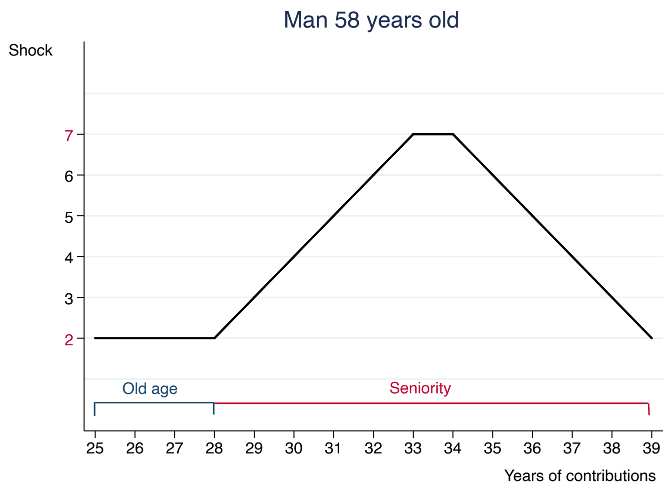
[3] The "quota" system allows workers to retire early if the sum of their age and years of contributions reached a certain threshold. For example, a worker could retire when their age and contributions added up to 95 (e.g., 60

diminishes after a certain threshold of contribution years, as even under the new post-reform rules, early retirement remained possible (Carta and De Philippis, 2023).

Carta and De Philippis (2023) propose a graphical representation to clarify the differences in the shock experienced due to the reform for a woman and a man, both 58 years old [Figure 3.2]. The graph clearly illustrates how the pension reform rules had a differentiated impact based on gender, reflecting the different work and contribution dynamics.



((a)) Impact of the Reform for a 58-year-old. woman with different years of contributions accumulated.



((b)) Impact of the Reform for a 58-year-old. man with different years of contributions accumulated.

Figure 3.2: Reform-Induced Variations in the Eligibility Rules between 2010 and 2014, by Gender
Source: Carta and De Philippis, 2023

years old with 35 years of contributions). This system was phased out by the Fornero Reform, but recently it was reintroduced for some categories of workers.

Therefore, the discontinuity of female careers compared to male careers presents a methodological challenge in analyzing the impact of the reform. While women experienced a more significant pension shock than men, the distribution of this shock was not uniform among all female workers, which makes it difficult to treat women as a homogeneous group.
This complexity affects the construction of a treatment group based exclusively on women, as not all individuals experienced the effect of the reform in the same way. Furthermore, data availability plays a crucial role: the lack of detailed information may lead to assumptions that, from the date of the first job until the interview date, the individual worked continuously and contributed regularly, unless stated otherwise. However, such assumptions are often implausible in the case of women.

Despite these challenges, compared to other reforms affecting the Italian pension system, the Fornero Reform remains one of the most significant in terms of the increase in the number of working years required before access to retirement. Moreover, the economic disincentives introduced by the reform for those retiring early before the age of 62 (INPS, 2012) increased the probability that individuals choose to postpone retirement, thus limiting the attenuating effect that would otherwise reduce the shock.

Limited Grandfather Clauses

The second characteristic that makes the Fornero Reform an excellent natural experiment is its broad applicability, as it affects the majority of workers in Italy, with only a few specific exceptions. The only exceptions provided by the reform were the so-called ”grandfather clauses,” which, under certain conditions, permitted retirement based on the pre-reform requirements. As a result, individuals who had already met the retirement requirements by December 31, 2011, those covered by the totalization regime, and a small group of specially protected individuals were exempted from the reform. These latter individuals, whose rights were protected by successive legislative interventions, numbered about 130,130, according to the INPS (2013) report. This aspect enhances the methodological significance of the reform, as it enables a more precise analysis of the effects of such a sweeping change compared to other reforms with a narrower scope or sector-specific impact.

Unexpected Nature

Finally, another aspect that characterizes the Fornero Reform as a natural experiment is its unexpected nature. Only 20 days passed between the rise of the government and the promulgation of the decree, and the first effects of the reform came into force just 26 days after its publication. This extremely short time frame had a significant impact on the economy, businesses, workers, and markets, leaving no opportunity to adapt in advance. The lack of time to adjust to the new expectations made the effects of the reform even more pronounced and unforeseen (Bianchi et al., 2021).

4

Data and Summary Statistics

4.1 The Survey on Household Income and Wealth (SHIW)

The database used in this analysis is the Survey on Household Income and Wealth (SHIW), a biennial survey conducted by the Bank of Italy that collects detailed information on the socio-demographic characteristics, incomes, consumption, and wealth of Italian households. The SHIW data, frequently used in the literature [(Carta and De Philippis, 2023); (Attanasio and Brugiavini, 2003); (Bottazzi et al., 2011); (Fornaro and Monticone, 2011)], provide a detailed economic overview of Italian households and individuals, representing one of the most comprehensive and long-standing databases in Italy. Initiated in the 1960s, it has gradually expanded its coverage to include wealth and other aspects of households' economic and financial behavior, thereby providing a more comprehensive and nuanced picture of the Italian economy.

The SHIW data are primarily cross-sectional data, based on a household sample including all members. However, starting in 1989, a panel component was introduced to support longitudinal analysis of socio-economic phenomena. It is important to emphasize that this is a mixed panel (not a pure panel): at each wave, part of the sample is refreshed with new households drawn randomly to ensure population representativeness [1]. This means that, over time, even the panel households are partially replaced.

[1] The panel component consists of households that have participated in at least two consecutive waves and a portion of households randomly drawn from the previous wave, while the non-panel households are drawn through a two-stage sampling process: in the first stage, municipalities are stratified by region and demographic size class, including all those with more than 40,000 inhabitants and selecting the others with probability proportional to size (PPS); in the second stage, households are randomly drawn from the population registries of the selected municipalities.

For this thesis, the waves of 2010, 2012, 2014, and 2016 are of particular interest. The structure of the questionnaire remained largely stable during these waves and is organized into seven main sections: family structure, employment status and income, means of payment and forms of saving, main residence, other real estate and debt, consumption and other household expenses, supplementary pensions and insurance, and a section dedicated to interviewer notes. Some variables are measured at the individual level within the household, while others are defined at the household level.

What are the main limitations of SHIW? Despite the richness of information, the dataset presents certain limitations. Specifically, some individual-level variables are not available to external users for privacy reasons and are accessible only in aggregate form. Moreover, many variables (such as those relating to contributions or savings) may be subject to recall errors or self-reporting. For example, the quality of the responses may be affected by respondents' reluctance to disclose income sources or actual wealth, particularly concerning sensitive questions, generating potential under-reporting. Interviewers are nonetheless required to flag the consistency of responses based on observable information (such as type of residence, living standards), and aggregate estimates are compared with national accounts data to assess overall consistency. Amounts held in certain forms of savings also derive from an imputation process based on declared classes of amounts, which may introduce distortions. These limitations are inherent in the self-declarative nature of the survey, which cannot achieve the same level of reliability as administrative data. An appendix A includes an analysis based on variables compiled by interviewers in SHIW, indicating the reliability and veracity of the responses provided by respondents.
Moreover, other sources of distortion may also be identified, for example, differences in participation rates (defined as the proportion of households actually interviewed relative to those selected in the sample) between panel and non-panel households (higher among the former, approximately 80%, and lower among the latter, approximately 35%). Additionally, replacing non-contactable households with similar ones can also introduce distortions, although a rigorous procedure is in place to limit its impact.
Finally, over time, some questions are modified or removed, making it difficult to compare responses across waves. Often, questions are updated to improve precision or to adapt to social and regulatory changes, but this inevitably results in a loss of temporal continuity for some variables.

It is important to take these limitations into account when evaluating the analysis of the results and their statistical representativeness.

4.2 Description of the Selected Sample

4.2.1 Sample Selection Criteria

In the selection of the sample for the analysis, this thesis draws inspiration from the methodology of Giorgio Brunello et al. (2023) and Carta and De Philippis (2023), which, although not focused on savings, provide valuable insights for defining the strategy for identifying the forward-looking effects of the Fornero reform. This selection is fundamental to ensure the validity of the analysis strategy, as it allows the inclusion of only those households most directly affected by the reform and excludes those that could not have been influenced, such as retirees or ineligible individuals.

4.2.2 Time Coverage

As previously mentioned, the 2008, 2010, 2012, 2014, and 2016 SHIW waves were used for this analysis. The years 2008 and 2010 represent the pre-Fornero reform period, while 2012, 2014, and 2016 represent the post-Fornero reform period. The sample was selected to allow for a Difference-in-Differences (DiD) analysis aimed at identifying the forward-looking effect of the Fornero reform on household savings. To properly implement the DiD model in this context, it is essential to have as long a post-reform period as possible in order to also capture any delayed adjustments by individuals to the reform itself, while avoiding including periods that could be characterized by other exogenous shocks that might interfere with the variables under examination.

Thus, it is necessary to consider that in 2014, a labor law reform known as the ”Jobs Act” was approved in Italy, which was fully implemented in 2015 and may act as a confounding factor. This reform introduced significant changes to the Italian labor market, including the “contratto a tutele crescenti” (progressive protection contract), reforms of the social safety nets, and various incentives for permanent employment contracts that stimulated the creation of new jobs (INPS, 2017). These changes may have influenced occupational behavior, the perception of job stability, and, consequently, household savings, thus generating confounding effects in the analysis of the impact of the Fornero reform.

It is important to take these considerations into account, but the inclusion of year fixed effects and the lack of significant interaction terms in that year suggest that the observed results are unlikely to be driven by concurrent policy interventions such as the Jobs Act.

Age Range of the Sample

The selected sample consists of households with at least one married or cohabiting couple born between 1954 and 1972. This criterion ensures that in 2012, the individuals were between 40 and 58 years old, thus including households where neither spouse would have been eligible for retirement at the time of the reform.

The minimum threshold of 40 years was chosen because, before this age, employment careers are more likely to be unstable and contribution records are often minimal, and individuals are demographically far from retirement. Therefore, the effects of the Fornero reform would likely be minimal or null.

The maximum threshold was chosen because individuals older than 58 years in 2012 could already have completed a significant part of their career contributions and might have been able to access retirement in the short term, especially women who enjoyed certain exemptions from the reform.

Consequently, individuals aged between 40 and 58 in 2012 were the most affected by the reform, albeit with varying intensity, and are those for whom it is most plausible to observe significant forward-looking effects on savings.

Years of Contributions Accumulated by Sample Individuals

For each year considered in the analysis, I excluded from the sample those households in which at least one of the two spouses was already retired or had never worked or had paid fewer than 5 years of contributions. This is because the objective of the analysis is to measure the response of households to an increase in the individual retirement age: the decision to save is made at the household level, but the effect of the reform applies to the individual situation. If one of the two spouses had never worked, the observed response to the reform would depend exclusively on the working spouse. In these cases, the saving decision would therefore not be comparable with that of other households in which both spouses were potentially affected by the reform.

A crucial assumption for the analysis is that each individual who reported having worked at least once in their life continues to pay contributions in subsequent years. This assumption of continuous contribution is necessary because, since SHIW is not a pure panel, it does not allow for observing all years of each individual's working career. Consequently, it is not possible to reconstruct the entire contribution history of all individuals in the pre- and post-reform period. Therefore, by assuming it to calculate the months of contributions, it is possible to identify individuals to be excluded: those who had not reached at least 5 years of contributions by 2012, and those who by 2012 had already accumulated more than 39 years of contributions (since they could have retired under Quota 96).

This assumption, as also explained by Carta and De Philippis (2023), can be considered conservative because it tends to overestimate the probability of early retirement (as it assumes continuous working careers), while at the same time underestimating the expected impact of the Fornero reform on retirement delays. Indeed, assuming continuous careers leads to a generous calculation of contribution years, thereby increasing the likelihood of early retirement and reducing the actual distance from retirement. In this way, the estimated effect of the reform might be more contained than in reality.

4.3 Description and Construction of Variables

The variables used in this study are divided into three main categories: output variables, control variables, and treatment variables. The choice of variables was guided by the relevant literature and the main objectives of the analysis, which are detailed below.

Output Variables

The selected variables aim to represent indicators of household saving and investment. These variables capture various dimensions of household saving behavior, from deposits to insurance products (including life insurance and death insurance), and also include supplementary pensions. These were included because they not only represent a form of long-term financial saving and investment (e.g., for future security or risk protection), but also reflect a risk management strategy of the household unit. These variables therefore cover the main forms of saving accumulation identified in the dataset and reflect medium- to long-term investment choices, consistent with the objectives of the analysis. In particular:

- Number of savings instruments held by the household: from 0 to 12, including bank/postal deposits, certificates of deposit, repurchase agreements, postal savings bonds, Italian government securities (BOT, CCT, BTP, CTZ, and others), Italian bonds and Italian mutual funds (liquidity, bond, mixed, equity, hedge funds, ETFs), listed and unlisted shares, and participations in companies.

- Total amount in euros of savings instruments: ranging from 0 to approximately €1.41 million; transformed using log(1+x) to account for right skewness (transformed range from 0 to approximately 14.46)[1].

- Number of supplementary pension forms held by the household: from 0 to 4; a dummy variable (0/1) was created since approximately 69% of individuals held zero supplementary pensions.

- Total amount in euros of supplementary pensions: from 0 to approximately €41,000; a dummy variable was also created to account for the high concentration of zeros[1].

- Number of life insurance policies and number of death insurance policies: from 0 to 4; converted into dummy variables (0/1) to account for the high concentration of zeros.

Control Variables

The following control variables were selected to include in the DiD analysis those socio-demographic and economic factors that the literature and economic theory suggest may be correlated with both saving behavior and the response to the pension reform:

- Education level (low, medium, high)

- Household size (number of members)

- Macro-region of residence (north, center, south)

- Household disposable income quintile[1]

- Household consumption quintile[1]

- Housing tenure type (where: 1 = owned by the family; 2 = rented or sublet; 3 = rent-to-buy; 4 = usufruct; 5 = free use by relatives or friends).

Specifically, the literature shows that financial literacy is higher among more educated men living in central and northern Italy (Fornaro and Monticone, 2011), and that this is associated with a higher probability of participating in complementary pension plans. This justifies the inclusion of the variables on geographic area and education level. Income and consumption are included because, according to economic theory, a household with higher income is more likely to save, while a household with higher consumption tends to save less, all else being equal. The variable on housing tenure type (e.g., owning or renting) is important because it may influence expenditures and, consequently, the capacity to save. Finally, household size is considered relevant because family composition affects levels of consumption and the capacity to save.

[1] All monetary variables have been recalculated in constant 2010 euros using the official consumer price index (CPI) published by ISTAT, originally based on 2016 = 100 and rescaled to 2010 = 100. Since inflation over the

Treatment Variable

The treatment variable was constructed based on declared pension contribution data for each individual (recalculated at 2010), combined with year of birth, gender, and type of employment[2]. For each individual, the following calculations were performed:

1. The number of months remaining until retirement under pre-Fornero reform rules, considering all retirement pathways (early retirement, old age, Quota 96) and selecting the lowest threshold;

2. The calculation was repeated for the months remaining until retirement under post-Fornero reform rules, accounting for the adjustment of pension eligibility requirements over time. For example, if an individual did not meet any pension thresholds before 2013, the months remaining were recalculated to account for an increase of 3 months compared to the previous thresholds, as required by adjustments for life expectancy. Again, the shortest possible time to reach one of the thresholds was selected;

3. Then the difference between the months remaining pre- and post-reform was calculated, thereby defining the treatment variable (delay).

The tables below illustrate how eligibility thresholds change under pre- and post-Fornero reform rules, and how these thresholds further evolve in the post-reform period, considering life expectancy adjustments:

2008–2016 period was relatively moderate, deflated values do not differ substantially from nominal ones.

[2] To identify the employment category for each worker, it was necessary to create a variable distinguishing each individual's employment status between public, private, and self-employed. Since SHIW does not directly provide this variable, several sources were cross-checked, including employment history for individuals who were unemployed in the survey year. The first category was assigned to private or former private workers, the second to public workers, and the third to self-employed workers, including former self-employed and those not in the labor force at the time of the survey. This choice was motivated by the fact that the Fornero reform had a more limited impact on the self-employed, so applying the same effect to them and those temporarily out of the labor force helped minimize potential errors while maintaining a conservative classification relevant to the Fornero reform.

Retirement Age : Before and After the Fornero Reform in 2012						
Category	**Employment Type**	**Pre-Fornero**			**Post-Fornero**	
		Old Age	**Seniority**	**Quota System***	**Old Age**	**Early Retirement**
Men	Private sector	65 y	40 y.c.	Quota 96	**66 y** and 20 y.c.	42 y.c. 1 m.c. and 62 y
	Self-employed	65 y	40 y.c.	Quota 96	**66 y** and 20 y.c.	42 y.c. 1 m.c. and 62 y
	Public sector	65 y	40 y.c.	Quota 96	**66 y** and 20 y.c.	42 y.c. 1 m.c. and 62 y
Women	Private sector	60 y	40 y.c.	Quota 96	62 y and 20 y.c.	41 y.c. 1 m.c. and 62 y
	Self-employed	60 y	40 y.c.	Quota 96	63 y 6 m and 20 y.c.	41 y.c. 1 m.c. and 62 y
	Public sector	65 y	40 y.c.	Quota 96	**66 y** and 20 y.c.	41 y.c. 1 m.c. and 62 y

* Quota System = Age + Contribution years had to reach a set threshold (e.g., age 60 + 36 years = quota 96).
** y = years old
m = months old
y.c. = years of contributions
m.c. = months of contributions

Figure 4.1: Retirement eligibility thresholds *before* the Fornero reform

Retirement Age : Life Expectancy Adjustments					
Category	**Employment Type**	**2013**		**2016**	
		Old Age	**Early Retirement**	**Old Age**	**Early Retirement**
Men	Private sector	66 y **3 m** and 20 y.c.	42 y.c. **5 m.c.** and 62 y	66 y **7 m** and 20 y.c.	42 y.c. **10 m.c.** and 62 y
	Self-employed	66 y **3 m** and 20 y.c.	42 y.c. **5 m.c.** and 62 y	66 y **7 m** and 20 y.c.	42 y.c. **10 m.c.** and 62 y
	Public sector	66 y **3 m** and 20 y.c.	42 y.c. **5 m.c.** and 62 y	66 y **7 m** and 20 y.c.	42 y.c. **10 m.c.** and 62 y
Women	Private sector	62 y **3 m** and 20 y.c.	41 y.c. **5 m.c.** and 62 y	**65 y** 3 m and 20 y.c.	41 y.c. **10 m.c.** and 62 y
	Self-employed	63 y **9 m** and 20 y.c.	41 y.c. **5 m.c.** and 62 y	**65 y** 9 m and 20 y.c.	41 y.c. **10 m.c.** and 62 y
	Public sector	66 y **3 m** and 20 y.c.	41 y.c. **5 m.c.** and 62 y	66 y **7 m** and 20 y.c.	41 y.c. **10 m.c.** and 62 y

* Quota System = Age + Contribution years had to reach a set threshold (e.g., age 60 + 36 years = quota 96).
** y = years old
m = months old
y.c. = years of contributions
m.c. = months of contributions

Figure 4.2: Retirement eligibility thresholds *after* the Fornero reform

The delay thus calculated is constant over time for each individual and is calculated, as already mentioned, as of 2010. This process ensures that the definition of the pension delay is based on fixed and comparable characteristics for each individual.

The choice of 2010 as the reference year is in line with Carta and De Philippis (2023), because it represents the last pre-reform year available with SHIW data.

Furthermore, the treatment, calculated in this way, is a continuous variable. Therefore, there is no clear division between a treatment group and a control group: individuals differ based on the intensity of the treatment, that is, the individual variation in the estimated pension delay. This approach reflects a continuous distribution of treatment exposure and better matches the heterogeneous reality of responses to the pension reform.

A crucial methodological aspect that emerged during the calculation of the delay variable was addressing a potential source of measurement error. In some cases, individuals reported a number of months of contributions that was higher than plausible, considering their age and the declared age of first employment. This discrepancy resulted in anomalous values of the treatment variable, with some individuals showing pension delays exceeding nine years, generating a heavily right-skewed distribution and potentially distorting the estimates.

To address this issue, a consistency check was implemented at the individual level, comparing the reported months of contributions with the maximum achievable at the interview date, calculated as the difference between chronological age and the age at first employment. In cases of excess contributions, the variable was corrected by imposing a theoretical maximum limit (i.e., the difference between the age at the time of the survey and the declared age of first employment) to eliminate over-reporting and bring the delay variable back to plausible values consistent with the individuals' work trajectories. This procedure made it possible to reduce the right-skewness problem and obtain a more realistic distribution of the variable.

4.4 Descriptive Statistics

4.4.1 Descriptive Statistics of Key Variables

The overall sample consists of $4,181$ families (then $8,362$ individuals) distributed across the five survey waves (968 observations in 2008, 911 in 2010, 867 in 2012, 817 in 2014, and 618 in 2016)[3].

The graphs in the Appendix C show the distribution of certain key variables (age and months of contributions) using boxplots, while for other variables (household size, employment category, geographic area, education level, housing size) they present percentages for each response category in each year, allowing for comparison of the sample composition across waves. These graphs allow for a detailed assessment of comparability between groups in different years and form a solid basis for the discussion of subsequent analyses.

Average age and months of contributions increase over time, as expected given that the selected birth cohort remains fixed; household size tends to decrease gradually, likely because the average age of households increases and children leave the household. A decline in the share of public sector workers and a gradual increase in private sector workers are also observed, particularly in 2014 and 2016, reflecting labor market dynamics during this period.

It is important to note that, due to the way the employment category variable is constructed in SHIW, individuals who are unemployed at the time of the survey are asked only whether they were previously employees, without distinguishing whether they worked in the public or

[3] This decrease in the number of households observed is consistent with the choice to fix a cohort of birth: over time, SHIW represents fewer individuals in this cohort, reflecting a lower probability of sampling and remaining in the survey, so this must be carefully considered when interpreting the analyses.

private sector. As a result, unemployed respondents are generally classified as former private employees. This may lead to an overestimation of the share of private sector workers over time, not necessarily because more individuals are actively employed in the private sector, but rather because job losses—especially following the economic crisis—are recorded as transitions from employment to unemployment without tracking the public/private distinction. Consequently, this contributes to a higher percentage of individuals falling under the ”private or former private” category.

However, this aspect does not constitute a major concern for the identification strategy adopted in the analysis. In fact, the pension eligibility rules introduced by the Fornero reform were largely similar for private and public sector employees—with the main differences applying to some categories of women. Therefore, grouping these categories together does not introduce significant bias in estimating the expected pension delay, which remains the key treatment variable of interest.

The other variables, instead, exhibit substantial stability. This outcome is consistent with the survey design: SHIW waves are constructed to be representative of the overall Italian population. Therefore, net of the characteristics that were intentionally fixed through sample selection criteria (such as year of birth or contribution history), the distributions of key socio-demographic variables are expected to remain relatively stable across waves. This expected stability reinforces the validity of analyses comparing families in the pre- and post-reform periods, as it suggests that any observed changes in the outcomes may be attributed to systematic variation (such as the introduction of the pension reform), rather than structural changes in the sample.

5

Methodology

5.1 Research Design

How does an exogenous and unanticipated increase in the retirement age generate forward-looking effects on household saving behavior? To address this question, the analysis exploits the increase in the retirement age introduced by the Fornero Reform, already described in detail in Chapter 3, whose features are particularly well-suited for a causal analysis.

The main hypothesis to be tested is that, in the presence of an increase in the working horizon caused by the postponement of the retirement age, individuals respond by adjusting their saving behavior. Specifically, it is hypothesized that workers adopt a *consumption smoothing* strategy, meaning they choose to maintain a constant level of consumption over time. This, according to the life cycle model, would imply a reduction in current savings, since the extension of the working life provides a longer horizon over which to spread the effort of accumulating retirement wealth, thereby reducing the urgency to save in the present compared to the past.

The Difference-in-Differences strategy allows for the identification of the causal effect by comparing how the outcome of interest evolves over time among individuals more exposed to a larger increase in the retirement age and those less exposed. The underlying idea is that, in the absence of the reform, the difference between these two groups would have remained constant over time (*Parallel Trends Assumption*). If this assumption is satisfied, the observed difference-in-differences (before/after for the more exposed, before/after for the less exposed) can be causally attributed to the reform itself.

In this case, since there is no randomized assignment of the treatment but rather a generalized reform, we exploit the continuous variation in the actual increase in the retirement age to estimate the treatment effect. The approach adopted is an extension of the traditional DiD framework with continuous treatment and an event study structure, which allows for the analysis of the dynamic effects of the reform over time without imposing a rigid dichotomy between treated and untreated groups.

Moreover, the model includes time and cell fixed effects, which allow for the isolation of time-invariant components and common macroeconomic shocks (such as the 2008 financial crisis), thereby improving the reliability of the identification.

The effect can be considered causal if the following conditions are met: (1) pre-treatment trends across groups are parallel; (2) there is no anticipation of the treatment that alters behavior ex ante; (3) there are no spillover effects across groups (i.e., the behavior of the less-treated is not influenced by that of the more-treated).

Each of these aspects will be discussed in detail in the remainder of the chapter.

5.2 Estimation Techniques

5.2.1 Baseline Specifications

This thesis adopts two specifications, each representing a different analytical framework. The baseline specification classifies household members by economic role (main and second earner), while the second, presented in the Appendix B, distinguishes individuals by gender (male and female).

Within each specification, two separate econometric models are estimated, depending on the nature of the outcome variable: a linear model for continuous financial outcomes and a binary response model for discrete outcomes.

In the two models of the baseline specification, individual 1 corresponds to the main earner of the household, while individual 2 represents the second earner. This distinction allows for a clear and consistent interpretation of the estimated coefficients. Identification relies on the information provided by the SHIW data, which reports separately the income received by each member of the couple. Specifically, the main earner is defined as the individual with the higher income; in the rare cases where both partners report the same income, the second earner is identified as the one who, at the time of the interview, is unemployed or has lost their job.

First Model

The first focuses on household-level outcomes, specifically on the number of saving instruments held by the family and on the logarithm of the total amount (in euros) invested in saving instruments. These two variables represent the main measures used to analyze the effect of the increase in the retirement age on the aggregate saving behavior of the household, and allow for two distinct interpretations: the number of saving instruments captures the diversification of the household portfolio, while the logarithm of invested amounts reflects investment intensity and is interpreted in percentage terms. This specification is also used to analyze the impact of the reform on overall household consumption levels.

$$\begin{aligned} Y_{ft} = \ & \beta_0 + \beta_1 \cdot delay_{f1} + \beta_2 \cdot delay_{f2} \\ & + \sum_{t \neq 2010} \beta_{3t} \cdot (delay_{f1} \cdot \mathbb{1}_{\{year=t\}}) + \sum_{t \neq 2010} \beta_{4t} \cdot (delay_{f2} \cdot \mathbb{1}_{\{year=t\}}) \\ & + \sum_{t \neq 2010} \lambda_t \cdot \mathbb{1}_{\{year=t\}} + X'_{ft}\delta + Z'_{ft}\theta + \mu_c + \varepsilon_{f1t} \end{aligned} \quad \text{(Eq. 1)}$$

Where:

- Y_{ft} is the outcome for family f in year t;
- $delay_{f1}$ and $delay_{f2}$ represent the increase in retirement age for the main earner ($i = 1$) and the second earner ($i = 2$), respectively, and they are fixed in 2010;
- $\mathbb{1}_{\{year=t\}}$ are year dummy variables (with 2010 omitted as the baseline category);
- X_{ft} includes time-varying family-level controls (e.g., household size, income quartile, area of residence, homeownership, response quality);
- Z_{fit} includes individual-level controls referring to the education of both members;
- μ_c denotes cell fixed effects;
- ε_{f1t} is the error term, clustered at the main earner's cell level.

Accordingly, the coefficient β_1 measures the average effect of the increase in the retirement age for the main earner, while β_2 captures the average effect for the spouse, net of fixed effects and controls. The coefficients β_{3t} and β_{4t} represent the interaction effects between the treatment and the year dummies, allowing for the analysis of the temporal dynamics of the response.

Second Model

The second model takes advantage of the availability of individual-level information on specific financial instruments, such as supplementary pensions and life insurance. Since the SHIW dataset reports this information separately for each household member, it is possible to estimate models that analyze the choices of the main earner and the spouse separately. In this case, the estimated equation takes the following form:

$$Y_{fit} = \beta_0 + \beta_1 \cdot delay_{fi} + \beta_2 \cdot delay_{fj} + \sum_{t \neq 2010} \lambda_t \cdot \mathbb{1}_{\{year=t\}} + X'_{ft}\delta + Z'_{fit}\theta + \mu_c + \varepsilon_{fit} \tag{Eq. 2}$$

Where:

- Y_{fit} is the individual-level outcome for individual i in household f in year t;
- $delay_{fi}$ represents the increase in the retirement age for individual i;
- $delay_{fj}$ represents the increase in the retirement age for individual j (i.e., the other member of the couple);
- $\mathbb{1}_{year=t}$ are year dummy variables (with 2010 omitted as the reference category);
- X_{ft} includes household-level controls;
- Z_{fit} includes individual-level controls;
- μ_c denotes cell fixed effects;
- ε_{fit} is the idiosyncratic error term, clustered at the cell level for individual i.

In this case, the coefficient β_1 measures the average effect of the individual's retirement delay on the probability of participating in financial instruments such as supplementary pensions or life insurance, net of individual and household-level controls, as well as cell and year fixed effects. The coefficient β_2 is included primarily as a control to account for the spouse's retirement delay and to better isolate the individual-specific effect of interest.

The following section discusses the strategies adopted to ensure the credible identification of the estimated effects.

5.2.2 Identification Strategy

The objective of causal identification in this analysis is to credibly estimate the effect of the increase in the retirement age on saving behavior, isolating the causal relationship from mere observational correlation. In the absence of randomization, it is necessary to adopt an identification strategy that allows the effect of the reform to be distinguished from other potentially confounding factors. In this context, a causal effect refers to the variation in the outcome of interest (e.g., number of saving instruments, amount invested, consumption level, or probability of participation in supplementary pensions and life/death insurance) that is attributable solely to the exogenous change in the working horizon induced by the reform, holding all other conditions constant.

To estimate this effect, a difference-in-differences approach is employed; however, this approach provides valid estimates only under some fundamental conditions, including the assumption of parallel trends in the pre-reform period, the absence of anticipation effects, and the absence of spillover effects between groups, all of which are discussed in the previous sections.

Moreover, the non-panel nature of the SHIW dataset poses an additional methodological challenge, as it is not possible to track the same individuals over time. To address this limitation, classification cells are constructed, allowing individual characteristics to be aggregated into homogeneous groups that can be consistently tracked across waves. This structure enables comparability over time, despite the repeated cross-sectional nature of the SHIW data.

Each of these aspects will now be examined in detail.

Verification of the Parallel Trends Assumption.

The parallel trends assumption represents the theoretical foundation for the validity of the difference-in-differences (DiD) method. It posits that, in the absence of treatment, the evolution of the outcome in the treated and control groups would have been identical over time. If the pre-existing trends systematically differed, the estimated treatment effect could be confounded with the effect of unobserved factors. In cases where the treatment is not binary but continuous, as in this case, the parallel trends assumption implies that the slopes of the outcome trajectories in groups with different levels of treatment must be similar in the pre-reform periods. In other words, the effect of the delay should not be associated with systematic variations in the outcome before the introduction of the reform. This allows for any subsequent divergences to be interpreted as the causal effect of the reform.

To empirically assess the plausibility of this assumption, several tests were conducted. For continuous variables, it was possible to perform visual tests by comparing the dynamics of the median outcomes across years for groups with low and high pension delay (low delay vs. high delay), identified by splitting the treatment distribution at its median in 2010. The graphs, presented in Appendix C, provide a preliminary assessment of the plausibility of the parallel trends assumption. In particular, separate graphs were produced for the main earner and the secondary earner, and for two key continuous variables: the logarithm of household consumption and the logarithm of total household savings (Figure C.7, Figure C.9, Figure C.8, Figure C.10).

Overall, the graphs seem to suggest the presence of parallel trends before the Reform, although they are not perfectly parallel. Furthermore, the disaggregation of the graphs by family role allows for the identification of potential heterogeneities in the response to the reform and strengthens the reliability of the visual evidence in support of the parallel trends assumption. The differences in median levels observed across groups in the graphs reflect the expected structural heterogeneity in cross-sectional data, related to characteristics such as age, employment status, or geographic area. These differences are explicitly controlled for in the model through individual and household-level covariates, as well as cell fixed effects that absorb the time-invariant component common to each group.

However, this analysis has some limitations: visual differences can be difficult to quantify, and the presence of noise within subgroups may either mask real differences or suggest non-significant divergences. Moreover, the presence of a continuous treatment variable makes the distinction between high-treated and low-treated groups less interpretable.

To reinforce the graphical evidence, a placebo test was conducted using only the pre-treatment years (2008–2010), applying the same empirical specification adopted in the main analysis. The idea behind this test is that, if the interactions between the treatment and the year 2008 turn out to be statistically insignificant, this would suggest that there were no divergent trends between the groups before the introduction of the reform. The results, reported in Table D.1, show that the coefficients of the interactions between the delay (both for the main and the second earner) and the year 2008 are small in absolute value and not statistically significant across all outcome variables. In particular, neither the number of saving instruments nor the logarithm of the total amount invested exhibits anticipatory effects, and the same holds for the logarithm of household consumption.

For binary variables, the same placebo test was implemented for the period 2008–2010 in the Tables D.2, D.4, D.3. Specifically, the significance of the interactions between the delay and the year 2008 was tested within the second specification adopted in the main model. The lack of statistical significance of these coefficients supports the hypothesis that groups with different treatment intensities did not exhibit systematic differences in trends before the introduction of the reform.

To summarize, these results support the plausibility of the parallel trends assumption and reinforce the validity of the causal interpretation of the reform's effect.

Classification Cells, Fixed Effects, and Clustering

Classification cells are constructed to group individuals with similar characteristics over time, thereby addressing the fundamental limitation that the SHIW dataset is not a panel and does not track the same individuals across waves. To ensure comparability across different survey years, the analysis assigns each individual to a unique combination of characteristics that defines a "cell." These cells serve two purposes: (1) they are used as fixed effects to control for time-invariant unobserved heterogeneity; and (2) they define the clustering structure for standard errors to allow for valid inference in the presence of correlated shocks within groups. This empirical strategy thus allows for meaningful comparisons between structurally similar individuals observed in different years, overcoming the limitations of a non-panel dataset.

The variables used to define the cells include: age (in five-year birth cohorts), gender, class of contributory seniority (measured in monthly contributions), and type of employment (private employee, public employee, or self-employed).

The contribution class is constructed by transforming the continuous variable of contribution months into five intervals, defined according to thresholds fixed at the 2010 level. Since contribution months naturally increase over time, these thresholds are dynamically adjusted by ± 12 months per year of distance from 2010 to ensure comparability across survey years. For instance, a person with the same career path would be placed in the same contribution class regardless of the year in which they are observed, simulating the classification they would have had in 2010. This approach allows individuals with similar structural characteristics to be grouped consistently over time, even though the SHIW data do not follow the same individuals longitudinally. Cells are constructed to contain at least 10 observations each. If a cell is too small, a reallocation algorithm is applied to shift the observation to an adjacent cohort or neighboring contribution class in order to avoid excessive fragmentation.

Cells are then used in two ways: (1) as fixed effects in the model to control for unobserved structural heterogeneity across groups; and (2) as clustering units for standard errors.

In the first specification (household level), as there is one observation per household, clustering is performed based on the cell of the main earner. In the second specification (individual level), where two observations per household may be present, clustering is based on both cells. This approach enhances the statistical robustness of the estimates and allows for a more precise identification of the causal effect.

In the first specification (household level), since the outcome variable is defined at the family level, the dataset must include only one observation per household. To avoid duplicating the same outcome across two rows (which would lead to incorrect standard errors), all relevant information from both individuals is merged into a single observation. Consequently, clustering is performed based on the cell of the main earner. In the second specification (individual level), where each household contributes two separate observations—one for each spouse—clustering is instead based on the individual's cell. This structure ensures statistical validity and supports accurate causal inference.

These cells are then used both to control for unobserved heterogeneity (via fixed effects) and to correct inference (via clustered standard errors), thereby strengthening the reliability and causal interpretability of the estimated effects.

Absence of Anticipatory Reactions

The Fornero Reform has already been described in detail in Section 3.3 as a particularly suitable context for causal analysis, since it exhibits all the characteristics of a natural experiment: it was implemented unexpectedly, had a broad impact on the working population, and introduced legislative changes that were exogenous to individual behavior. These features greatly reduce the likelihood of ex-ante strategic reactions by individuals, thereby strengthening the assumption of no anticipatory behavior. From this perspective, the reform provides an ideal setting for the credible identification of causal effects, as it is reasonable to assume that savings decisions observed before its implementation were not influenced by expectations of imminent change.

To conclude, the next chapter presents the empirical results derived from the identification strategies discussed above, providing evidence on how households adjusted their financial and retirement behaviors in response to the reform.

6 Results and Implications

This section presents the main findings of the empirical analysis, with the aim of assessing the impact of the increase in the retirement age on the economic decisions of Italian households. The results are organized into three key areas: consumption, savings, and financial protection instruments (complementary pensions and insurance). Each subsection discusses the empirical evidence in light of theoretical hypotheses, highlighting the adjustment mechanisms adopted by family members in response to the Fornero reform.

6.1 Effects on Household Consumption

The results reported in Table D.7 indicate that the increase in the retirement age did not have a statistically significant impact on household consumption levels. All coefficients associated with the interactions between pension delay and post-reform years are not statistically significant, confirming the absence of a systematic consumption response.

This result is consistent with the *consumption smoothing* theory, according to which households tend to maintain stable consumption levels over time, even in the face of future pension shocks, by resorting to alternative adjustment mechanisms. According to this theory, a reduction in savings could be expected, as the extension of the working period reduces the need to accumulate resources for retirement. The observed absence of change in consumption, therefore, suggests that households have attempted to preserve their current spending capacity by adjusting other components of the family budget. Then, this result provides preliminary evidence consistent with the theoretical predictions of the life-cycle model.

6.2 Effects on Household Savings

The results reported in Tables D.5 and D.6 reveal a pattern consistent with the hypothesis of a delayed but significant household response to the increase in the retirement age.

As for the number of saving instruments, the baseline coefficient (i.e., in 2010) for the **main earner** ($delay1\_m$) is -0.013. However, the interaction with year 2014 is -0.063 and significant at the 5% level: summing the two coefficients yields a total effect of approximately -0.076 for each additional year of pension delay. This indicates a reduction in the number of instruments used in 2014, which may be interpreted as a possible streamlining of the household's financial portfolio in response to the extension of the working horizon of the main earner. The non-significant effects for 2008 and 2016 are consistent with the theoretical hypothesis: on the one hand, the absence of anticipation, and on the other, a possible fading of the effect over time.

For the **secondary earner** ($delay2\_s$), none of the interactions is significant and the coefficients are small, suggesting less responsive behavior by the lower-earning partner, all else equal, at least in terms of the number of instruments.

The R-squared value of 0.199 indicates that the model explains approximately 20% of the observed variability in the dependent variable. Given the microeconomic nature of the data and the complexity of financial behavior, this represents a satisfactory proportion of explained variance, which lends additional robustness to the interpretation of the estimated coefficients.

In the case of the *logarithm of total savings* (Table D.6), the overall effect for the **main earner** in 2014 is given by the sum of 0.012 (baseline) and -0.067 (interaction), hence -0.055, interpretable as a 5.5% reduction in total savings. 2016 also shows a marginally significant effect (sum -0.049). This result is consistent with the *life cycle* theory, according to which an increase in the retirement age leads to a longer working horizon, reducing the need to accumulate savings.

In contrast, the **secondary earner** shows in 2014 an interaction of $+0.091$, significant at the 5% level. Considering the baseline coefficient (-0.026), the total effect is positive ($+0.065$): an increase of one year in the secondary earner's retirement age leads to a 6.5% increase in total savings of the family. This result appears to contrast with theoretical predictions and may reflect a specific intra-household dynamic: all else equal for the main earner, an increase in the retirement age of the second earner represents a potential cost, as the couple might benefit from coordinating their retirement dates (Atalay et al., 2019). Consequently, the family may react by increasing savings to compensate for the temporal misalignment in labor market exits within the household.

Overall, the absence of an effect in 2008 supports the validity of the identification strategy, while the differentiated response between 2012 and 2014 is consistent with the time needed to assimilate the reform and adapt behaviors accordingly.

The R-squared value of 0.604 indicates that the model explains approximately 60% of the observed variability in the dependent variable. This represents a high proportion of explained variance in the context of microeconomic data, which provides substantial robustness to the interpretation of the estimated coefficients and supports the empirical relevance of the adopted approach.

6.3 Effects on Complementary Pensions and Insurance

The results reported in Tables D.10, D.12, D.11, D.8, D.9 overall show weak effects of pension delay on the probability of holding a complementary pension or a life or death insurance policy. This outcome is consistent with theoretical expectations, according to which these forms of protection are less sensitive to changes in the retirement age, since the diffusion and understanding of insurance and pension instruments in Italy have historically been limited by a generally low level of financial literacy in the population (Fornaro and Monticone, 2011).

However, some significant and noteworthy exceptions emerge. First, the secondary earner shows in 2014 a positive and significant effect on the probability of holding a complementary pension ($+1.83$ percentage points) after an increase in delay, to be added to the slightly negative baseline coefficient (-0.05 pp): the net effect is positive, approximately $+1.78$ percentage points. This suggests a possible compensation strategy by the partner less central to household income, who may react to the extension of the working horizon by planning an exit from the labor market more coordinated with the main earner, through an increase in private pension saving.

Second, the main earner shows in 2014 positive and significant effects on the probability of holding a life insurance policy ($+1.5pp$) and a death insurance policy ($+1.6pp$). These results suggest a rational protective behavior: the economically most relevant individual in the household may perceive a growing risk of morbidity or mortality before retirement and react by insuring against such events, in order to safeguard the household's economic stability.

Overall, these findings confirm the presence of differentiated responses among family members, consistent with their position in the life cycle and their economic role within the household.

7 Conclusion and Future Directions

The results obtained are consistent with the theoretical hypotheses formulated and with the expectations linked to the adopted empirical design. No significant variations are observed in consumption, in line with the principle of *consumption smoothing* predicted by the life-cycle model. A reduction in savings is instead detected for the main earner, which is consistent with the idea that an extension of the working horizon reduces the need for precautionary accumulation. At the same time, a coordinating behavioral adjustment is observed on the part of the secondary earner, for whom an increase in retirement age leads to higher household savings, holding other conditions constant.

The effects on complementary pension schemes and insurance are generally limited, but a prudential behavior emerges for the main earner, who shows a higher likelihood of holding insurance policies. This pattern may be related to existing literature documenting an increase in perceived health risks, such as mortality and morbidity, linked to pension reforms that raise the statutory retirement age. It underscores the main earner's central role in ensuring the household's financial protection.

Instead, the second earner shows a higher likelihood of holding complementary pension products following a retirement delay, unlike the main earner. This finding is reinforced by the alternative specification, which highlights that women, following a delay, are significantly more likely to enroll in complementary pension plans, a behavior not observed among men. This aligns with the observed saving behavior: the second earner may be less inclined to accept a delayed retirement (especially when their partner does not experience the same delay) and therefore increases precautionary saving and pension participation to compensate.

Furthermore, no anticipatory effects emerge from the data, consistently with expectations related to the reform: the absence of statistical significance in 2008 suggests that families did not change their behavior prior to the implementation of the new legislation. This also supports the assumption that no pre-existing trends, unrelated to the reform itself, were driving the observed post-reform changes.

The year 2014 is the one in which the estimated effects are strongest and statistically significant, confirming the hypothesis of a delayed response to the reform. This dynamic may reflect the natural adjustment time of household behavior but could also be partially attributed to the biennial structure of the dataset. By contrast, 2016 does not record persistent effects: this may be due either to a progressive absorption of the reform by individuals.

From a methodological point of view, the main limitations of this analysis stem from the nature of the dataset used: it is based on survey data collected biennially, not administrative records, and does not follow individuals over time. This imposes some econometric and interpretative challenges, which have been partly addressed through the construction of cells and the use of continuous treatment variables.

The consistency of the results with economic theory, combined with the credibility of the identifying assumptions—such as the absence of anticipatory behavior and the lack of pre-existing differential trends—strengthens the internal validity of the analysis and suggests that the limitations of the data have been effectively mitigated by the empirical approach adopted.

A natural extension of this analysis would be the use of more precise administrative data to validate the findings presented here, reinforce the robustness of the empirical conclusions, and enable a more accurate analysis of heterogeneous responses across demographic and economic subgroups. Another promising direction would be to apply the same empirical strategy to different contexts and reforms that have raised the statutory retirement age, in order to assess the external validity of the results and explore whether similar behavioral responses emerge across institutional settings.

From a policy perspective, this study suggests that the household is the relevant unit of analysis when examining behavioral responses to pension reforms. An individual-level shock, such as an increase in the statutory retirement age, often triggers a coordinated adjustment within the couple, with heterogeneous responses depending on the economic role of each partner.

Moreover, while the reform induces some shifts in precautionary behavior (particularly in savings and insurance uptake) there is still limited engagement with financial market instruments. This response is not uniform across population subgroups. As the literature suggests, these disparities are largely attributable to gaps in financial literacy, particularly among women and households in Southern Italy. If low financial literacy functions as a barrier between households and the financial system, then structural changes to public pension rules may disproportionately penalize those less equipped to adapt. This interpretation is reinforced by the observed asymmetries in the distribution of complementary pension and insurance variables, often characterized by left-skewed shapes and concentration of outliers.

In light of the demographic and financial pressures facing PAYG systems, especially rising life expectancy and declining fertilit, raising the retirement age is likely to remain a necessary policy tool. However, to mitigate distributional distortions and ensure a more equitable transition, enhancing financial literacy and access to complementary financial instruments may serve as an effective and targeted intervention. Empowering individuals to respond proactively to policy changes could improve both the fairness and the efficiency of pension reforms in the long run.

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A

Appendix - Analysis of Response Quality and Robustness Checks

A.1 Motivation

In analyses based on survey data, the quality and reliability of responses can influence the results, especially when dealing with self-reported economic data. In this study, variables are available that represent the interviewers' assessments regarding the respondents' understanding of the questions, the precision with which they answered, and the truthfulness of their responses. In particular, the variable $verored$ assesses the truthfulness of the responses and ranges from 1 (low quality) to 10 (high quality). The variable $comprens$, instead, ranges from 0 to 10 and captures the interviewer's assessment of the respondent's understanding of the survey questions. These variables allow for the estimation of the potential impact of response quality on the results.

A.2 Methodology

A dichotomous variable, $low\_quality$, was constructed, taking the value 1 if at least one of the two interviewer-assessed response quality indicators was less than or equal to the median of its respective distribution, and 0 otherwise. This criterion was adopted to identify cases in which the respondent's understanding of the questionnaire or the reliability of their answers, as assessed by the interviewer, was relatively low compared to the rest of the sample.

Descriptive statistics were then conducted to compare the means of the main variables between individuals with high and low response quality, and t-tests were performed to assess differences in means, focusing in particular on the main outcome variable and key control variables.

A.3 Results

The variable *low quality* was defined based on the median values of two interviewer-assessed indicators of response quality. Consequently, approximately 45.9% of the sample is classified in the low-quality group. Although this split is a direct result of the chosen threshold, it remains informative to investigate whether systematic differences emerge between the two groups.

Descriptive statistics reveal that individuals with lower response quality tend to report slightly lower average and median levels of income, consumption, and savings. For instance, the average number of different financial instruments held is 1.92 for individuals with high-quality responses, compared to 1.73 among those with low-quality responses. Median values reflect a similar pattern. In contrast, differences in age, employment history, geographic area, and other covariates appear minor and not statistically significant. When running OLS regressions controlling for education level, household size, geographic area, household income and consumption quintiles, as well as housing status and cell fixed effects, the estimated coefficient on *low quality* remains statistically significant. Specifically, individuals with low response quality report holding on average 0.096 fewer types of financial assets ($p < 0.05$). A similar result emerges for total household financial wealth: individuals in the low-quality group report, on average, significantly lower log savings, with an estimated adjusted gap of 0.088 log points, also statistically significant at the 5% level.

To further assess robustness, regressions were re-estimated by including *low quality* as a control variable and then by excluding low-quality observations altogether. Including the variable does not substantially alter the estimated coefficients of the treatment variables, suggesting that the response quality is not a confounder. However, excluding low-quality observations leads to slightly stronger treatment effects, likely due to changes in sample composition.

A.4 Discussion

The analysis suggests that response quality is an influential factor in explaining heterogeneity in saving behaviors. Individuals assessed as having lower-quality responses tend to report significantly fewer types of financial assets and lower levels of total savings, even after controlling for standard socio-economic characteristics. This pattern may indicate that lower response quality reflects a reduced level of attention or understanding in completing the survey, which in turn affects the accuracy of the reported financial data.
Although the inclusion of *low quality* as a control does not meaningfully affect the estimates of the treatment variables, its statistically significant association with the outcome variables highlights the importance of accounting for this dimension of data reliability. Including the full sample while controlling for response quality offers a compromise between correcting for potential biases and preserving the representativeness and size of the dataset.
These findings underscore that interviewer-based assessments of response quality, when available, can provide valuable insight into the validity of self-reported economic data and should be carefully considered in survey-based analyses.

B

Appendix- Alternative specification

B.1 Motivation and Differences from the Main Specification

This section explores an alternative specification compared to the main one, in which the treatment is differentiated between individuals not based on their economic position within the household, but rather on gender (male/female).

It is important to stress that the value of the treatment (i.e., the pension delay induced by the reform) is exactly the same for each individual in both specifications, since it is calculated based on each individual's characteristics within the sample. What changes is how the delay is represented in the model, to identify behaviors attributable to gender rather than income position.

This distinction makes it possible to capture systematic differences in the response to the reform that reflect social norms, life expectancy, risk aversion, or family roles, regardless of income level.

The two equations used in the alternative specification are formally identical to those in the main one. The only difference lies in the treatment variables: instead of distinguishing between main and secondary earners, the treatment is now assigned based on gender, with $delay1$ corresponding to men and $delay2$ to women.

B.2 Main Results and Comparison with the Main Specification

The results obtained with the alternative specification highlight some important similarities and differences compared to the main one:

- **Household savings:** for the number of instruments, the negative and significant effect in 2014 for men (–0.064***) mirrors that observed for the main earner. For the logarithm of savings, by contrast, a positive and significant effect is observed for women in 2014 (+6.0%) (Table D.16). In the main specification, the effect was significant for both earners (main and second). The difference in sign remains: for men, the effect is negative, although not statistically significant, as in the main specification; for women, the effect is positive. This suggests that an increase in pension delay for women is associated with an increase in household savings in terms of invested amount, in line with what was observed in the main specification. This may also be partially explained by the fact that men are more often classified as main earners and women as secondary earners, so the results between the two specifications are not expected to diverge substantially.

- **Consumption:** as in the main specification, in general, no significant effects of pension delay emerge for either men or women. However, it is interesting to note that only in the alternative specification a significant coefficient is observed for women in 2016, with a negative effect (–2.9%) on consumption (Table D.16). Then, all else equal, an increase in women's retirement age leads to a reduction in overall household consumption in 2016. A possible explanation is that in 2016 the statutory retirement age for women—especially self-employed workers—increased by three years compared to 2013, resulting in a more substantial perceived delay and possibly greater uncertainty within households. This may have prompted some families to reduce consumption in favor of precautionary saving. Alternatively, the observed effect could be driven by an exogenous decline in household income during that year. In fact, unlike other specifications where the effects tend to weaken in 2016, here the coefficient remains significant, which could raise concerns. Although year fixed effects are included to account for macroeconomic shocks common to all households, it is still possible that unobserved, group-specific shocks in 2016—such as a gender- or occupation-specific income drop—may have contributed to the estimated effect. Therefore, the observed significance should be interpreted with caution.

- **Complementary pensions:** in the main specification, only the interaction for the secondary earner in 2014 was significant (total effect: $0.0005+0.0183 = +0.0178$), while all other interactions were not statistically significant. This result is confirmed in the alternative specification, where significant effects are observed for women both in 2012 ($+0.0231$) and in 2014 ($+0.0259$), which add to a negative and significant baseline coefficient (-0.0185) (Table D.13). The overall effect remains positive in those years and suggests a stronger responsiveness among women to the reform.

  This supports the interpretation that, although women initially show a lower average likelihood of subscribing to a complementary pension, they tend to adjust earlier when facing an increase in retirement age. Compared to the classification by economic role, the conclusion remains consistent: an increase in women's retirement age is associated with a higher probability of holding a complementary pension plan. This behavior may be explained by intra-household dynamics: when the retirement age of the female partner rises while her partner's retirement age remains unchanged, the resulting mismatch can reduce the time the couple spends together after retirement. This potential loss of shared leisure may motivate women to invest in complementary pensions as a form of individual adjustment.

- **Insurance:** in the main specification, only for the main earner, the interaction with 2014 was significant for both life and death insurance. In the alternative specification, the interactions related to life insurance are never significant (Table D.14), neither for men nor for women. Conversely, for death insurance, a positive and significant effect is observed for women in 2014 ($+2.04$ pp), accompanied by a weakly significant effect also in 2008 ($p - value = 0.068$) (Table D.15). This behavior suggests greater female responsiveness to this specific form of protection, but at the same time raises doubts about the validity of the parallel trend assumption, as the effect already visible in 2008 may indicate the presence of a pre-existing trend not attributable to the reform.

B.3 Conclusions

The alternative specification based on gender not only confirms the main findings from the primary specification, but also adds a new layer of insight by highlighting gender-based heterogeneity. In several cases, the results for men and women align with those for main and secondary earners, as men are more frequently classified as main earners and women as secondary earners. However, the divergence in statistical significance—despite similar signs across specifications—suggests that certain behavioral responses are more clearly captured by gender, while others are better explained by economic roles within the household. This comparison reinforces the robustness of the results and shows that both dimensions offer valuable and complementary perspectives.

C

Appendix - Figures

Figure C.1: Distribution of individual ages across survey waves (2008–2016).

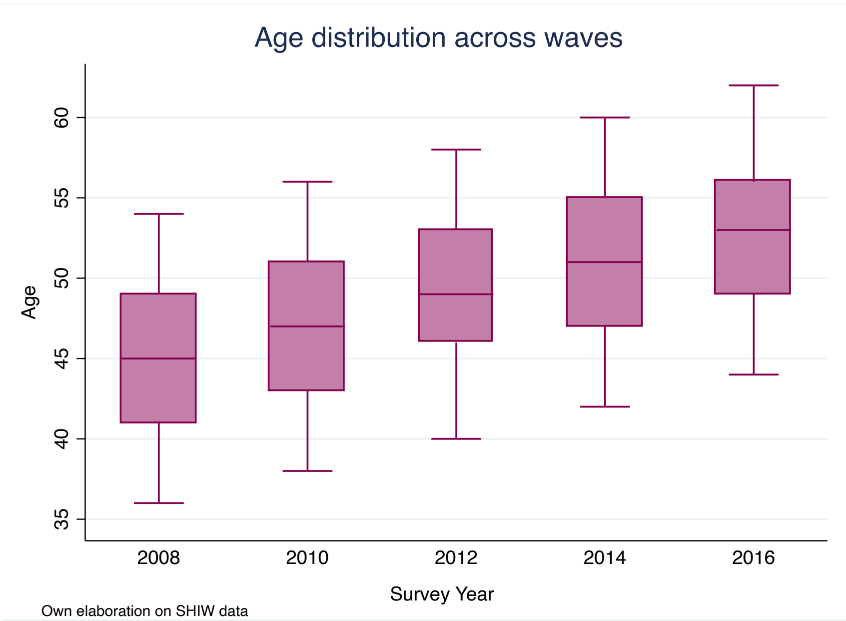


Figure C.2: Distribution of months of pension contributions by respondents across survey waves.

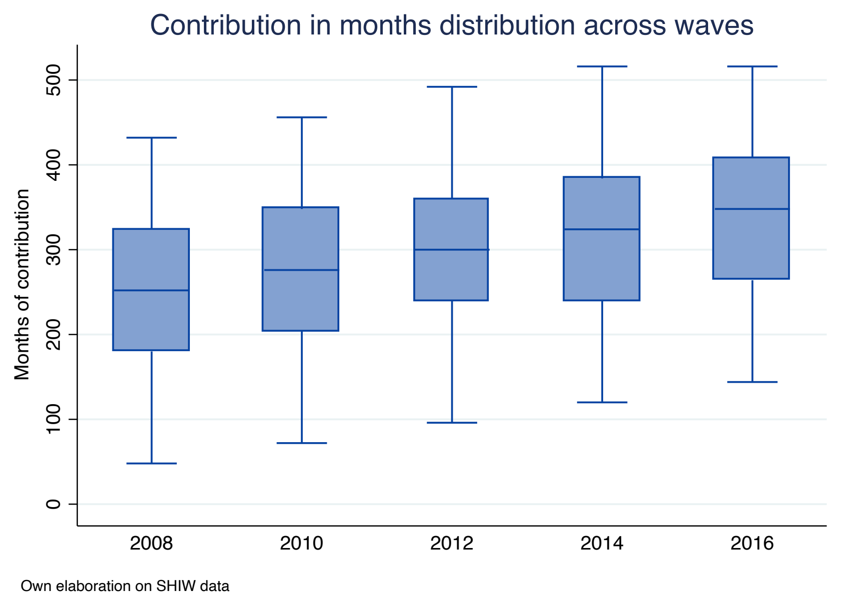


Figure C.3: Distribution of Household Size across survey waves.

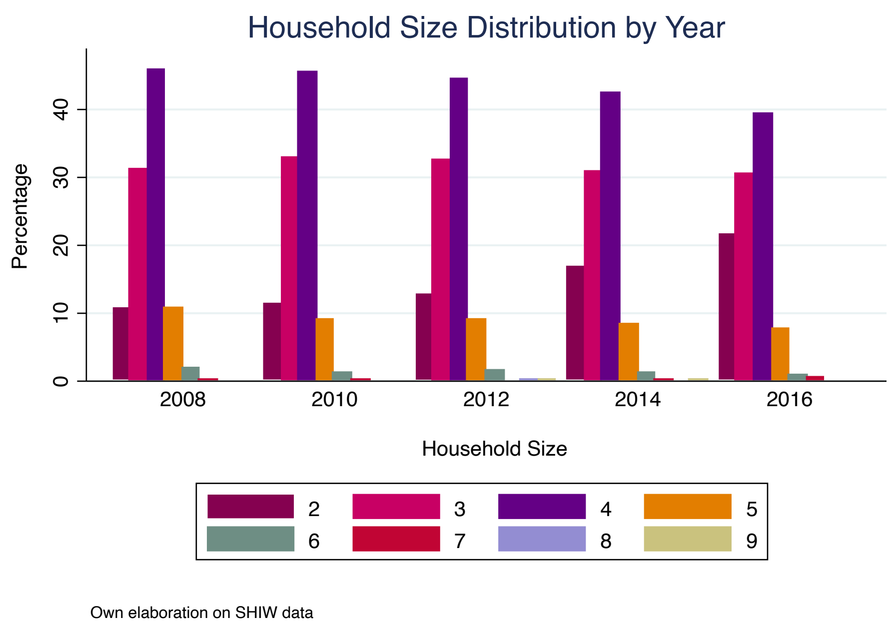


Figure C.4: Distribution of Employment categories across survey waves.

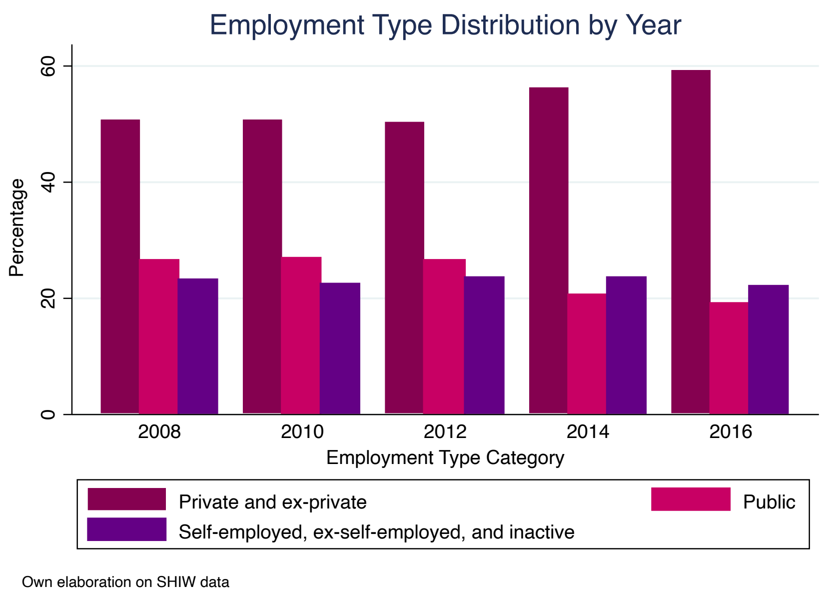


Figure C.5: Distribution of Geographical area across survey waves.

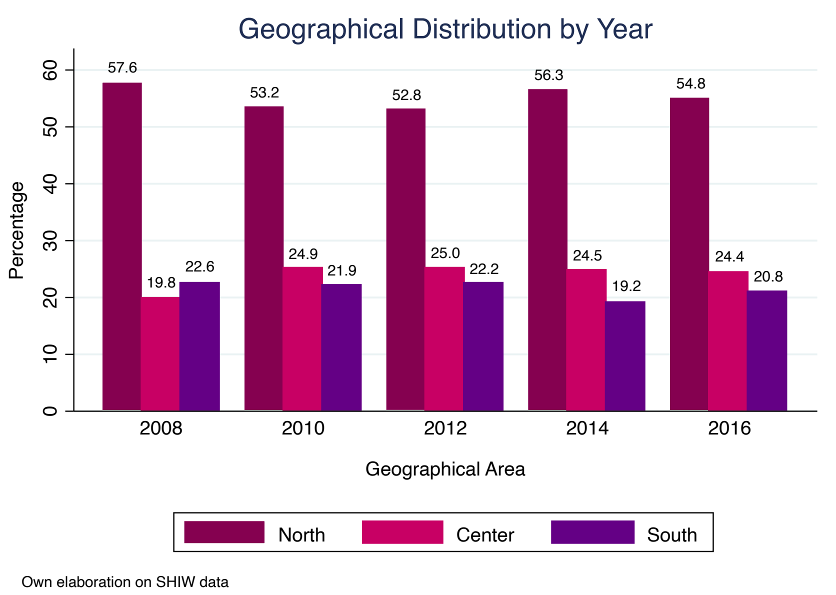


Figure C.6: Distribution of Education categories across survey waves.

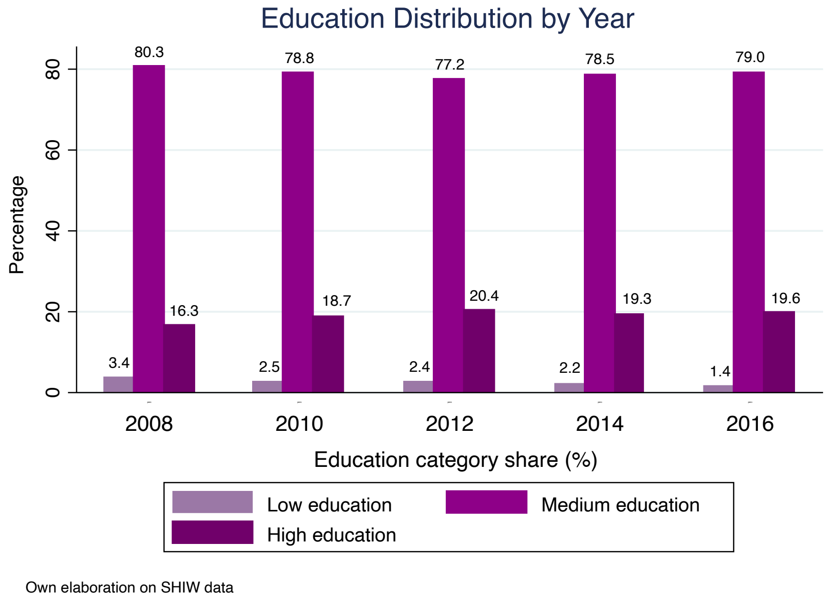
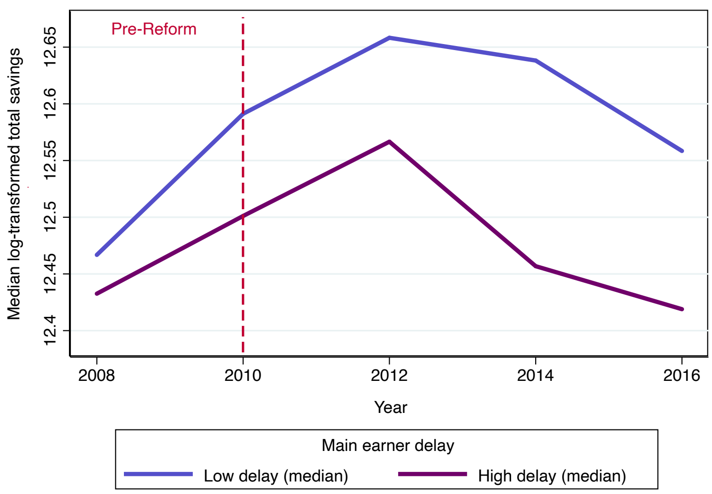
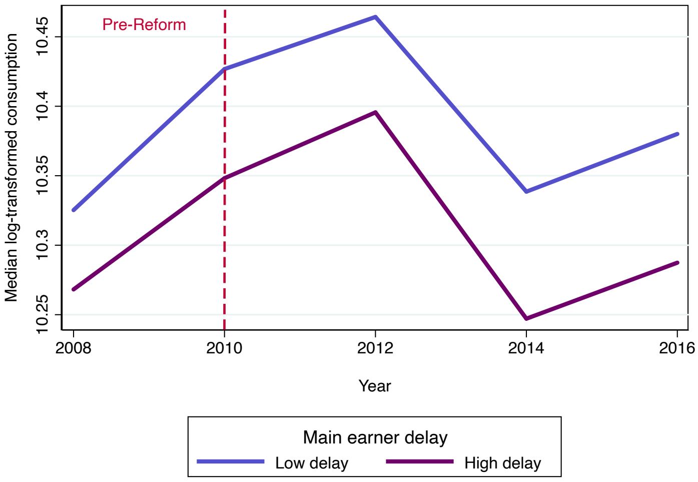


Figure C.7: PTA: Pre-Reform Savings Trends by Main Earner Delay



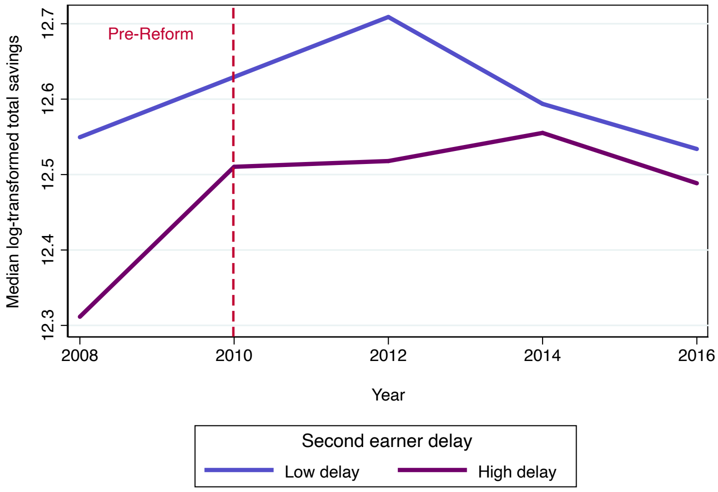
The graph displays the evolution of total (log) savings for the main earner. The two groups follow similar dynamics during the pre-treatment period. Starting in 2012, a gradual divergence appears, pointing to a possible behavioral response to the increase in the retirement age.

Figure C.8: PTA: Pre-Reform Consumption Trends by Main Earner Delay



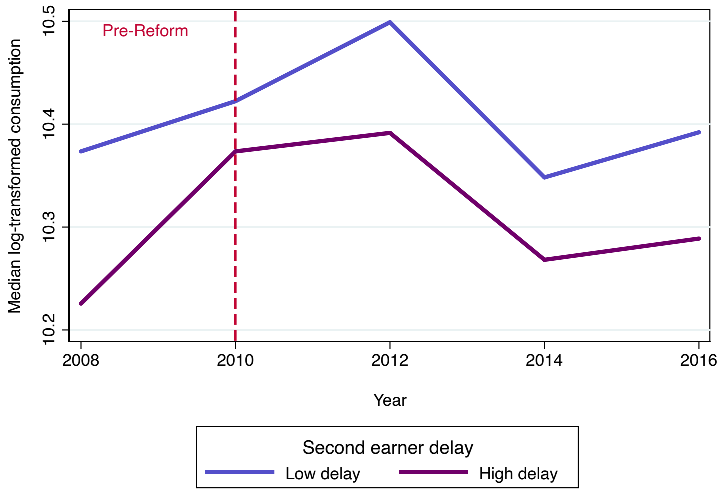
The graph shows the evolution of (log) household consumption for the main earner, comparing individuals with Low and High pension delay. The trajectories appear largely parallel both before and after the reform, suggesting no clear divergence between the two groups. This visual evidence is consistent with the absence of a strong causal effect of the reform on consumption.

Figure C.9: PTA: Pre-Reform Log Total Savings Trends by Secondary Earner Delay



The graph, referring to the second earner, shows that pre-reform trajectories between the Low and High delay groups are not perfectly parallel, but also not strongly divergent, suggesting a limited departure from the parallel trends assumption. After 2010, some divergence emerges, particularly around 2012–2014, before the trends appear to realign again.

Figure C.10: PTA: Pre-Reform Log Consumption Trends by Secondary Earner Delay



The graph shows relatively parallel consumption trajectories for the second earner before 2010, supporting the plausibility of the parallel trends assumption. After the reform, some mild divergence between the Low and High delay groups emerges, although it is less pronounced than that observed for the main earner.

D

Appendix - Tables

Table D.1: Placebo Test (2008–2010): Effect of Pension Delay on Financial Outcomes

	Number of Saving Instruments	*Log Total Savings*	*Log Consumption*
	(1)	(2)	(3)
Main delay (*delay1_m*)	-0.012	0.020	-0.013
	(0.033)	(0.030)	(0.012)
Second delay (*delay2_s*)	-0.014	-0.030	-0.003
	(0.041)	(0.019)	(0.009)
Main delay × 2008	-0.035	-0.026	0.010
	(0.031)	(0.029)	(0.010)
Second delay × 2008	-0.007	0.012	0.001
	(0.034)	(0.036)	(0.013)
Observations	1,879	1,879	1,879
R-squared	0.209	0.671	0.488
Clustered SE	Yes (cell_m_adj)	Yes (cell_m_adj)	Yes (cell_m_adj)

Notes: Coefficients are shown with robust standard errors clustered at the cell level (cell_m_adj).
Each regression includes year fixed effects (2008), education, household size, geographic area, income quintiles, consumption quintiles, dwelling ownership, low response quality, and cell fixed effects.
Number of Saving Instruments ranges from 0 to 12.
For variables expressed in logarithms (Total Savings and Consumption), coefficients approximate the percentage change in the outcome associated with a one-unit change in the regressor.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.2: Placebo Test (2008–2010): Effect of Pension Delay on Complementary Pension Ownership

	Main Earner	*Secondary Earner*
Main delay/ Second delay (*delay1_m* / *delay2_s*)	0.0118	0.0016
	(0.0117)	(0.0112)
Interaction × 2008	-0.0009	-0.0087
	(0.0132)	(0.0109)
Observations	1,883	1,883
R-squared	0.120	0.121
Clustered SE	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients reported with robust standard errors clustered at the cell level in parentheses.

Each regression includes year fixed effects (2008), education, household size, geographic area, income quintiles, consumption quintiles, dwelling ownership, and cell fixed effects.

The dependent variable is a dummy equal to 1 if the individual owns a complementary pension. Coefficients can be interpreted as marginal effects on the probability of ownership.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.3: Placebo Test (2008–2010): Effect of Pension Delay on Life Insurance Ownership

	Life Insurance Ownership	
	Main Earner	*Secondary Earner*
Main delay/ Second delay (*delay1_m* / *delay2_s*)	0.0008	0.0079
	(0.0069)	(0.0073)
Interaction × 2008	0.0047	-0.0046
	(0.0060)	(0.0062)
Observations	1,883	1,883
R-squared	0.102	0.095
Clustered SE	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients reported with robust standard errors clustered at the cell level in parentheses.
Each regression includes year fixed effects (2008), education, household size, geographic area, income quintiles, consumption quintiles, dwelling ownership, and cell fixed effects.
The dependent variable is a dummy equal to 1 if the individual owns a life insurance policy. Coefficients can be interpreted as marginal effects on the probability of ownership.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.4: Placebo Test (2008–2010): Effect of Pension Delay on Death Insurance Ownership

	Death Insurance Ownership	
	Main Earner	*Secondary Earner*
Main delay/ Second delay (*delay1_m* / *delay2_s*)	0.0060	0.0036
	(0.0099)	(0.0074)
Interaction × 2008	0.0014	-0.0007
	(0.0092)	(0.0071)
Observations	1,883	1,883
R-squared	0.128	0.121
Clustered SE	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients reported with robust standard errors clustered at the cell level in parentheses.

Each regression includes year fixed effects (2008), education, household size, geographic area, income quintiles, consumption quintiles, dwelling ownership, and cell fixed effects.

The dependent variable is a dummy equal to 1 if the individual owns a death insurance policy. Coefficients can be interpreted as marginal effects on the probability of ownership.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.5: Effect of Pension Delay on Number of Saving Instruments

	Coefficient	(Std. Error)	p-value
Main delay (*delay1_m*)	-0.013	(0.0236)	0.572
Second delay (*delay2_s*)	-0.029	(0.0395)	0.466
Main delay × 2008	-0.024	(0.0308)	0.447
Main delay × 2012	-0.038	(0.0231)	0.102
Main delay × 2014	-0.063**	(0.0258)	0.019
Main delay × 2016	0.019	(0.0369)	0.616
Second delay × 2008	-0.019	(0.0337)	0.578
Second delay × 2012	-0.011	(0.0351)	0.746
Second delay × 2014	-0.025	(0.0386)	0.514
Second delay × 2016	-0.004	(0.0535)	0.948
Observations		4,181	
R-squared		0.199	
Clustered SE		Yes (cell_m_adj)	

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level (cell_m_adj).

All regressions include year fixed effects (2008, 2012, 2014, 2016), education, household size, geographic area, income quintiles, consumption quintiles, dwelling ownership, low response quality, and cell fixed effects.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.6: Effect of Pension Delay on Log Total Savings

	Coefficient	(Std. Error)	p-value
Main delay (*delay1_m*)	0.012	(0.0295)	0.674
Second delay (*delay2_s*)	-0.026	(0.0198)	0.200
Main delay × 2008	-0.018	(0.0282)	0.533
Main delay × 2012	-0.034	(0.0307)	0.280
Main delay × 2014	-0.067**	(0.0312)	0.036
Main delay × 2016	-0.061*	(0.0337)	0.079
Second delay × 2008	-0.004	(0.0360)	0.912
Second delay × 2012	0.043	(0.0366)	0.242
Second delay × 2014	0.091**	(0.0402)	0.027
Second delay × 2016	0.018	(0.0283)	0.537
Observations		4,181	
R-squared		0.604	
Clustered SE		Yes (cell_m_adj)	

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level (cell_m_adj).

All regressions include year fixed effects (2008, 2012, 2014, 2016), education, household size, geographic area, income quintiles, consumption quintiles, dwelling ownership, low response quality, and cell fixed effects.

Interpretation: Since the dependent variable is expressed in natural logarithms, the coefficients can be interpreted approximately as percentage changes in total savings associated with a one-unit increase in the regressor.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.7: Effect of Pension Delay on Log Consumption

	Coefficient	(Std. Error)	p-value
Main delay (*delay1_m*)	-0.005	(0.0098)	0.631
Second delay (*delay2_s*)	0.0003	(0.0082)	0.973
Main delay × 2008	0.012	(0.0101)	0.230
Main delay × 2012	0.0075	(0.0100)	0.456
Main delay × 2014	-0.0053	(0.0098)	0.593
Main delay × 2016	-0.0043	(0.0110)	0.697
Second delay × 2008	0.0001	(0.0133)	0.996
Second delay × 2012	-0.0085	(0.0095)	0.375
Second delay × 2014	-0.0099	(0.0125)	0.432
Second delay × 2016	-0.0134	(0.0127)	0.297
Observations		4,181	
R-squared		0.433	
Clustered SE		Yes (cell_m_adj)	

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level (cell_m_adj).

All regressions include year fixed effects (2008, 2012, 2014, 2016), education, household size, geographic area, income quintiles, consumption quintiles, dwelling ownership, low response quality, and cell fixed effects.

Interpretation: Since the dependent variable is expressed in natural logarithms, coefficients represent approximate percentage changes in household consumption due to a one-unit change in the regressor.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.8: Effect of Pension Delay on Financial Protection Instruments (Main Earner)

	Complementary Pension	Life Insurance	Death Insurance
	(1)	(2)	(3)
Main delay (*delay1_m*)	0.007	-0.001	0.001
	(0.010)	(0.007)	(0.009)
Main delay × 2008	-0.002	0.004	0.002
	(0.013)	(0.006)	(0.009)
Main delay × 2012	-0.010	0.003	0.000
	(0.013)	(0.007)	(0.009)
Main delay × 2014	0.00005	0.016^{**}	0.015^{**}
	(0.010)	(0.007)	(0.007)
Main delay × 2016	-0.011	-0.001	-0.004
	(0.014)	(0.008)	(0.011)
Observations	4,190	4,190	4,190
R-squared	0.082	0.054	0.074
Clustered SE	Yes (cell_adj)	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level.
All regressions include controls for secondary earner delay, year fixed effects (2008, 2012, 2014, 2016), education, household size, geographic area, income quintiles, consumption quintiles, dwelling ownership, low response quality, and cell fixed effects.
All dependent variables are binary indicators equal to 1 if the individual owns the respective financial product.
Coefficients represent changes in probability expressed in percentage points.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.9: Effect of Pension Delay on Financial Protection Instruments (Secondary Earner)

	Complementary Pension	Life Insurance	Death Insurance
Second earner delay (*delay2_s*)	-0.0005	0.0075	0.0060
	(0.0098)	(0.0072)	(0.0070)
Delay $\times$ 2008	-0.0055	-0.0034	0.0000
	(0.0109)	(0.0062)	(0.0068)
Delay $\times$ 2012	0.0156	-0.0063	0.0011
	(0.0095)	(0.0079)	(0.0089)
Delay $\times$ 2014	0.0183*	-0.0002	0.0010
	(0.0103)	(0.0081)	(0.0094)
Delay $\times$ 2016	0.0193	0.0037	0.0111
	(0.0117)	(0.0075)	(0.0105)
Observations	4,190	4,190	4,190
R-squared	0.0832	0.0589	0.0788
Clustered SE	Yes (cell_adj)	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients are reported with robust standard errors clustered at the cell level (cell_adj).

All regressions include controls for the partner's delay, year fixed effects (2008, 2012, 2014, 2016), education, household size, geographic area, income quintiles, consumption quintiles, dwelling ownership, low response quality, and cell fixed effects.

The dependent variables are binary indicators equal to 1 if the individual owns the respective financial product.

Coefficients represent changes in probability expressed in percentage points.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.10: Effect of Pension Delay on Complementary Pension Ownership: Main vs. Secondary Earner

	Dependent variable: Complementary Pension Ownership	
	Main Earner	*Secondary Earner*
Main delay/ Second delay (*delay1_m*)	0.007	-0.0005
	(0.010)	(0.0098)
Interaction × 2008	-0.002	-0.0055
	(0.013)	(0.0109)
Interaction × 2012	-0.010	0.0156
	(0.013)	(0.0095)
Interaction × 2014	0.00005	0.0183*
	(0.010)	(0.0103)
Interaction × 2016	-0.011	0.0193
	(0.014)	(0.0117)
Observations	4,190	4,190
R-squared	0.0822	0.0832
Clustered SE	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level.
All regressions include partner's delay, year fixed effects, and controls for education, household size, geographic area, income and consumption quintiles, dwelling ownership, and cell fixed effects.
The dependent variable is a binary indicator equal to 1 if the individual holds a complementary pension, 0 otherwise. Coefficients represent percentage point changes in probability.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.11: Effect of Pension Delay on Life Insurance Ownership: Main vs. Secondary Earner

	Dependent variable: Life Insurance Ownership	
	Main Earner	*Secondary Earner*
Main delay/ Second delay (*delay1_m*)	-0.001	0.0075
	(0.007)	(0.0072)
Interaction × 2008	0.004	-0.0034
	(0.006)	(0.0062)
Interaction × 2012	0.003	-0.0063
	(0.007)	(0.0079)
Interaction × 2014	0.016^{**}	-0.0002
	(0.007)	(0.0081)
Interaction × 2016	-0.001	0.0037
	(0.008)	(0.0075)
Observations	4,190	4,190
R-squared	0.0540	0.0589
Clustered SE	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level.

All regressions include partner's delay, year fixed effects, and controls for education, household size, geographic area, income and consumption quintiles, dwelling ownership, and cell fixed effects.

The dependent variable is a binary indicator equal to 1 if the individual holds a life insurance policy, 0 otherwise.

Coefficients represent percentage point changes in probability.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.12: Effect of Pension Delay on Death Insurance Ownership: Main vs. Secondary Earner

	Dependent variable: Death Insurance Ownership	
	Main Earner	*Secondary Earner*
Main delay/ Second delay (*delay1_m*)	0.001	0.0060
	(0.009)	(0.0070)
Interaction × 2008	0.002	0.0000
	(0.009)	(0.0068)
Interaction × 2012	0.000	0.0011
	(0.009)	(0.0089)
Interaction × 2014	0.015^{**}	0.0010
	(0.007)	(0.0094)
Interaction × 2016	-0.004	0.0111
	(0.011)	(0.0105)
Observations	4,190	4,190
R-squared	0.0737	0.0788
Clustered SE	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level.
All regressions include partner's delay, year fixed effects, and controls for education, household size, geographic area, income and consumption quintiles, dwelling ownership, and cell fixed effects.
The dependent variable is a binary indicator equal to 1 if the individual holds a death insurance policy, 0 otherwise. Coefficients represent percentage point changes in probability.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.13: Effect of Pension Delay on Complementary Pension Ownership: Men vs. Women

	Male	**Female**
Delay	0.0223**	-0.0185**
	(0.0103)	(0.0050)
Interaction $\times$ 2008	-0.0117	0.0077
	(0.0128)	(0.0126)
Interaction $\times$ 2012	-0.0160	0.0231**
	(0.0121)	(0.0098)
Interaction $\times$ 2014	-0.0054	0.0259**
	(0.0105)	(0.0101)
Interaction $\times$ 2016	-0.0030	0.0168
	(0.0134)	(0.0131)
Observations	4,186	4,186
R-squared	0.0711	0.0781
Clustered SE	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level.
All regressions include partner's delay, year fixed effects, and controls for education, household size, geographic area, income and consumption quintiles, dwelling ownership, and cell fixed effects.
The dependent variable is a binary indicator equal to 1 if the individual holds a complementary pension, 0 otherwise. Coefficients represent percentage point changes in probability.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.14: Effect of Pension Delay on Life Insurance Ownership: Men vs. Women

	Male	**Female**
Delay	0.0063	-0.0011
	(0.0093)	(0.0030)
Interaction × 2008	−0.0015	0.0038
	(0.0077)	(0.0054)
Interaction × 2012	−0.0015	−0.0019
	(0.0089)	(0.0077)
Interaction × 2014	0.0078	0.0095
	(0.0093)	(0.0071)
Interaction × 2016	−0.0040	0.0058
	(0.0093)	(0.0066)
Observations	4,186	4,186
R-squared	0.0449	0.0453
Clustered SE	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level.

All regressions include partner's delay, year fixed effects, and controls for education, household size, geographic area, income and consumption quintiles, dwelling ownership, and cell fixed effects.

The dependent variable is a binary indicator equal to 1 if the individual holds a life insurance policy, 0 otherwise.

Coefficients represent percentage point changes in probability.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.15: Effect of Pension Delay on Death Insurance Ownership: Men vs. Women

	Male	**Female**
Delay	0.0161	0.0097
	(0.0107)	(0.0063)
Interaction × 2008	−0.0094	0.0133*
	(0.0095)	(0.0071)
Interaction × 2012	−0.0057	0.0067
	(0.0113)	(0.0079)
Interaction × 2014	−0.0015	0.0204**
	(0.0084)	(0.0086)
Interaction × 2016	−0.0012	0.0077
	(0.0121)	(0.0090)
Observations	4,186	4,186
R-squared	0.0589	0.0591
Clustered SE	Yes (cell_adj)	Yes (cell_adj)

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level.
All regressions include partner's delay, year fixed effects, and controls for education, household size, geographic area, income and consumption quintiles, dwelling ownership, and cell fixed effects.
The dependent variable is a binary indicator equal to 1 if the individual holds a death insurance policy, 0 otherwise. Coefficients represent percentage point changes in probability.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.16: Effect of Pension Delay on Household Saving Behaviors: Men vs. Women

	N. Saving Instruments	*Log Total Savings*	*Log Consumption*
	(1)	(2)	(3)
Main effect			
Male delay	-0.024	-0.007	-0.010
	(0.019)	(0.027)	(0.010)
Female delay	-0.028	-0.016	0.004
	(0.039)	(0.021)	(0.007)
Interaction with year (Male delay)			
× 2008	-0.020	-0.005	0.012
	(0.031)	(0.026)	(0.010)
× 2012	-0.053**	-0.003	0.014
	(0.021)	(0.030)	(0.010)
× 2014	-0.064***	-0.025	0.002
	(0.020)	(0.027)	(0.008)
× 2016	-0.001	-0.033	0.011
	(0.045)	(0.034)	(0.010)
Interaction with year (Female delay)			
× 2008	-0.020	-0.015	-0.001
	(0.036)	(0.037)	(0.013)
× 2012	0.010	0.010	-0.018
	(0.036)	(0.052)	(0.009)
× 2014	-0.009	0.060*	-0.020
	(0.040)	(0.033)	(0.012)
× 2016	0.018	-0.009	-0.029***
	(0.059)	(0.031)	(0.011)
Observations	4,186	4,186	4,186
R-squared	0.187	0.598	0.431
Clustered SE	Yes (cell_m_adj)	Yes (cell_m_adj)	Yes (cell_m_adj)

Notes: Coefficients are reported with robust standard errors (in parentheses), clustered at the cell level.
All regressions include year fixed effects, and controls for education, household size, geographic area, income and consumption quintiles, dwelling ownership, and cell fixed effects.
Coefficients in columns (2) and (3) can be interpreted approximately as percentage changes.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.