Retirement and the Demographic Transition: a Survey Experiment

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Abstract

Do people factor in information on the national pension system when formulating their retirement expectations? This paper, using a novel representative sample of working Italians aged between 15 and 75, induces an exogenous variation in information by exposing half of the sample to news about the pension system. I find that exposure to the information treatment increases expected retirement age. The effect is decreasing in prior beliefs and turns negative for people with high pre treatment expected retirement age, meaning that they react by *anticipating* their retirement. This happens because of the fear of unfavorable changes in eligibility that could come in the meantime. There is, on the other hand, no sizable effect on expected public pension benefits. The treatment also has a positive effect on expected spending growth over 12 months and a negative effect on actual spending, suggesting an increase in the precautionary saving as a result of the treatment, while there is no significant effect on private pension plan and life insurance holdings.

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"*No pension system is sustainable given today's demographic trends*"

— Giancarlo Giorgetti, Italy's Finance Minister, July 18, 2024

1 Introduction

Population is ageing and shrinking in Italy: according to ISTAT, the National Bureau of Statistics, residents will drop by 5 million in 2050 and by 14 million in 2080 in comparison with 2023. The age distribution (divided by gender in the demographic pyramids depicted in Figure 1) is expected to tilt towards older ages in the next decades. The dependence ratio - computed as the number of over-65 citizens as a share of the 15-64 years old population - will raise to 0.73 from today's 0.57 (Figure 2, top panel). At the same time, the economy has been sluggish in the last three decades: GDP grew by only 0.8% between 1990 and 2019, while the OECD average growth rate in the same period was 2.2% Figure 2, bottom panel).

The combination of slow economic growth and demographic decline - in particular the latter one - poses a great threat to the sustainability of the first pillar of the pension system. As in most advanced countries, Italy's social security is based on the pay-as-you-go principle (Franco 2002): each year, benefits are financed by payroll taxes paid by those who are currently working. This inter-generational pact hinges on two factors: the long run growth of the economy and demographic trends, again as pointed out by Franco (2002). Therefore, given Italy's disappointing figures on both dimensions, the sustainability of the National pension system is a compelling issue.

In this paper, I investigate how people's expectations about retirement change in response to an exogenous provision of information concerning the pension system. Using the novel Italian Survey of Consumer Expectations (ISCE), I provide different information treatments to two randomly formed halves of the sample, in order to observe if and how much people revise their beliefs on retirement age and their pension income when they become better informed on the financial hurdles of the welfare system. In the survey, questions on the planned retirement age and the expected replacement rate - the latter one being defined as the ratio between the first public pension income over the last working stipend - are asked to employed people after the treatment and in a probabilistic manner. Employed respondents are provided with real line intervals both for the age at which they plan to retire and for their expected replacement rate. They are then asked to assign a number between 0 and 100 to each of these intervals, with

the condition that all numbers add up to 100. For each individual in the survey, I obtain a subjective distribution for the planned retirement age and the expected replacement rate, of which I can compute the implied mean and standard deviation.

I find that providing information on the status of the National pension system causes treated respondents to revise their retirement expectations. The revision strongly depends on the age at which the respondent planned to retire before the treatment. More optimistic people, i.e., those who planned to retire below the age of 60, revise their beliefs by one year. On the other hand, those who already expected to retire very late (above the statutory old age requirement of 67 years of age) paradoxically reduce their planned working horizon. This result might be explained in two ways. First, they might be interpreted as evidence of political risk: individuals who initially desired to extend their career decide to anticipate retirement to avoid the risk of being involved in a pension reform that could reduce their benefits or force them to work longer than their initial plan.

Second, the misinformation about how the PAYGO system works. Most Italians, indeed, believe that National Social Security operates a fully funded scheme, in which contributions are invested by INPS and then paid back upon of retirement. This misunderstanding might explain the heterogeneity in the response of expected retirement age in the following way. A young worker might decide to work more years (and then postpone retirement) to accumulate enough resources for retirement because she must make up for the "poor management" of payroll taxes by the State. On the other hand, a person who would like to work more to "accumulate" more contributions and have a wealthier pension loses this incentive when she learns that, in any way, her public pension will not be what she expected. In other words, if the only reason why people plan to work beyond the statutory old age retirement of 67 years old is a higher benefit, learning about the troubled financial conditions of the pension system might make them change their mind.

I then look at the impact of the treatment on consumption and investment decisions following the treatment. Leveraging on the experiment, I estimate its impact on spending and expected consumption growth in the subsequent wave. I find that the treatment lowered actual spending and increased expected consumption growth over 12 months horizon. I read this result through the lens of the precautionary saving model (Jappelli and Pistaferri 2017): an extended working horizon entails a longer lifetime exposure to income risk, and so a stronger precautionary saving motive. This effect dominates the theoretical consumption response to an increase in permanent income due to higher lifetime labour earnings as opposed to pension benefits for the additional years of work. This happens because of the presence of a borrowing constraint, that prevents

individuals from financing current consumption with future income increases.

There is, on the other hand, no causal effect on the demand for private pension plans and life insurance, differently from what Jappelli et al. (2021) find. This result might be explained by the lack of financial literacy among the public. Italy is in fact one of the OECD countries with the lowest financial education levels (OECD 2023). Lack of financial literacy might "scare" investors and refrain from this kind of investment (Nieddu and Pandolfi 2021, Van Rooij et al. 2012, Davis et al. 2022). The second possible explanation is that the pension fund market in Italy is not as well developed as in the rest of advanced countries, and it's characterized by supply-side frictions. The third one is the high tax burden: high income and payroll tax rates crowd out private savings, making it impossible to buy a private pension insurance plan.

I then explore further heterogeneity dimensions for planned retirement age, spending and expected consumption growth. The causal effect is stronger for younger people (below 50 years of age), private sector workers, relatively less educated and poorer people, respectively without a college degree and a below-median net financial wealth.

Finally, following Coibion et al. (2021), I test whether the treatment had an impact on expectations on macro variables like GDP growth, unemployment inflation and interest rates on mortgages. The idea is that learning on the financial fragility of the pension system might convince treated individuals that either a financial crisis is more likely, or that the Government will put in place a fiscal consolidation plan, both with negative consequences on the real economy. Overall, I find no evidence that this is the case: the treatment only reduces mean expected inflation, proportionally to the prior belief.

Related Literature. Social security shapes individuals' working, saving and portfolio allocation decisions. Attanasio and Brugiavini (2003) and Bottazzi et al. (2006), leveraging on pension reforms implemented in Italy in the '90s, show that reducing the generosity of the system - both in terms of retirement age and entitlements – increases private savings and wealth. However, this replacement doesn't happen "one-to-one": every euro of lost public pension wealth is replaced by less than one euro in private wealth in contrast with the Permanent Income Hypothesis (Friedman 1957).

Jappelli et al. (2021) document the existence of a positive correlation between pension uncertainty and the demand for private social security. Recent evidence by Carta and De Philippis (2024), Bianchi et al. (2023) and Brunello et al. (2023) looks at the impact of an increase in statutory retirement age on labour supply and career dynamics. Leveraging on the 2011 pension reform as a natural experiment, they find that rising statutory retirement age induced women

to work more - both on the intensive and the extensive margin - and hindered job promotion opportunities for younger workers, especially in the slowest-growing businesses.

However, little is known on how subjective retirement expectations and spending decisions are influenced by actual knowledge over the PAYGO system and, in turn, how they influence investing and consumption decisions. The reason why this question has not been answered in the literature yet is the classical econometric concern of endogeneity. Indeed, retirement (and expectations on it) is linked to individuals' working histories, which are in major part endogenous, as the result of career choices (Guiso et al. 2002, Low et al. 2010 and Jappelli and Pistaferri 2017). Career choices, in turn, are linked to unobservable characteristics that are likely to be correlated with people's perception over their post-work life. Heterogeneity in risk aversion and in patience is the leading example of omitted variable in the consumption/household finance literature (see Fuchs-Schündeln and Schündeln 2005 and Christelis et al. 2024 more recently). More patient people might decide to work more to "earn" a higher pension benefit. On the other hand, risk aversion impacts investment decisions and portfolio allocations, that in turn impact how people believe they will provide for their old age. Here, instead, the randomized nature of the treatment induces an exogenous variation in retirement expectations, that is therefore uncorrelated with some other characteristics influencing old age beliefs as well.

Another limitation of the existing literature is the scant information on retirement expectations. Indeed, few existing datasets provide detailed individual and subjective distributions of planned retirement age and expected retirement rate. In the Italian context, Guiso et al. (2013) use a representative survey of Italian investors to elicit pension uncertainty. In the survey they use three questions that are asked. First, what is their expected replacement rate, defined the same way in which is defined in this paper. Second, what is the minimum value and third what is the maximum value. Assuming either a triangular or a uniform subjective distribution, they compute the implied standard deviation of the replacement rate for each individual, finding that it's correlated with age and job type and sector. A similar approach is followed by Jappelli et al. (2021). They use the 2016 SHIW wave, that asks the same type of questions as in Guiso et al. (2013) and find that pension uncertainty - measured by the subjective standard deviation of the replacement rate, computed in the same way, correlates positively with the probability of having a private pension plan. Both papers rely on a nontrivial distributional assumption that might lead to measurement error of retirement expectations and uncertainty: either a triangular or a uniform distribution. The novelty of this paper in this regard lies in asking about retirement in a probabilistic manner. The fact that each individual assigns a probability measure to a small interval on the line of natural numbers allows to get a more ac-

curate subjective distribution, that requires no a priori distributional assumption outside each bin. Indeed, mean and standard deviation of the distribution, as showed in Appendix C, can be computed using the formulas for the expected value, the variance and the standard deviation, only assuming that, within each bin, the probability mass is concentrated in the midpoint.

On top of the works mentioned above, this paper is related to those papers that answer to macroeconomic and household finance questions using survey experiments. Christelis et al. (2024) use a randomized assignment to hypothetical lottery wins, showing that wealth shocks increase stock holdings. Kumar et al. (2023) and Coibion et al. (2024) investigate the effects of GDP growth uncertainty on firms' investment and household expenditure respectively. The main finding is that macro uncertainty induces firms to invest less (especially in R%D) and households to engage more in precautionary saving. Coibion et al. (2023) study the effect of news about inflation expectations on consumption decisions using a representative survey of Duch households, documenting a positive effect on durable spending following the exogenously generated variation in inflation expectations. Coibion et al. (2023) looks at the impact of Fed's forward guidance on consumers' inflation and mortgage rates expectations, Georgarakos and Kenny (2022) document that an increase in people's perception of adequacy of the policies implemented during the COVID-19 pandemic by the European Authorities spurs durable consumption. Finally, Coibion et al. (2021) find that news about future Government's debt cause households to anticipate a large increase in inflation, both on a 12-months and a 10-years horizon. All the paper cited above elicit firms' and consumers' subjective expectations in a probabilistic manner: asking firms to assign a probability to some real line intervals. This paper is both in terms of methodology and topic related to the last paper, even though it addresses specifically a narrower type of fiscal sustainability problem: social security.

Outline of the Paper. The Paper continues as follows. Section 2 briefly describes the pension system in Italy, highlighting its sustainability issues. Section 3 describes the ISCE survey and the experimental design. Section 4 discusses the effects of the information treatment on retirement expectations, and shows that the treatment preserves its persistence in subsequent wave. Section 5 looks at the impact of the treatment on consumption and consumption expectation, leveraging on the experiment as a source of exogenous variation. Section 6 shows the heterogeneity of the results. Section 7 investigates the effects of the treatment on the subjective expectation on GDP growth, inflation and unemployment. Section 8 concludes.

2 The Italian Pension System

The Italian pension system has historically been extremely generous (Attanasio and Brugiavini 2003, Bottazzi et al. 2006, Guiso et al. 2013). Starting from the mid '60s, reforms were implemented that reduced the eligibility criteria and facilitated the access to retirement[1]. As a result, pension spending soared in the subsequent decades, accounting for a bigger share of national product. Indeed social security spending went from being just 5.3% of GDP in 1960 to 15.5% in 1986 (Galli and Masera, 1988). As a matter of fact, this astonishing increase in retirement-related spending is considered one of the main drivers of Italy's public debt rise in the 70's and the '80s (still Galli and Masera 1988).

During the '90s, many reforms were implemented to curb this upward trend. In 1992, the Amato[2] reform lowered pension benefits and raised eligible retirement age for workers who had accumulated as of as 1993 less than 15 years of contribution. This intervention was followed by a more stringent reform in 1995 that modified the algorithm used to compute pension benefits. The transition was from an earning-based formula, in which the benefit is proportional to the average income earned during the last years of work, to a contribution-based formula, for which benefits are proportional to all the payroll taxes paid during the entire working years. Given that typically wages are increasing in age and experience, this intervention entailed a massive reduction in benefits for younger cohorts of workers (Bottazzi et al. 2006).

The most important reform in recent years was implemented in 2011. The Fornero reform, named after the Labour Minister Elsa Fornero, raised retirement age to 67, and anchored it to average life expectancy. In alternative, women and men can retire, regardless of age, if they have accumulated at least 41 or 42 years of contribution respectively. As this paper is written, the Fornero reform set the prevailing rules for retirement nowadays in Italy.

In 2018 "Quota 100" was introduced. According to Q100, people could retire with at least 62 years of age and 38 years of contribution, a significantly more generous retirement regime than the Fornero one. Q100 was phased out in 2021, replaced by a slightly more stringent regime called Q102 (meaning $64 + 38$) for 2022 and abolished definitively in 2024.

Coming to our days, the pension system is one of the hottest topics in Italy's politics, making the headlines of newspapers every day, as the quote at the beginning of the paper certifies. And it's rightfully so, given the severe demographic crisis Italy is in, as showed by

[1] A famous reform is the Rumor reform, named after Prime Minister Mariano Rumor. The reform stated that public sector workers could retire as soon as the reached 15 years of contribution. This gave rise to the "baby retirees", i.e., people who stopped working at the age of 50, 40 or even younger. Anedoctical evidence can be found in the book Boeri and Rizzo (2020).

[2] Named after Prime Minister Giuliano Amato

Figure 1 and Figure 2, produced using ISTAT data. Pension spending accounts for roughly 15% of GDP and is expected to peak at 17% in 2045 (INPS 2024), making Italy's Social Security the most generous among OECD countries, as documented by OECD (2023).

3 The Survey and The Experimental Design

In this section I describe the how survey and the information treatment are conducted. Furthermore, I show some descriptive evidence. In the next sections, instead, I discuss the treatment effects. The experiment is run using the novel Italian Survey of Consumer Expectations (ISCE). Started in October 2023 (first wave), ISCE is a quarterly survey interviewing a rotating representative panel of 5000 Italians aged between 15 and 75. The survey asks questions on consumption and income expectations, as well as questions concerning retirement and expectations on macroeconomic variables like GDP growth, inflation, unemployment and interest rates. Guiso and Jappelli (2024a) and Guiso and Jappelli (2024b) provide a detailed description of the survey.

The Survey. The survey consists in the following sections, showed in Appendix A. In the first part, Section A, basic demographic information is asked, like age, gender, place of residence, education and employment. Section B asks income- and work-related questions. It asks about family and individual net monthly income. It also contains questions on perceived employment risk (for employed) and the job-finding probability (for unemployed or those looking for the first job). Section C is dedicated to household's wealth. It first asks whether respondents' families own the house they live in. Then, it asks about real and financial assets (real estate, bank accounts, bonds, stocks or equity funds, private insurance policies and pension plans) as well as debts. Section D asks about past months consumption. Not only total consumption, but also food consumption, utility bills and medical expenses. The question on past total spending is the following[3]

"Considering all your household's consumption (food and non-food consumption, rent expenses, mortgage/loan payments, insurance, utilities, ...), how much did you spend in [month]?"

- *€500 - €1000*
- *€1000 - €1500*
- *€1500 - €2000*

[3]Individual consumption is computed as the midpoint of the chosen interval

- *€2000 - €2500*
- *€2500 - €3000*
- *€3000 - €4000*
- *€4000 - €5000*
- *€5000 - €7500*
- *€7500 - €10000*
- *€10000 - €15000*
- *≥ €15000*

Section E deals with expectations and intentions. In this section, people are asked about how much their household net income and consumption will grow in a 12-month horizon. These questions are phrased in a probabilistic manner: respondents are provided with a series of growth rate intervals, and they assign a number between 0 and 100 to each of them. Of course, their sum must be 100. For concreteness, here the question on expected consumption growth is reported:

"In the next 12 months, you expect that your household's overall consumption, (consider ALL expenses: food in and out of the home, housing expenses, clothing, transportation, travel, vacations, etc., ...)"

- *will decrease by more than 8%*
- *will decrease between 6 and 8%*
- *will decrease between 4 and 6%*
- *will decrease between 2 and 4%*
- *will decrease between 0 and 2%*
- *will remain constant*
- *will decrease between 0 and 2%*
- *will decrease between 2 and 4%*
- *will decrease between 4 and 6%*
- *will decrease between 6 and 8%*
- *will increase by more than 8%*

Total.....100

This type of question allows to elicit a subjective distribution for the considered variable, i.e., a distribution for each individuals over the proposed intervals. The moments of these

subjective distributions might be computed very easily. Indeed, assuming that, within each bin, the probability mass is concentrated in the midpoint, the mean of the distribution is simply the weighted average of the midpoints using as weights the scores assigned by the respondent to each range. The variance, and the standard deviation are then computed applying the well known formulas, that are showed in Appendix B.

At this point in the third wave (April 2024), the sample is randomly split in two groups that I call C and T. Before continuing the survey, group T reads a small sentence sourced from the 2023 Annual INPS Report, the latest available at the time of the experiment. The sentence is the following:

"According to the latest Annual Report of INPS, the progressive ageing of the population, which increases the number of retirees and reduces the number of active workers, makes it increasingly difficult to finance pensions in all European countries, raising financial stability issues."

The aim of this treatment is twofold. First, its intention is to let people know that the Italian PAYGO has been struggling in the last decades due to the ageing of the population. The treatment, in the last part, also mentions that many European countries might face financial stability issues due to the increasing difficulty in financing social security. As discussed by Jappelli et al. (2021), pension risk is made by three components. The first is idiosyncratic income risk: people have different career paths and different working histories, some related to choices, some others related to unemployment or health shocks that are not under their control. Second, as discussed in the first introductory part, there are GDP growth and demographic projections in the long run. Third, there is the risk of changes in the regulation impacting both retirement age and retirement income. This treatment speaks to the last two sources of risk: the reference to "financial stability issues" points to both.

Group C doesn't read any sentence, but continues the survey without any additional information. After the treatment, two questions concerning retirement are asked. The former is on planned retirement age:

"At what age do you plan to retire?"

- *Before 58 of age*
- *Between 58 and 60*
- *Between 60 and 62*

- *Between 62 and 64*
- *Between 64 and 66*
- *Between 66 and 68*
- *Between 68 and 70*
- *Over 72*

Total.....100

The latter is on the public replacement rate, defined in the question as the ratio between the public pension check and labour earnings. Respondents are asked to exclude retirement incomes that might come from sources other than the Government, to deal with the fact that many people in the sample have private pension plans they will from earn once retired. The phrasing of the question is:

"Think about when you will retire and consider only the public pension, i.e., exclude any pension funds and supplementary pensions. What percentage of your earned income will the government pension represent? "

- *Less than 40% of your last salary before retirement*
- *Between 40 and 50% of the last salary received before retirement*
- *Between 50 and 60% of the last salary received before retirement*
- *Between 60 and 70% of the last salary received before retirement*
- *Between 70 and 80% of the last salary received before retirement*
- *Between 80 and 90% of the last salary received before retirement*
- *Between 90 and 100% of the last salary received before retirement*

Total.....100

The last section of the survey contains questions on macroeconomic expectations. Respondents are asked to make a prediction on the GDP growth rate and the national unemployment rate in the next 12 months. The phrasing of these questions is exactly analogous to the previous ones and therefore not reported for brevity (the whole questionnaire might be found in Appendix A).

Descriptive Evidence. Table 1 shows the summary statistics and offers a comparison with the 2022 Bank of Italy's SHIW, the latest available. Both surveys include employed people aged

between 15 and 75. Sample weights are used in both surveys. Overall ISCE does a good job in terms of representatives. The average age is about 44-45 years old, 58 percent of the respondents are male and about one half are married. One third of the sample lives in the South (and on Islands), while one half of the sample is surveyed in the North. Education levels look fairly in line with the 2022 SHIW: 27 percent of the sample holds a Master Degree or more, exactly as in SHIW. Interestingly enough, in ISCE people report an expected replacement rate of 61 percent (65 in SHIW), while planned retirement age is similar in both surveys: 66 years old. The sample size I use is of 2800 people instead of the total panel of 5000 because the questions concerning retirement are only asked to those employed people in ISCE.

Table 2, on the other hand, shows the summary statistics for treated and controls. As in every RCT, it's important to make sure that the sample was actually split randomly. To see this, I perform a balance test. If the two groups are truly randomly formed, there should be no differences in means in major observable characteristics between the two groups. This is exactly the case. The only variable that appears to be different in the mean between the two groups is family size. This occurs in Guiso and Jappelli (2024a)'s randomization as well. However, even if significant at the 1 percent, the difference in means is only 0.10, therefore of no actual significance whatsoever. Therefore, I can safely conclude that the randomization worked well and that the treatment really captures the causal effect of the information provision.

Figure 3 shows that the empirical distribution of the treated group lies completely above the one of the controls. In other words, there is a clear first order stochastic dominance of the controls over the treated. This implies that, on average, the treatment managed to shift the expected replacement rate of the treated to the left, as they assign less probability weight to higher values. However, the shift is not homogeneous across all values: there are some points in which the two CDFs coincide. This fact might speak to the heterogeneity of the results, both in terms of age and in terms of the prior belief. A similar argument goes for Figure 4: here, the two distributions are practically unchanged, suggesting that the average effect is negligible. However, there could be heterogeneous effects of the treatment as well. In both cases I am going to show that it's the case.

Figure 5 shows the pooled distribution of expected retirement years. The decade in which people are going the retire the most in the sample is 2040. A little back of the envelope calculation explains why. The average Italian working population is about 45, Table 2 shows. Assuming that these workers will have a continuous career path, they will, under the current regulation, retire in about 20 year, i.e., between 2040 and 2050. These are the two decades in which pension spending is predicted to peak (as said in Section 2) and, at the same time, the

decades with the sharpest contraction in the average replacement rates.

Figure 6 compares subjective expectations elicited from the survey and Italy Finance Ministry forecasts by decade of retirement. To compute the decade of retirement, I sum the expected retirement age to the year of birth, in turn obtained by subtracting age from 2024, i.e., the year of the survey. The left panel offers the comparison for private employees, while the right panel for self-employed. A striking evidence emerges: while self-employed tend to overestimate their public retirement age, employees severely underestimate it.

Another interesting fact to notice is that retirement age and replacement rates are strongly inversely related. Figure 7 shows the correlation between the implied means of the expected retirement age and the replacement rate. This correlation is strong both in the second and in the third wave. Figure 8, on the other hand, shows the correlation between the implied second moments of the same variables. There is a strong positive correlation in both waves. This relation implies that if a person is subjectively uncertain over the age at which she will retire, she is also, on average, uncertain on the replacement rate. I interpret this fact as evidence of political pension risk attached to the pension system. The intuition is the following: in principle, if I know for sure the age at which I will retire, I might be more confident on the pension regime I will be eligible for. If I am uncertain on when I will retire, because there is policy uncertainty on pension rules, then also my pension will arguably be uncertain.

The above intuition is also confirmed by looking at how the implied moments of the subjective distributions correlate with age. Figure 9 shows that the first moment of the retirement age and replacement rate covary negatively and positively with age. In other words, younger people both expect to work more and receive a less generous pension. Figure 10 shows the correlation between the second moments and age: they are both negative: people closer to retirement are fairly certain about when they will retire and how much their public pension will be.

Retirement expectations are arguably connected with employment risk and income risk. (again Jappelli et al. 2021). The data propose three measures of income risk. The first one is a "subjective" measure, elicited by means of a question in which the respondent has to rate from 0 to 10 the chances of keeping her job in the next 12 months[4]. The second, is a more objective measure, whether the respondent is a public employee or a self-employed. As argued by Fuchs-Schündeln and Schündeln (2005), public employment is much safer than private employment, that's why it could be seen as a measure of employment risk. The third, is the implied standard deviation of the expected income growth over a 12 months horizon, computed in the way outlined above and detailed in Appendix A. Of course, all these three

[4]This question is asked only to employed people, exactly as the retirement expectations questions

measures as a result of a choice, so its relation with retirement expectations must be views as a simple correlation in absence of a well identified shock to employment risk, which has proven rather hard to find[5]. Figure 11 shows that there is a clear correlation between retirement expectations and subjective employment risk. In other words, people understand that loosing their job would be extremely harmful not only in the short term, but also in the long term, as a fragmented career would surely make them work longer to reach the eligibility criteria for retirement and earn a lower replacement rate.

Another important correlation to look at is the one between retirement expectations and today's consumption decisions. Do people who expect to work more consume less? From a theoretical perspective, the impact of a higher expected retirement age is ambiguous. On the one hand, working for more years means a higher permanent income, since working income is surely higher than pension benefits. This might lead to an increase in consumption, according to the permanent income hypothesis (Friedman 1957). On the other hand, a longer working horizon entails a longer lifetime exposure to income risk. This might induce to consume less as the precautionary saving motive becomes stronger. Again, simply looking at a bin-scatter of consumption variables and retirement expectations is useful. This is what Figure 12 is about: the top-left panel shows a strong negative correlation between consumption (in log) and the first moment of the implied mean of expected retirement age. On the other hand, the bottom-left panel shows a positive correlation between expected consumption growth (in 12 months) and expected retirement age. The correlation between the two consumption measures and the expected replacement rate is not as strong as the former ones. Even though they cannot be interpreted casually, these correlations might be evidence that the latter effect dominates the former. The intuition for this result lies in the presence of borrowing constraints: people do not immediately spend the increase in their lifetime income, as they cannot borrow against it. As showed in Jappelli and Pistaferri (2017), the presence of borrowing constraints not only changes the sensitivity of consumption to income shocks, but also makes the actual timing of the increase relevant, as people are not allowed to finance current consumption with future income increases. Notice that both binscatters (i.e., those in the left column) show residualized data, i.e., after controlling for expected income growth and expected squared consumption growth, the typical regressors of an empirical test of the Euler Equation and excess sensitivity of consumption to anticipated income changes (see Jappelli and Pistaferri 2010 and Sciacchetano 2024).

The tacking stock of this first look at the data suggest that there is sizable heterogeneity in retirement expectations over age, as elder individuals are generally speaking more optimistic

[5]See Jappelli and Pistaferri 2017 for a review of both the empirical and theoretical literature on income and unemployment risk.

that younger ones. In the next section, I investigate the role of the information treatment in changing people's beliefs.

4 Treatment Effects

Baseline. Given that the treatment is randomized, is by construction uncorrelated with individual observable and unobservable characteristics. Therefore OLS is going to give an unbiased estimate of the treatment effect. Using only the wave in which the experiment is carried out, I estimate the following equations:

$$Ret\ Age_i^j = \alpha + \gamma Prior_i^j + \beta Treat_i + \delta Treat_i \times Prior_i^j + \varphi \mathbf{X}_i' + \varepsilon_i \tag{1}$$

$$Rep\ Rate_i^j = \alpha + \gamma Prior_i^j + \beta Treat_i + \delta Treat_i \times Prior_i^j + \varphi \mathbf{X}_i' + \varepsilon_i \tag{2}$$

In equations (1) and (2), the outcome variables are either the first or the second moment of the two subjective distributions: $j \in \{mean, std\}$. $Prior_j$[6] is the corresponding moment in the second wave, i.e., the one before the treatment. The coefficients γs represent the importance of the prior belief. They should be positive, since it's sensible to think that, at least on average, there is consistency over time in retirement expectations. They do not need to be 1 because prior expectations refer to three months before the experiment and it's possible that they changed prior the treatment for reasons unrelated to the treatment[7].

The coefficients βs are the main effect of the treatment on the outcome variable. They could be positive or negative. I expect the coefficient in equation (1) to be positive: arguably learning bad news about the pension system could make people think that they will retire later. On the other hand, I expect the coefficient for (2) to be negative. The δs inform on how the main effect varies with the prior belief. This interaction might be viewed in two ways. First, in a Bayesian learning perspective (Coibion et al. 2023), is the weight attached to the prior belief. Second, it might be seen as an heterogeneous treatment effect (Cunningham 2021). According to the first point of view, the estimated δs should be negative: if the treatment is somewhat successful in creating a variation in the expectations, the individual should assign a lower weight to the prior belief. From the point of view of heterogeneous treatment effects, it should be negative as well.

[6] In Appendix C I also look at other measures of uncertainty such as the squared mean, the variance and the coefficient of variation, defined as the standard deviation over the mean. Results are in Table C1 and Table C2.

[7] My setting differs from Kumar et al. (2023) and Coibion et al. (2024), in which prior and posterior beliefs are elicited within the *same* survey, but using different questions. Instead, here prior and posterior beliefs are elicited using the *same* question, but asked three months later. This addresses the concern of survey fatigue coming from asking two very similar questions in a few minutes.

Intuitively, if a person already has a high planned retirement age, the treatment should have little effect, surely smaller than the effect on a "more optimistic" household. Finally, $\mathbf{X}_i$ is a vector of individual controls. Given that the treatment is randomized, it's uncorrelated with any of these observable characteristics, therefore the estimated coefficients should change little with their introduction. Nevertheless, I include them to improve the precision of the estimates.

Table 3 shows the OLS estimates of equation (1). In Panel A, the dependent variable is the mean expected retirement age, i.e., the implied mean of the subjective distribution of the expected retirement age. Panel B, on the other hand, shows the result for the implied standard deviation. Column 1 shows the simplest possible regression, in which the only regressor is the treatment dummy. Column 2 also includes the prior belief, but not its interaction with the treatment. Columns 3 and 4 show the saturated equation, with and without controls respectively. The main effect of the treatment to mean expected retirement age is around 7 years. This of course is not the total effect, that also include the interaction between the prior and the treatment. Consistently from the above discussion, its coefficient is negative, and the coefficient attached to the prior is positive and significant at 1 percent. Following the Bayesian learning approach, the sum $\gamma+\delta$ represents the weight that the treated individuals still attaches to the prior belief after the treatment. This sum is slightly more than 0.50. This means that the experiment managed to induce some variation in retirement expectations: after the treatment, the weight attached to the prior belief goes from 1 (by construction) to 56 percent, suggesting that 44 percent of the weight is attached to the signal of the information treatment.

The main effect of the standard deviation is not statistically significant even at 10 percent. while the interaction terms is statistically significant at this level. As discussed above, the introduction of the controls makes little difference in terms of the estimated coefficients. Finally Column 5 includes in the sample also the fourth wave. The effect on the mean expected retirement age is still positive and statistically different from 0, even though somewhat smaller.

A further comment is needed to interpret the results in Panel A of Table 3. Figure 13 shows the total effect as a function of the prior belief. The tacking stock of this graph is of course not the linear shape, which is by construction, but the fact that for very high levels of expected prior retirement age, the effect is *negative*. This result is at a first glance counterintuitive. However, it's worth stressing that the age at which individuals plan to retire is endogenous as well argued by Battistin et al. (2009), Kolsrud et al. (2024) and Olafsson and Pagel (2024): people might decide to work beyond the moment when they become eligible for retirement. Moreover, the prior belief tells about people's preferences and working histories: an individual who expects to retire at 59, for instance, is a person who started working very early and plans

to work until she accrues 41/42 years of contributions, which is, as of today, the minimum to access the seniority pension in Italy. What these people learn from the treatment is that they will be required to work more as they conjecture that retirement age/contributions will increase at some point of their working career. On the other hand, a person who expects to retire older than 67, the old-age retirement threshold, perhaps wants to work more because she wants to earn a more generous pension check. However, the treatment "scares" these people that this decision will entail a loss in the pension, given that there is the risk that the regime might change for the worst by the time they want to retire. Therefore, they respond by anticipating their retirement, as the expected benefits of postponing it become lower than the expected benefits. Evidence in favor of this argument is that the total effect is 0 exactly around 67, i.e., the old age threshold. In other words, who expected to retire at old age before the treatment has no incentive to revise their expectations. Moreover the positive region is much bigger than the negative region: for most values of the prior, the effect is positive and sizable, especially for those who expected to retire below 60 years-old.

Table 4 shows the OLS estimates for (2). Differently from the retirement age, the experiment has not been successful at creating any variation in the subjective distribution of the expected replacement rate.

Triple DD. Equations (1) and (2) are estimated using data from the third wave only, not fully exploiting the panel dimension of dataset. As a robustness, I also take advantage of the panel by estimating a triple DD. The idea is to compare treated among themselves according to their prior belief, controlling for time and individual fixed effects. I estimate the following equations:

$$\begin{aligned} Ret\ Age_{it}^{j} &= \beta Treat_i \times Post_t + \gamma Treat_i \times Post_t \times Prior_i^{j} \\ &+ \sum_k \iota_k Prior_i^{j} \times \mathbf{I}\{t = k\} + \alpha_i + \lambda_t + \varepsilon_{it} \end{aligned} \tag{3}$$

$$\begin{aligned} Rep\ Rate_{it}^{j} &= \beta Treat_i \times Post_t + \gamma Treat_i \times Post_t \times Prior_i^{j} \\ &+ \sum_k \iota_k Prior_i^{j} \times \mathbf{I}\{t = k\} + \alpha_i + \lambda_t + \varepsilon_{it} \end{aligned} \tag{4}$$

Table 5 shows the estimated results. The first two columns look at the implied mean, while the last two the implied standard deviation. Panel A shows the results for the expected retirement age, while Panel B for the replacement rate. Results are very close to the baseline: the main effect on the main expected retirement age is of 7 years in considering up to the

third wave, while is equal to 6 years if also the fourth wave is included. The effect is small and not statistically different from 0 for the implied standard deviation and not statistically insignificant for both moments of the expected replacement.

5 Expected Consumption Growth and Spending

As argued in Section 3, working for a longer period might entail a larger lifetime exposure to income risk and employment risk. Figure 10 shows a negative correlation with past consumption and a positive correlation with expected consumption growth. In this section, leveraging on the experiment, I substantiate these correlations with a casual claim. In order to do this, I estimate the following reduced form equations.

$$Y_i = \alpha + \beta Treat_i + \gamma Treat_i \times Prior\ Ret\ Age_i + \delta Prior\ Ret\ Age_i + \varphi \mathbf{X}_i' + \varepsilon_i \tag{5}$$

Where $Y_i \in \{\log(c_{i,4}), \mathbf{E}_4[\Delta c_{i,12m}], Private\ Pension_{i,4}, Life\ Insurance_{i,4}\}$. In equation (5), the LHS variables refer to the fourth wave, the one after the treatment. Log of consumption refers to the month preceding the fourth wave, i.e., October 2024. Both regressions resemble the reduced form evidence by Coibion et al. (2024), in which consumption (one period ahead) is regressed against the treatment and its interaction with the prior belief. The effect on spending choices may be estimated by means of a triple DD, as done above, excluding the third wave, when the experiment is performed. The reason for the exclusion of the third wave is that, in the survey, the questions on consumption are asked *before* the treatment, and so there must be no effect of the treatment. The equation is:

$$\begin{aligned} Y_{it} &= \beta Treat_i \times Post_t + \gamma Treat_i \times Post_t \times Prior\ Ret\ Age_i \\ &+ \sum_k \iota_k Prior\ Ret\ Age_i \times \mathbf{I}\{t = k\} + \alpha_i + \lambda_t + \varepsilon_{it} \end{aligned} \tag{6}$$

Table 6 and Table 7 show the estimated coefficients for (5) for the four variables outlined above. There is a positive main effect on expected consumption growth in the next period, counteracted by the negative coefficient attached to the interaction between the treatment dummy and the prior belief, while the signs are the opposite for actual spending (in log). Adding controls changes only by little the estimated coefficients.

The effect on private pension and life insurance plans is positive but not significant at 10 percent. Many factors could hide behind this result. First, the relatively limited time elapsed

between the treatment and the subsequent wave: 3 months. It might be that these people are in fact looking for an alternative to National Social Security, but have not purchased any package yet. Alternatively, it could be that the low average level of financial education holds survey respondents from actually engaging in the private insurance market. People might see private pension plans as risky, or do not have the necessary financial skills for properly managing these instruments (Nieddu and Pandolfi 2021). Davis et al. (2022) shows that the low financial literacy might be a barrier to the purchase of annuities. Moreover, Van Rooij et al. (2012) document a positive correlation between financial literacy and net worth, controlling for demographic characteristics affecting wealth.

The last explanation I propose is a supply-side bottleneck. Italy's pension fund market is underdeveloped compared to its European peers. In other words, even though people might want to purchase a private insurance/private pension plan, they in practice cannot because they face both informational and market frictions.

Finally, Table 8 shows the triple DD estimated results. They are very close to those in the two preceding tables.

As before, to make sense of the total effect of the treatment, in Figure 14 I plot it as a function of prior mean expected retirement age, both for expected consumption growth (left axis) and log of actual spending (right axis). For those who expect to retire relatively early (below 60 years old), the effect is quite substantial for both outcomes: it's overall positive for expected consumption growth and negative for actual spending. In other words, the treatment manages to change individual's saving plans: people decide to postpone their consumption and save more in the present.

So far, I have described reduced form evidence of the treatment effect. Table 9 shows the 2SLS results, in which the LHS variables are regressed against the after-treatment expected retirement age, instrumented by meas of equation (1). Even though the signs of the coefficients are of the same interpretation as the effects in Figure 12, the F-stat of the excluded instruments (the treatment dummy and its interaction with the prior) is below the commonly accepted standards for relevance. Therefore, these 2SLS must be taken with caution.

6 Heterogeneity

The results showed so far mask noticeable heterogeneity among relevant economic and demographic dimensions. Table 10 performs split-sample regressions for the three main dependent variables considered so far: expected retirement age, expected consumption growth and actual

spending (in log). The first dimension I look at is age: the treatment effect is significant only for those below 50 years old for all the three considered variables. Moreover, while expected retirement age increases more for treated individuals living in the North as opposed to the rest of Italy, the effect on the two spending measures are not statistically significant for the latter ones. The third dimension I look at is public against private sector. As argued in Section 3, public employment is an inverse measure of income risk. Therefore, it's interesting to look at how this affects retirement expectations and saving decisions. The effect, for all three variables, is significant only for those working in the private sector. The intuition for this result is that the absence of employment risk for public employees allows them to smooth consumption more easily than private sector workers. Then I look at financial literacy. Following the approach by Lusardi (2008) and Lusardi and Mitchell (2011), I measure financial literacy in the survey by asking three questions on basic financial notions. The first question asks about the compound interest rate, the second on the difference between nominal and real variable and the third on portfolio diversification. These three questions are asked at the end of the interview and are the following.

"Imagine leaving $100 in a bank account that yields an interest rate of 2 % per year and has no fees. After 5 years, how much do you imagine the amount available is?"

- ***More than 102 euros***
- *Exactly 102 euros*
- *Less than 102 euros*
- *I don't know*
- *I'd rather not answer*

"Suppose you leave 1,000 euro in a checking account that yields an interest rate of 1 percent and has no management fees. Imagine, too, that inflation is 2 percent. Do you think that, in a year's time, when you withdraw the money, you will be able to buy the same amount of goods that you could buy by spending the 1,000 euros today?"

- *Yes*
- ***No, I will be able to buy a smaller quantity***
- *No, I will be able to buy a larger quantity*
- *I don't know*
- *I'd rather not answer*

"In your opinion, does buying shares in a single company usually provide a more secure return than buying shares in multiple companies through a mutual fund?"

- *True*
- ***False***
- *I don't know*
- *I'd rather not answer*

The financial literacy score is the sum of the correct answers these three questions, and therefore ranges from 0 to 3. I consider *"I don't know"* and *"I'd rather not answer"* as wrong answers. I split the sample in those with a score less than 2 and greater or equal than 2. I find the effects are significant only for people with a relatively low financial education.

People with higher financial literacy also have a higher wealth (Van Rooij et al. 2012). Therefore, as a final dimension of heterogeneity, I look at wealth: above versus below the median. The effect is significant only for those individuals with a financial wealth lower than the 50th percentile of €140K.

7 Macro Expectations

Coibion et al. (2021) look at the causal effect of information on public debt and interest payments in the US on inflation expectations. Their idea is that when people learn about the deteriorating situation of the fiscal sector, they might raise inflation expectations both in the short and in the long run, as they might believe that the Government will try to pay the debt back by means of inflation. This is one of the direct implications of the Fiscal Theory of the Price Level (Cochrane 2023), and has recently been tested by Hazell and Hobler (2024).

In the context of this paper, the treatment stresses that the complicated situation of the pension system might cause financial stability problem. It's therefore interesting if treated people change their macro expectations after the treatment. They might indeed think a financial crisis more likely, or anticipate a fiscal consolidation plan in the next budget law. Both would result is a contraction of economic activities, with rising unemployment and decreasing GDP growth. To test this hypothesis, I estimate the following linear equation by OLS:

$$Macro_i^j = \alpha + \beta Treat_i + \gamma Treat_i \times Prior\ Macro_i^j + \delta Prior\ Macro_i^j + \varepsilon_i \tag{7}$$

Where $Macro_i^j$ is GDP growth, unemployment rate, inflation and interest rates on mortgages in a 12 months horizon; while $j \in \{mean, std\}$ as before. Results are in reported in Table

11. Overall, there are no significant effects, apart from mean expected inflation, reported in Panel A column 3. Indeed, while the main effect is not statistically distinguishable from 0, the coefficient of the interaction between the prior and the treatment dummy is negative and significant at 5 percent.

8 Conclusion and Policy Implications

This paper is the first to look at how information on the pensions system influences retirement expectations, consumption and investment decisions. I find that respondents who received the information treatment update their planned retirement age in a way that depends on what they expected before the treatment. Treated individuals that expected to retire relatively early extend their planned working horizon, spend less, and defer consumption to the future. On the other hand, individuals with already high expected retirement age decide to anticipate it to avoid the risk of pension reform that either reduce benefit or increase retirement age beyond the planned one. These effects are stronger for younger individuals, private sector workers and relatively less educated and poorer survey respondents, i.e., with no college education and below-median net financial wealth. In contrast to previous empirical evidence, there is no sizable impact on the demand for private pension plans. This last result sparks further research questions and makes a very policy relevant point. Why only few Italians hold a private pension plan, and why doesn't the treatment have any effect? One possible answer might be a limitation of this paper: it's difficult to see a sizable and statistically significant effect three months after the treatment. Perhaps supply-side frictions might be responsible for such a low participation in the market: the private insurance market is not as well as developed in Italy as in other European Countries, not to mention the UK and the US. Finally, financial education plays an important role. The Italian population is among the lowest financially educated in the advanced world. It might be that little knowledge of the financial markets and pension funds is what discourages Italians from participating to the market.

Either is demand or supply, further research must be done to unravel the very complicated situation of National PAYGO systems.

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Tables

Table 1: Summary Statistics and Comparison between ISCE and SHIW 2022

	ISCE Wave 1		**SHIW 2022**	
	Mean	Std. Dev	Mean	Std. Dev
Age	44.34	10.92	45.53	11.63
Male	0.58	0.49	0.58	0.49
Married	0.53	0.50	0.58	0.49
Family Size	2.86	1.14	3.07	1.25
Working members	1.91	0.97	1.85	0.78
South	0.32	0.47	0.27	0.44
Centre	0.21	0.41	0.21	0.40
North	0.47	0.50	0.52	0.50
Primary Education	0.33	0.47	0.34	0.47
Secondary Education	0.42	0.49	0.39	0.49
Tertiary Education	0.25	0.44	0.27	0.45
Employee	0.84	0.37	0.75	0.43
Public sector	0.20	0.40	0.21	0.40
Unemployment risk	0.17	0.24	0.16	0.29
Net Individual Earnings	1.79	0.38	1.87	2.62
Home owner	0.78	0.42	0.81	0.39
Pension Replacement Rate (expected)	60.97	16.39	65.23	18.50
Retirement Age (expected)	65.70	3.87	66.06	4.32

This table compares the ISCE survey with SHIW 2022 for the subsample of employed individuals aged between 15 and 75. Sample weight are used in both surveys. Overall, ISCE does a very good job in terms of representatives compared to SHIW.

Table 2: Balance Test between Treated and Controls

	Controls	Treated	Difference (Std. Error)
Age	44.04	44.04	-0.01 (0.47)
Male	0.56	0.57	-0.01 (0.02)
Married	0.51	0.53	-0.02 (0.02)
Family size	2.91	2.80	0.11*** (0.05)
Working members	1.91	1.89	0.02 (0.04)
Home owner	0.78	0.78	-0.00 (0.02)
South	0.31	0.33	-0.02 (0.02)
Centre	0.21	0.20	0.02 (0.02)
North	0.48	0.48	-0.00 (0.02)
Primary Education	0.29	0.30	-0.00 (0.02)
Secondary Education	0.41	0.41	0.00 (0.02)
Tertiary Education	0.30	0.30	0.00 (0.02)
Employee	0.83	0.84	-0.01 (0.02)
Public Sector	0.20	0.20	-0.00 (0.02)
Unemployment risk	0.16	0.17	-0.01 (0.01)
Expected Replacement Rate	61.44	60.33	1.11 (0.71)
Expected Retirement Age	65.80	65.76	0.04 (0.18)
Expected Spending Growth	0.81	0.90	-0.09 (0.17)
Expected Earnings Growth	-0.67	-0.49	-0.19 (0.15)
Total Wealth (in '000€)	180.990	180.625	0.364 (0.844)
Individual net monthly earnings	1854.53	1855.00	-0.47 (16.88)
Monthly Spending	1486.52	1519.64	-33.12 (65.79)

This table compares the treatment and the control group across a set of observable characteristics in the wave before the treatment. The last column shows the differences in mean between the two groups. The stars indicate statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: The Effect on the Expected Retirement Age

	(1)	(2)	(3)	(4)	(5)
Panel A: Implied Mean					
T	0.07	0.13	8.10***	8.08***	6.81***
	(0.16)	(0.14)	(2.78)	(2.72)	(1.94)
T X Prior			-0.12***	-0.12***	-0.10***
			(0.04)	(0.04)	(0.03)
Prior		0.65***	0.71***	0.67***	0.70***
		(0.02)	(0.03)	(0.03)	(0.02)
Observations	2438	1883	1883	1883	3500
Baseline	65.76	65.76	65.76	65.76	65.76
Panel B: Implied Standard Deviation					
T	-0.04	-0.05	0.09	0.10	0.09*
	(0.06)	(0.06)	(0.07)	(0.08)	(0.05)
T X Prior			-0.10*	-0.10*	-0.10**
			(0.06)	(0.06)	(0.04)
Prior		0.49***	0.54***	0.54***	0.53***
		(0.03)	(0.04)	(0.04)	(0.03)
Observations	2438	1883	1883	1883	3500
Baseline	1.38	1.38	1.38	1.38	1.38
Controls	No	No	No	Yes	Yes
Waves	3	3	3	3	3 and 4

This Table shows the OLS estimates of equation (1). The dependent variable is either the implied mean or the implied standard deviation of the subjective distribution of the expected retirement age, defined as the age i plans to stop working. $Treat_i$ is a dummy equal to 1 if i received the information treatment. $Prior_i$ is the corresponding moment in wave 1. Standard errors clustered at the individual level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: The Effect on the Expected Replacement Rate

	(1)	(2)	(3)	(4)	(5)
Panel A: Implied Mean					
T	-0.70	-0.30	-3.43	-1.73	-1.55
	(0.61)	(0.67)	(2.88)	(2.11)	(2.11)
T X Prior			0.05	0.03	0.02
			(0.05)	(0.03)	(0.03)
Prior		0.41***	0.39***	0.41***	0.39***
		(0.02)	(0.03)	(0.02)	(0.02)
Observations	2743	1900	1900	3532	3532
Baseline	61.20	61.20	61.20	61.20	61.20
Panel B: Implied Standard Deviation					
T	-0.23	0.16	0.21	0.21	0.15
	(0.28)	(0.29)	(0.40)	(0.40)	(0.29)
T X Prior			-0.01	-0.00	-0.02
			(0.05)	(0.05)	(0.04)
Prior		0.50***	0.50***	0.50***	0.51***
		(0.02)	(0.03)	(0.03)	(0.02)
Observations	2499	1599	1599	1599	2975
Baseline	7.25	7.25	7.25	7.25	7.25
Controls	No	No	No	Yes	Yes
Waves	3	3	3	3	3 and 4

This Table shows the OLS estimates of equation (2). The dependent variable is either the implied mean or the implied standard deviation of the subjective distribution of the expected replacement rate, defined as the expected ratio between the first pension check and the last working income. $Treat_i$ is a dummy equal to 1 if i received the information treatment. $Prior_i$ is the corresponding moment in wave 1. Standard errors clustered at the individual level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Triple DD

	Implied Mean		Implied Std. Dev.	
	(1)	(2)	(3)	(4)
Panel A: Expected Retirement Age				
T X Post	8.06***	6.82***	0.09	0.09
	(2.78)	(2.42)	(0.07)	(0.06)
T X Post X Prior Mean	-0.12***	-0.10***		
	(0.04)	(0.04)		
T X Post X Prior Std. Dev.			-0.11*	-0.10**
			(0.06)	(0.05)
Observations	5428	7045	5428	7045
Baseline	65.76	65.76	1.38	1.38
Panel B: Expected Replacement Rate				
T X Post	-2.56	-1.22	0.20	0.14
	(2.79)	(2.40)	(0.39)	(0.32)
T X Post X Prior Mean	0.04	0.02		
	(0.04)	(0.04)		
T X Post X Prior Std. Dev.			-0.01	-0.02
			(0.05)	(0.04)
Observations	5695	7327	5077	6453
Baseline	61.20	61.20	7.25	7.25
Waves	3	3 and 4	3	3 and 4

This Table shows the OLS estimates of equations (3) and (4). Regressions include the interaction between the prior and the time dummy. Standard errors clustered at the individual level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Treatment Effect on Consumption

	$\mathbf{E}_4[\Delta c_{i,12m}]$		$\log(c_4)$	
	(1)	(2)	(3)	(4)
T	8.95***	9.08***	-1.15**	-0.82**
	(3.17)	(3.14)	(0.45)	(0.42)
T X Prior Mean Ret. Age.	-0.13***	-0.13***	0.02**	0.01**
	(0.05)	(0.05)	(0.01)	(0.01)
Prior Mean Ret. Age.	0.09***	0.08**	-0.02***	-0.01*
	(0.03)	(0.03)	(0.01)	(0.00)
Observations	1617	1617	1617	1617
Baseline	0.73	0.73	1534.13	1534.13
Controls	No	Yes	Yes	Yes

This Table shows the OLS estimation results of equation (5) for expected consumption growth (columns 1 and 2) and log of consumption (3 and 4). Standard errors clustered at the individual level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Treatment Effect on Private Pension and Life Insurance

	Private Pension		Life Insurance	
	(1)	(2)	(3)	(4)
T	0.21	0.33	0.48	0.64
	(0.39)	(0.38)	(0.41)	(0.40)
T X Prior Mean Ret. Age	-0.00	-0.00	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Prior Mean Ret. Age	-0.00	-0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Observations	1617	1617	1617	1617
Baseline	0.30	0.30	0.30	0.30
Controls	No	Yes	Yes	Yes

This Table shows the OLS estimation results of equation (5). The dependent variable is a dummy equal to 1 if i has a private pension plan (columns 1 and 2) or a dummy if i has a private life insurance (column 3 and 4). Standard errors clustered at the individual level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Triple DD

	$\mathbf{E}_4[\Delta c_{i,12m}]$	$\log c_4$	Private Pension	Life Insurance
	(1)	(2)	(3)	(4)
Treat X Post	10.99***	-0.91**	-0.14	-0.24
	(3.75)	(0.42)	(0.26)	(0.29)
Treat X Post X Prior Ret. Age	-0.17***	0.01**	0.00	0.00
	(0.06)	(0.01)	(0.00)	(0.00)
Observations	5123	5123	5123	5123

This Table shows the OLS estimation results of equation (6). The dependent variables are indicated on top of each column. Standard errors clustered at the individual level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: 2SLS

	First Stage	$\mathbf{E}_4[\Delta c_{i,12m}]$	$\log c_4$	Private Pension	Life Insurance
	(1)	(2)	(3)	(4)	(5)
Expected Retirement Age		1.18**	-0.15**	0.04	0.06
		(0.57)	(0.07)	(0.05)	(0.06)
T	7.99***				
	(2.95)				
T X Prior	-0.12***				
	(0.04)				
Prior	0.72***	-0.76**	0.09*	-0.03	-0.04
	(0.03)	(0.39)	(0.05)	(0.03)	(0.04)
Observations	1617	1617	1617	1617	1617
F-test instruments	3.81				

This Table shows the 2SLS estimation results of equation (6). The dependent variables are indicated on top of each column. Standard errors clustered at the individual level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Heterogeneity

	By Age		Place of Residence		Job Sector		Financial Literacy		Wealth	
	≤ 50	≥ 50	South/Centre	North	Private	Public	Low Score	High Score	$\leq$ Median	$\geq$ Median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Expected Retirement Age										
T	11.06***	7.55*	8.55**	8.25**	11.89***	-5.80	10.27***	4.92	8.74**	7.30*
	(3.33)	(4.55)	(4.10)	(3.81)	(3.13)	(5.60)	(3.69)	(4.12)	(3.89)	(3.93)
T X Prior	-0.16***	-0.12*	-0.13**	-0.13**	-0.18***	0.09	-0.16***	-0.07	-0.13**	-0.11*
	(0.05)	(0.07)	(0.06)	(0.06)	(0.05)	(0.09)	(0.06)	(0.06)	(0.06)	(0.06)
Observations	1450	433	983	900	1520	363	1087	796	946	937
Baseline	66.31	64.89	66.33	65.62	66.11	65.50	66.07	65.88	66.07	65.92
Panel B: Expected Consumption Growth										
T	9.57**	3.88	5.59	12.06***	9.43***	7.60	9.40**	7.98	9.58**	7.79*
	(3.75)	(5.98)	(4.75)	(4.34)	(3.58)	(7.17)	(4.08)	(5.04)	(4.62)	(4.12)
T X Prior	-0.14**	-0.05	-0.08	-0.18***	-0.14**	-0.11	-0.14**	-0.12	-0.14**	-0.11*
	(0.06)	(0.09)	(0.07)	(0.07)	(0.05)	(0.11)	(0.06)	(0.08)	(0.07)	(0.06)
Observations	1245	372	837	780	1314	303	922	695	828	789
Baseline	0.62	0.90	0.56	0.87	0.63	1.02	0.57	0.92	0.49	0.93
Panel C: Log of Consumption										
T	-1.32**	-1.19	-0.97	-1.34**	-0.96**	-1.71	-1.65***	-0.44	-1.24**	-1.08
	(0.53)	(0.94)	(0.66)	(0.65)	(0.48)	(1.19)	(0.58)	(0.73)	(0.54)	(0.76)
T X Prior	0.02**	0.02	0.01	0.02**	0.01**	0.03	0.02***	0.01	0.02**	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	1245	372	837	780	1314	303	922	695	828	789
Baseline	7.15	7.19	7.12	7.20	7.15	7.20	7.13	7.20	7.09	7.23

This Table shows the OLS estimation results of equations (1) and (5) dividing the sample by the variables indicated on the columns. Panel A shows the results for the mean expected retirement age. Panels B and C of forwarded mean expected consumption growth and log of spending respectively. Standard errors clustered at the individual level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

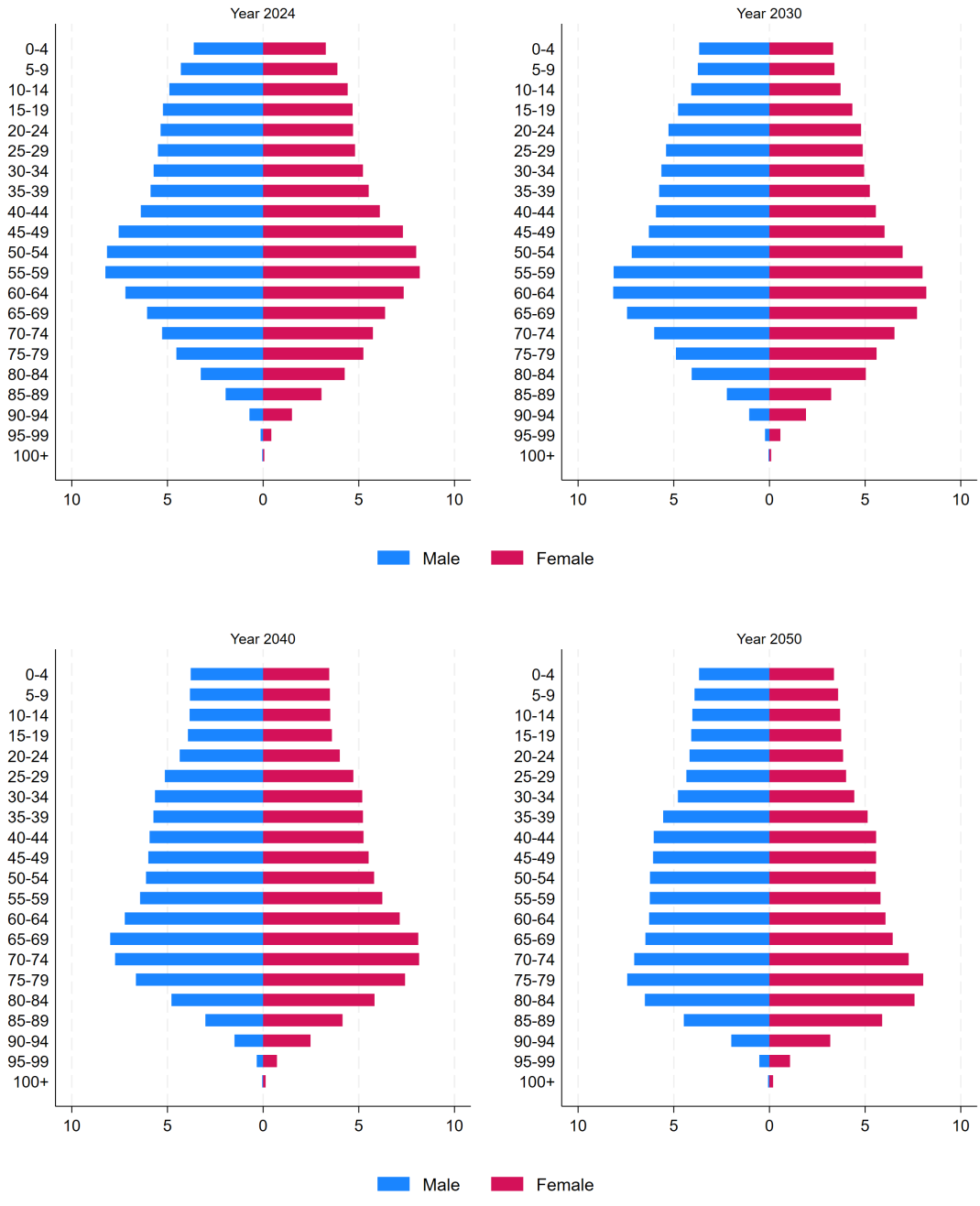
Table 11: Treatment Effect on Macro Expectations

Expectations for:	GDP Growth	Unemployment	Inflation	Rate on Mortgages
	(1)	(2)	(3)	(4)
Panel A: Implied Mean				
T	0.05	-0.02	0.05	0.33
	(0.17)	(0.49)	(0.17)	(0.26)
T X Prior	0.05	0.01	-0.12**	-0.03
	(0.06)	(0.05)	(0.06)	(0.05)
Prior	0.30***	0.33***	0.28***	0.40***
	(0.04)	(0.04)	(0.04)	(0.03)
Observations	1900	1900	1900	1900
Baseline	-1.95	9.44	1.63	5.31
Panel B: Implied Std. Dev.				
T	0.08	0.01	0.01	0.01
	(0.07)	(0.06)	(0.07)	(0.04)
T X Prior	-0.09*	-0.03	-0.04	-0.02
	(0.05)	(0.05)	(0.05)	(0.05)
Prior	0.48***	0.43***	0.44***	0.41***
	(0.03)	(0.03)	(0.03)	(0.03)
Observations	1900	1900	1900	1900
Baseline	1.77	1.48	1.76	0.99

This Table shows the OLS estimation results of equation (7). The dependent variables are indicated on top of each column. Standard errors clustered at the individual level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figures

Figure 1: Demographic Pyramids in Italy

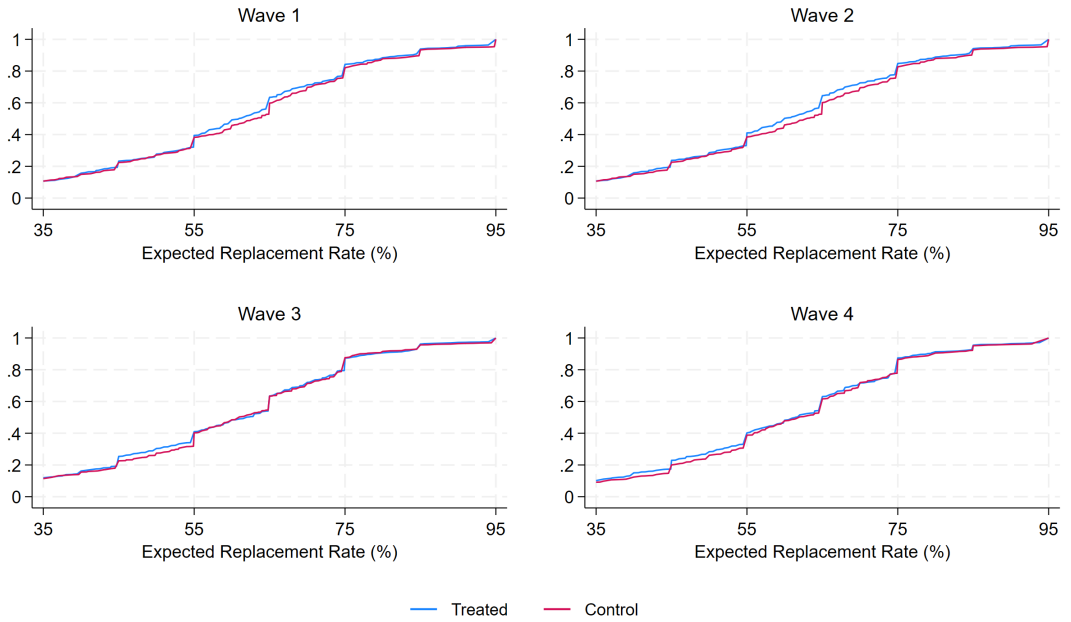


This Figure shows the Demographic Pyramids in Italy for selected years: 2024, 2030, 2040, 2050. Source: Italian Statistical Office

Figure 2: Dependency Ratio and GDP growth

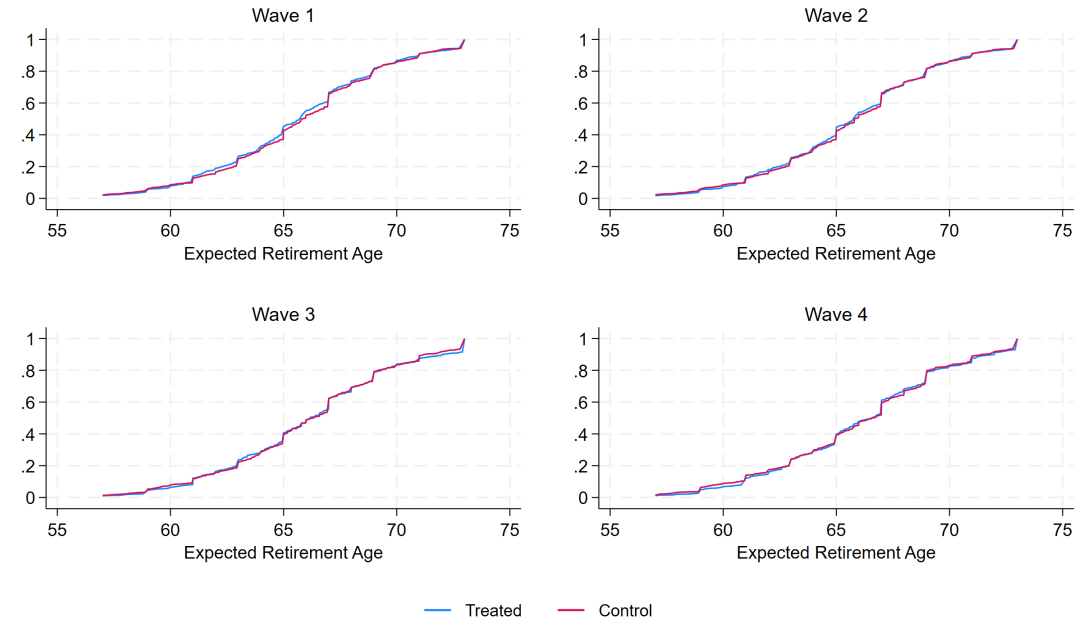
The top graph shows the dependency ratio: defined as the ratio between the retired and the working population (15-64). The Source is the Italian Statistical Office. The bottom graphs offers a comparison between Italy's GDP growth and OECD average. The Source is the St. Louis Federal Reserve.

Figure 3: Expected Retirement Age (implied mean)



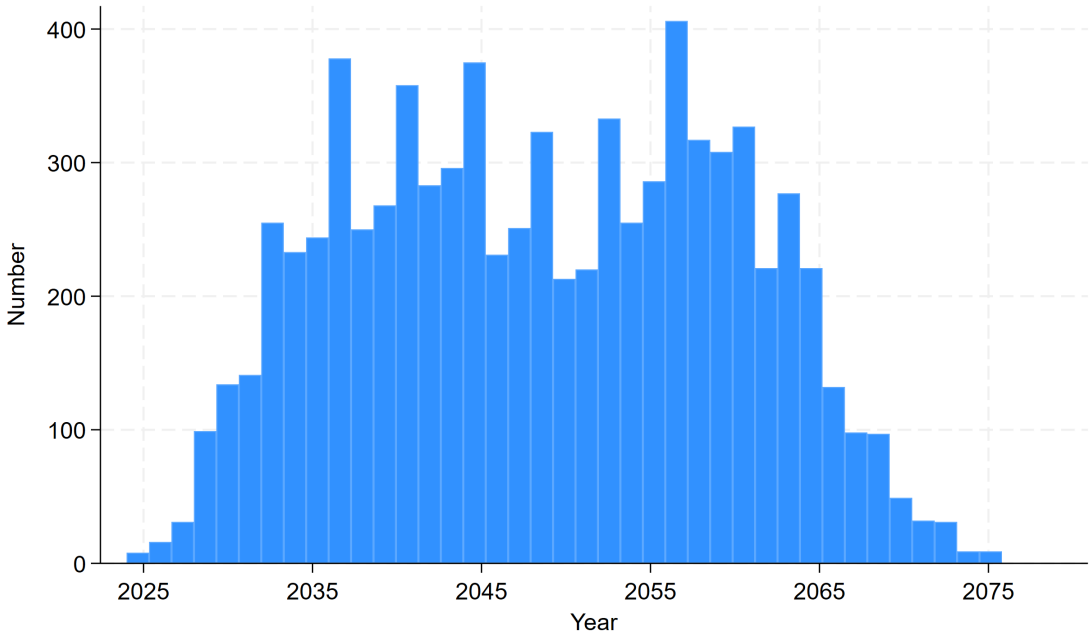
This Figure shows the empirical CDF of the implied mean of the expected replacement rate for treated and controls

Figure 4: Expected Replacement Rate (implied mean)



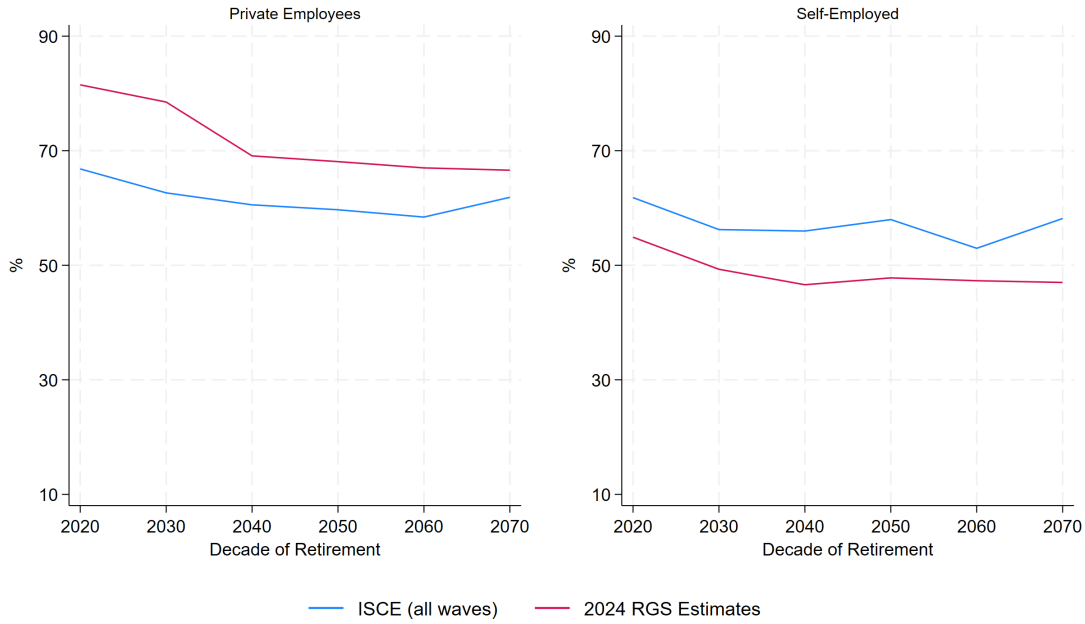
This Figure shows the empirical CDF of the implied mean of the expected retirement age for treated and controls

Figure 5: Distribution of Retirement Ages



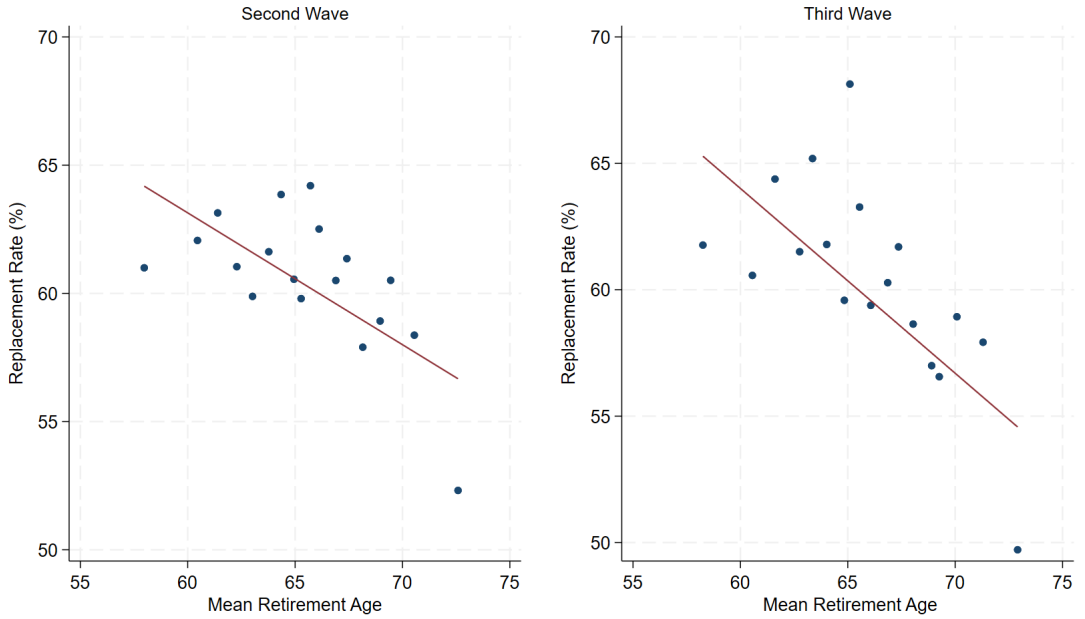
This Figure shows the distribution of the expected retirement years of people in the sample

Figure 6: Replacement Rates in the Survey and Finance Ministry Projections



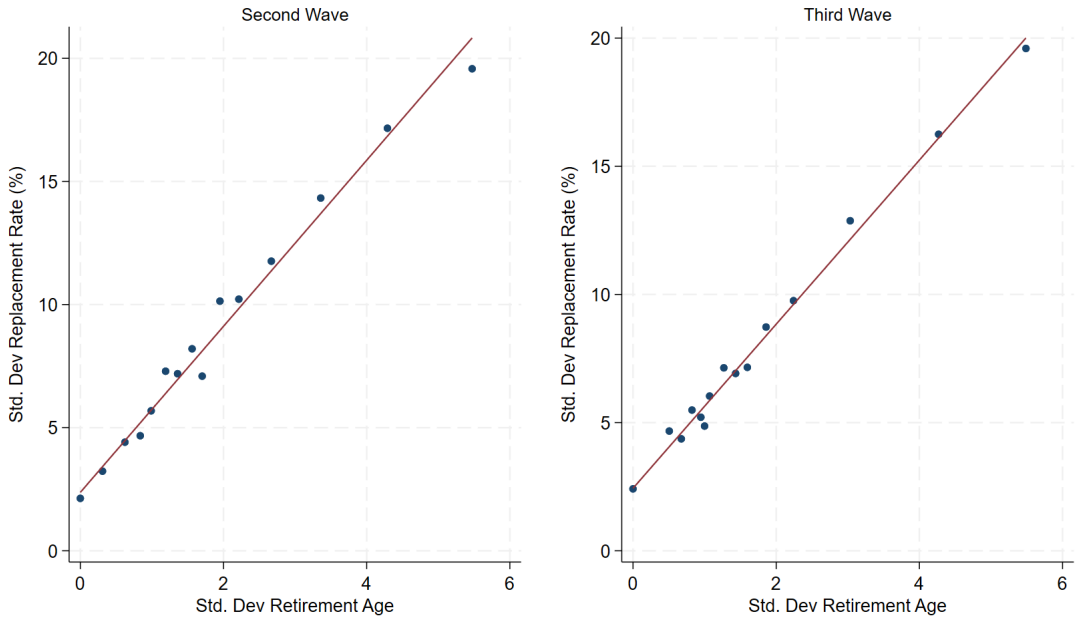
This Figure compares replacement rate expectations with forecasts by the *Ragioneria dello Stato* (RGS). The left panel shows that private employees underestimate their replacement rate, while self employed overestimate it.

Figure 7: Retirement Age and Retirement Age (implied means)



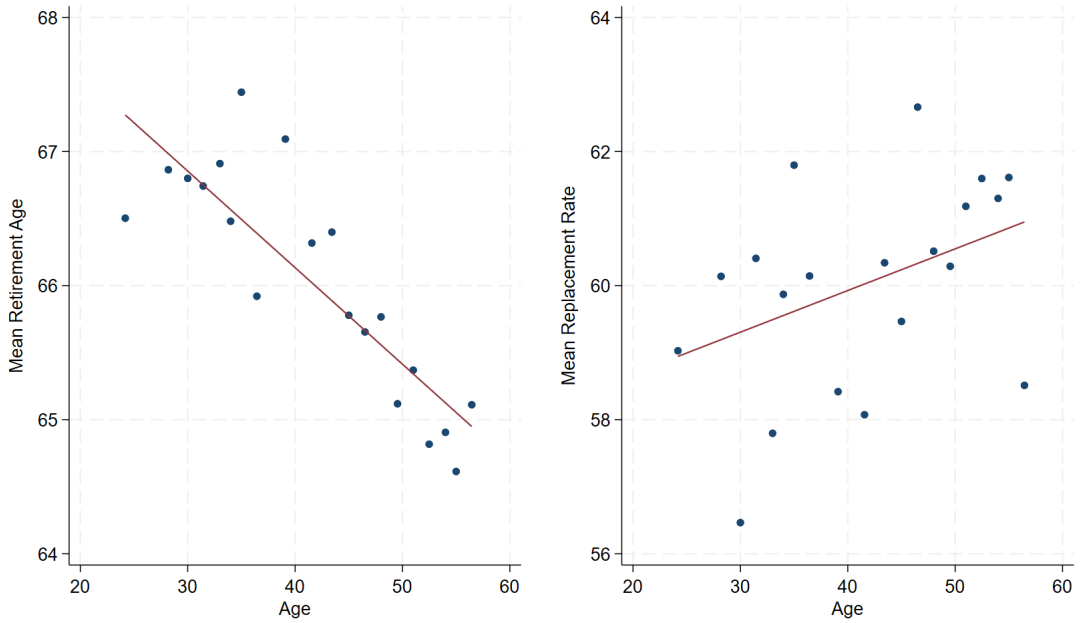
This Figure shows the correlation between the two first two moments of the expected retirement age and the expected replacement rate in the second and in the third wave.

Figure 8: Retirement Age and Retirement Age (implied standard deviations)



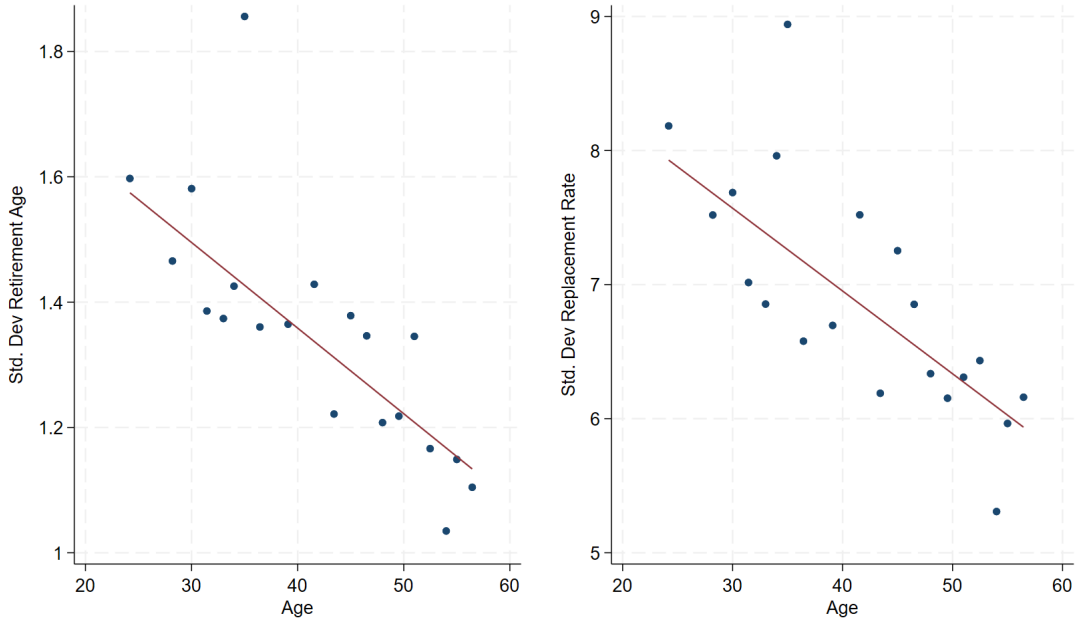
This Figure shows the correlation between the two second moments of the expected retirement age and the expected replacement rate in the second and in the third wave.

Figure 9: Retirement Age, Retirement Age (implied means) and Age



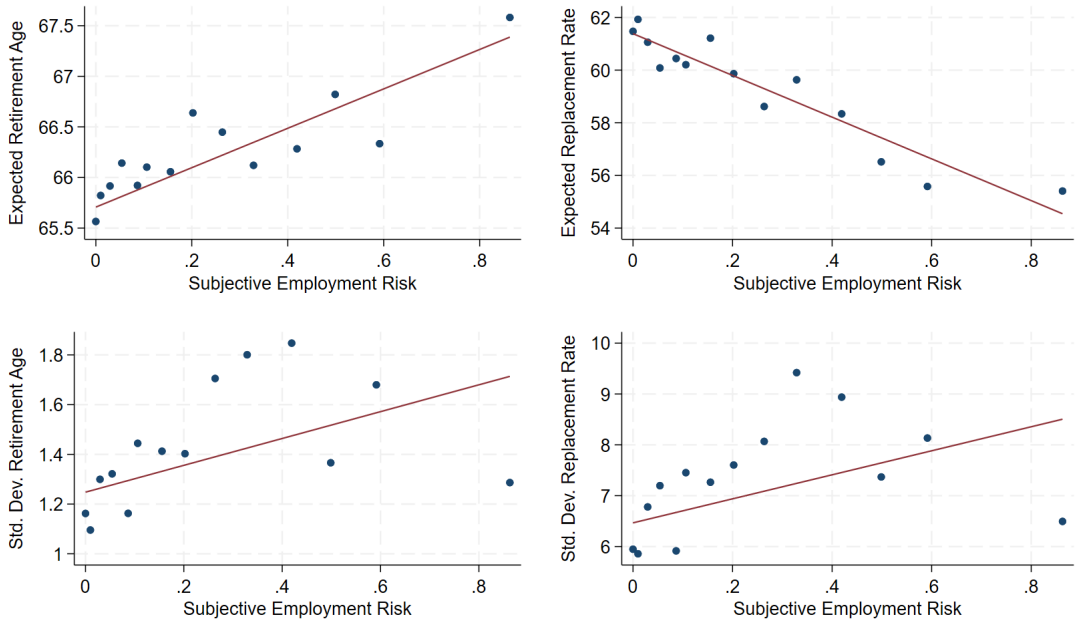
This Figure shows the correlation between age and the two first moments of the distributions

Figure 10: Retirement Age, Retirement Age (standard deviations) and Age



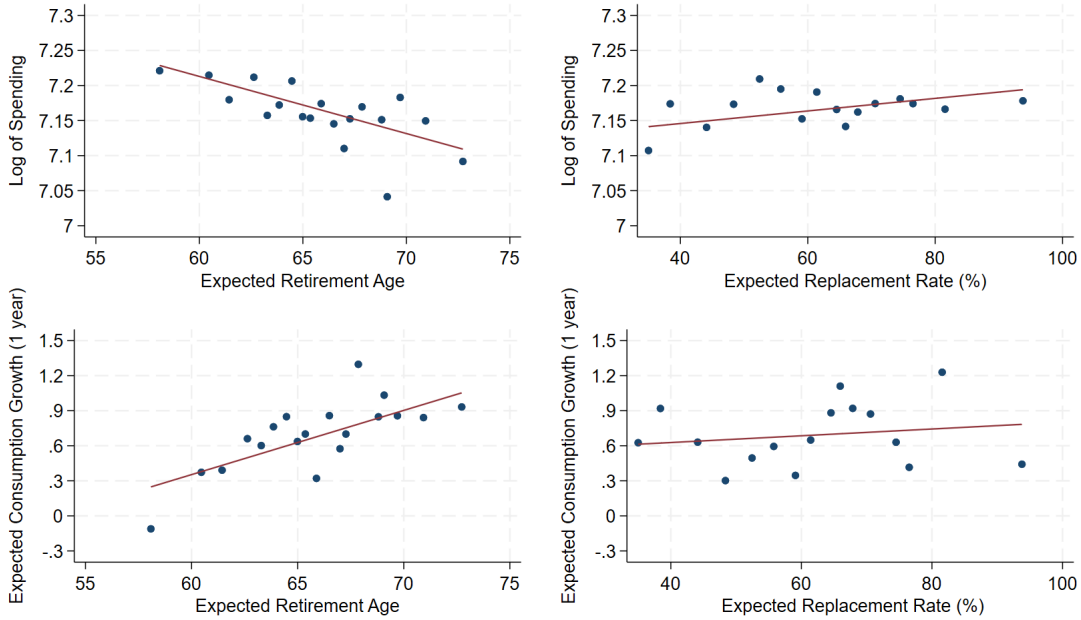
This Figure shows the correlation between age and the two second moments of the distributions

Figure 11: Retirement Age, Retirement Age and Employment Risk



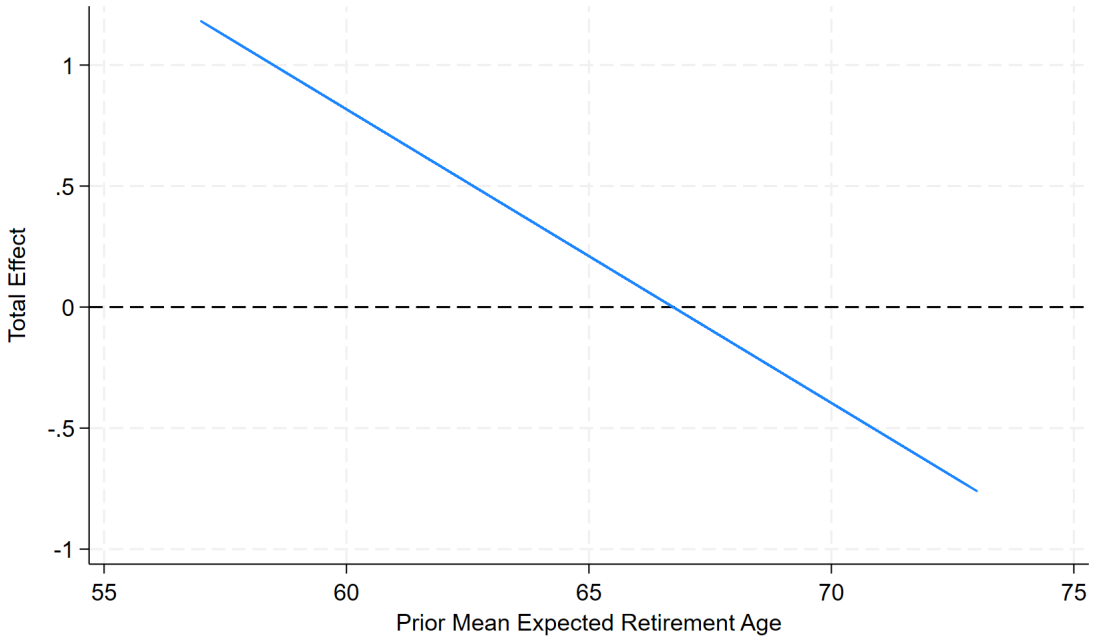
This Figure correlates the implied mean of the expected retirement age and replacement rate with perceived employment risk. Perceived employment risk a number from 0 to 10 that indicates the probability of losing the current job within the next 12 months. There is a clear and strong positive correlation with retirement age and negative correlation with the replacement rate.

Figure 12: Retirement Age, Retirement Age and Consumption



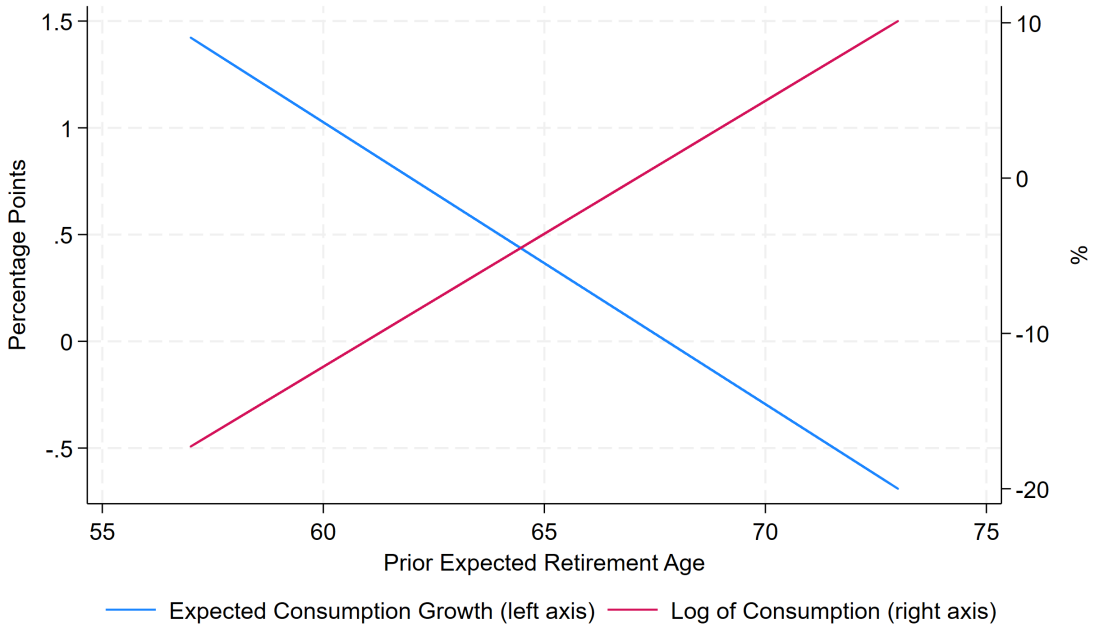
This Figure shows the correlation between either consumption (in log) or expected consumption growth in the next 12 months and expected retirement age and replacement rate. There is a clear negative correlation between consumption and retirement age, while a positive correlation between consumption growth and retirement age. This might be evidence of precautionary saving out of retirement.

Figure 13: The effect on expected Retirement Age



This Figure shows the total Treatment Effect on Mean Expected Retirement Age as a function of the prior belief.

Figure 14: The effect on Consumption



This Figure shows the total Treatment Effect on Mean Expected Consumption Growth (left axis) and Log Consumption (right axis)

Appendix A: The Questionnaire

Section A: Socio-Economic Variables

A. 1 Gender

(a) Male

(b) Female

A. 2 Age

A. 3 Indicate your level of education

(a) PhD/Master

(b) Bachelor's Degree

(c) University (without degree)

(d) High School (with certificate)

(e) High School (without certificate)

(f) Middle School (with certificate)

(g) Middle School (without certificate

(h) Primary School/No Education

A. 4 Indicate the Occupation/Employment Status

(a) worker or similar position

(b) employee

(c) teacher

(d) managerial/middle management employee

(e) headmaster, senior official, educational director, university lecturer, magistrate

(f) freelancer

(g) entrepreneur

(h) Self-employed/Craftsman

(i) Other Independent

(j) Looking for a first job

(k) Unemployed

(l) Housewife

(m) Wealthy

(n) Retired

(o) Student

(p) Doesn't indicate/Reject

A. 5 Can you tell me your marital status?

(a) Married or in a civil union
(b) Single
(c) Separated/Divorced
(d) Widow/Widower

A. 6 Indicate how many people are in your household, **including yourself**

(a) 1
(b) 2
(c) 3
(d) 4
(e) 5
(f) 6 and more

Section B: Income and Work

B. 1 **To all:** Considering all of your household's income, what was your total household monthly income in [...], after all taxes?

(a) 500-1000€
(b) 1000-1500€
(c) 1500-2000€
(d) 2000-2500€
(e) 2500-3000€
(f) 3000-4000€
(g) 4000-5000€
(h) 5000-7500€
(i) 7500-10000€
(j) 10000-15000€
(k) over €15000
(l) Don't know/Don't indicate

B. 2 **To all:** Consider now your earned or retirement income. What was your monthly income in [...], after all taxes?

(a) 500-1000€
(b) 1000-1500€
(c) 1500-2000€
(d) 2000-2500€
(e) 2500-3000€
(f) 3000-4000€

(g) 4000-5000€
(h) 5000-7500€
(i) 7500-10000€
(j) 10000-15000€
(k) over €15000
(l) Don't know/Don't indicate

B. 3 **If employed (a-i in A.4)**: With reference to your current employment situation, indicate how likely you are to be able to keep your job in the next 12 months if you wanted to (*Note: Use a scale of 1 to 100 to answer your answer, with 1 being "unlikely" and 100 being "extremely likely*)

Section C: Household's Wealth

C. 1 The house you live in is:
(a) Owned by my household
(b) For rent
(c) Other (free use or usufruct)
(d) I prefer not to say

C. 2 Can you tell me how much you think the value of your household's wealth in real estate is? (owner-occupied dwelling, other dwellings, land)
(a) 0-50000€
(b) 50000-100000€
(c) 100000-200000€
(d) 200000-500000€
(e) 500000-1000000€
(f) Over €1000000
(g) I don't own any real estate
(h) Don't know/Don't indicate

C. 3 . Can you tell me how much your household's financial savings are? Please think not only about your savings in your checking account but also about any investment products and insurance policies you own (fixed income securities, bond funds, stocks and equity funds, supplementary pensions, life insurance)
(a) 0-50000€
(b) 50000-100000€
(c) 100000-200000€
(d) 200000-500000€
(e) 500000-1000000€

(f) Over €1000000
(g) I don't have any savings to spare
(h) Don't know/Don't indicate

C. 4 Can you tell me how much your household's debts are (mortgages, other debts)
(a) 0-50000€
(b) 50000-100000€
(c) 100000-200000€
(d) 200000-500000€
(e) 500000-1000000€
(f) Over €1000000
(g) Don't have debts
(h) Don't know/Don't indicate

Section D: Consumption

D. 1 Considering all your household's consumption (food and non-food consumption, rent expenses, mortgage/loan payments, insurance, utilities, ...), how much did you spend in [...]?
(a) 500-1000€
(b) 1000-1500€
(c) 1500-2000€
(d) 2000-2500€
(e) 2500-3000€
(f) 3000-4000€
(g) 4000-5000€
(h) 5000-7500€
(i) 7500-10000€
(j) 10000-15000€
(k) over €15000

D. 2 In [...], what was your household's average monthly expenditure on food consumption at home and outside the home?
(a) 500-1000€
(b) 1000-1500€
(c) 1500-2000€
(d) 2000-2500€
(e) 2500-3000€
(f) 3000-4000€

(g) 4000-5000€
(h) 5000-7500€
(i) 7500-10000€
(j) 10000-15000€
(k) over €15000

Section E: Expectations and Intentions (before treatment)

E. 1 In the next 12 months, you expect that your household total annual income, net of all taxes you expect to pay and the transfers you expect to receive from the government (pensions, child benefits, bonuses, etc.), compared to last year...
(a) will decrease by more than 8%
(b) will decrease between 6 and 8%
(c) will decrease between 4 and 6%
(d) will decrease between 2 and 4%
(e) will decrease between 0 and 2%
(f) will remain constant
(g) will decrease between 0 and
(h) will decrease between 2 and
(i) will decrease between 4 and
(j) will decrease between 6 and
(k) will increase by more than 8%

E. 2 In the next 12 months, you expect that your household's overall consumption, (consider ALL expenses: food in and out of the home, housing expenses, clothing, transportation, travel, vacations, etc., ...)
(a) will decrease by more than 8%
(b) will decrease between 6 and 8%
(c) will decrease between 4 and 6%
(d) will decrease between 2 and 4%
(e) will decrease between 0 and 2%
(f) will remain constant
(g) will decrease between 0 and 2%
(h) will decrease between 2 and 4%
(i) will decrease between 4 and 6%
(j) will decrease between 6 and 8%
(k) will increase by more than 8%

Treatment (only in the 3rd wave)

"According to the latest Annual Report of INPS, the progressive aging of the population, which increases the number of retirees and reduces the number of active workers, makes it increasingly difficult to finance pensions in all European countries, raising financial stability issues"

Section E: Expectations and Intentions (after treatment)

E. 3 At what age do you plan to retire?

(a) Before 58 of age
(b) Between 58 and 60 of age
(c) Between 60 and 62 of age
(d) Between 62 and 64 of age
(e) Between 64 and 66 of age
(f) Between 66 and 68 of age
(g) Between 68 and 70 of age
(h) Over 72

E. 4 Think about when you will retire and consider only the public pension, i.e., exclude any pension funds and supplementary pensions. What percentage of your earned income will the government pension represent?

(a) Less than 40% of your last salary before retirement
(b) Between 40% and 50% of the last salary received before retirement
(c) Between 50% and 60% of the last salary received before retirement
(d) Between 60% and 70% of the last salary received before retirement
(e) Between 70% and 80% of the last salary received before retirement
(f) Between 80% and 90% of the last salary received before retirement
(g) Between 90% and 100% of the last salary received before retirement

E. 5 When you are old, do you expect to receive help/support from: (possible multiple answers)

(a) Sons
(b) Relatives or friends
(c) Government
(d) I will have to provide for myself

E. 6 In your opinion, what will be the growth of the Italian economy in the 12 months?

(a) will decrease by more than 8%
(b) will decrease between 6 and 8%
(c) will decrease between 4 and 6%
(d) will decrease between 2 and 4%
(e) will decrease between 0 and 2%
(f) will remain constant
(g) will decrease between 0 and 2%
(h) will decrease between 2 and 4%
(i) will decrease between 4 and 6%
(j) will decrease between 6 and 8%
(k) will increase by more than 8%

E. 7 In your opinion, what will be the inflation rate, i.e., the rate of price growth, in the Italian economy over the next 12 months?

(a) will decrease by more than 8%
(b) will decrease between 6 and 8%
(c) will decrease between 4 and 6%
(d) will decrease between 2 and 4%
(e) will decrease between 0 and 2%
(f) will remain constant
(g) will decrease between 0 and 2%
(h) will decrease between 2 and 4%
(i) will decrease between 4 and 6%
(j) will decrease between 6 and 8%
(k) will increase by more than 8%

E. 8 What do you think the unemployment rate will be in a year's time?

(a) It will be between 0 and 2%
(b) It will be between 2 and 4%
(c) It will be between 4 and 6%
(d) It will be between 6 and 8%
(e) It will be between 8 and 10%
(f) It will be between 10 and 12%
(g) It will be between 12 and 14%
(h) It will be greater than 14%

E. 9 In a year's time, at what interest rate do you think you will be able to invest your savings in the financial markets?

(a) It will be between 0 and 2%
(b) It will be between 2 and 4%
(c) It will be between 4 and 6%
(d) It will be between 6 and 8%
(e) It will be greater than 8%

E. 10 In a year's time, what do you think will be the interest rate on mortgages for buying a home?

(a) It will be between 0 and 2%
(b) It will be between 2 and 4%
(c) It will be between 4 and 6%
(d) It will be between 6 and 8%
(e) It will be greater than 8%

Appendix B: Elicitation of the mean and the standard deviation of the subjective distributions

Take, for example, the question on expected consumption growth:

"In the next 12 months, you expect that your household's overall consumption, (consider ALL expenses: food in and out of the home, housing expenses, clothing, transportation, travel, vacations, etc., ...)"

- *will decrease by more than 8%:* X_1 *(*$p_1 = -9$*)*
- *will decrease between 6 and 8%:* X_2 *(*$p_2 = -7$*)*
- *will decrease between 4 and 6%:* X_3 *(*$p_3 = -5$*)*
- *will decrease between 2 and 4%:* X_4 *(*$p_4 = -3$*)*
- *will decrease between 0 and 2%:* X_5 *(*$p_5 = -1$*)*
- *will remain constant:* X_6 *(*$p_6 = 0$*)*
- *will decrease between 0 and 2%:* X_7 *(*$p_7 = 1$*)*
- *will decrease between 2 and 4%:* X_8 *(*$p_8 = 3$*)*
- *will decrease between 4 and 6%:* X_9 *(*$p_9 = 5$*)*
- *will decrease between 6 and 8%:* X_{10} *(*$p_{10} = 7$*)*
- *will increase by more than 8%:* X_{11} *(*$p_{11} = 9$*)*

Total.....100

It must be that $\sum_i X_i = 100$. The expected variable is:

$$\mathbb{E}\left[\%\Delta y_i\right] = \sum_i p_i \, X_i$$

Where p_i is the midpoint of each interval and X_i is the probability attached to each bin. On the other hand, the standard deviation is equal to:

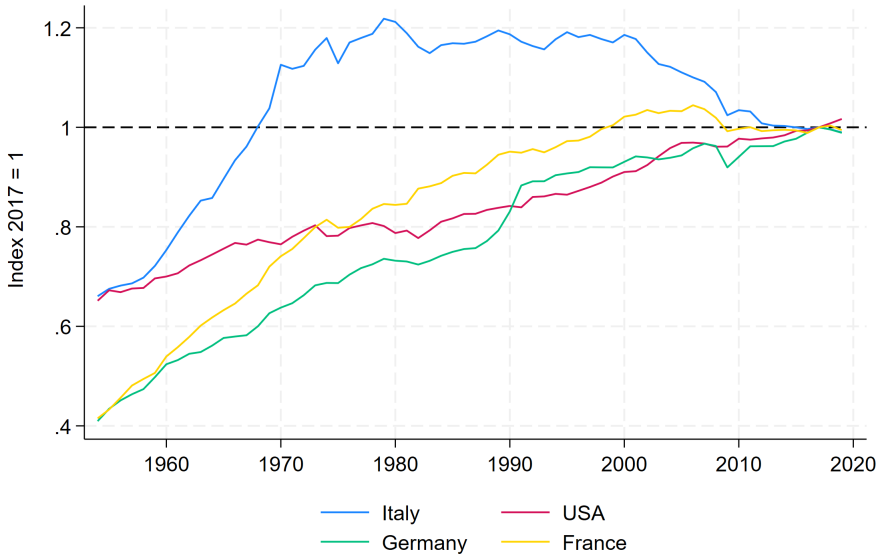
$$Std\left[\%\Delta y_i\right] = \sqrt{Var\left[\%\Delta y_i\right]} = \sqrt{\mathbb{E}\left[(\Delta y_i^2)\right] - \left(\mathbb{E}\left[\Delta y_i\right]\right)^2} =$$

$$= \sqrt{\sum_i p_i^2 \, X_i - \left(\sum_i p_i \, X_i\right)^2}$$

For the other questions, both moments are computed in the same way.

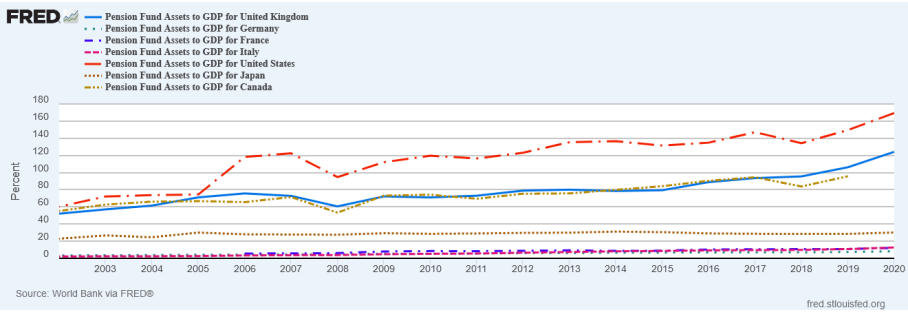
Appendix C: Additional Figures and Tables

Figure C1: TFP in Italy, Germany, France and US



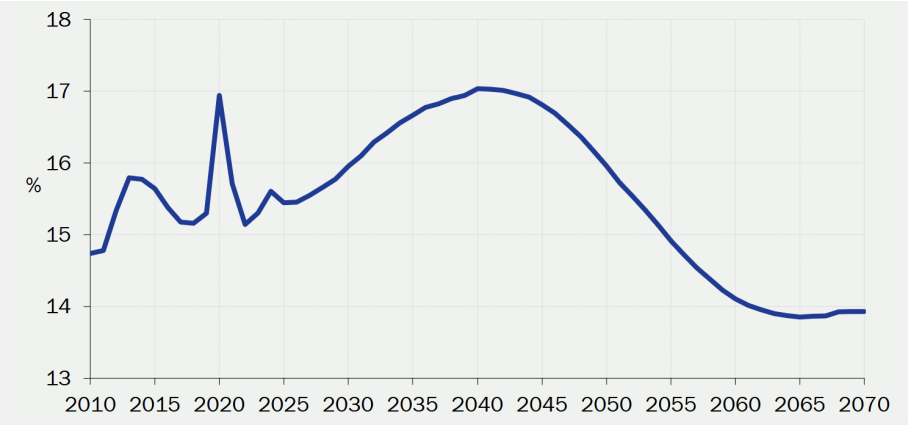
This Figure shows TFP in Italy, France, Germany and the United States

Figure C2: Pension Fund Assets to GDP in G7 Countries



This Figure shows the ratio between the total assets of pension funds as a share of GDP in G7 countries: Italy, Germany, France, United Kingdom, Japan and United States. *Source:* Federal Reserve of St. Louis.

Figure C3: Pension Spending as a share of GDP in Italy



This Figure shows Pension Spending as a share of GDP. Source: *Documento di Economia e Finanza*, Finance Ministry.

Table C1: Other measures of Uncertainty of Retirement Age

	Variance	Squared Ret. Age	C.V.
	(1)	(2)	(3)
T	0.38	1032.72***	0.00
	(0.28)	(364.20)	(0.00)
T X Prior Variance	-0.19**		
	(0.08)		
T X Prior Squared Ret. Age		-15.48***	
		(5.53)	
T X Prior C.V.			-0.10*
			(0.06)
Observations	1883	1883	1883

This Table shows the OLS estimates of equation (1). The dependent variables are the implied variance, the implied mean squared retirement age and the coefficient of variation. The latter is defined as the standard deviation over the mean. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C2: Other measures of Uncertainty of Replacement Rate

	Variance	Squared Rep. Rate	C.V.
	(1)	(2)	(3)
T	53.47	235.74	0.01
	(121.00)	(254.12)	(0.01)
T X Prior Variance	0.04		
	(0.06)		
T X Prior Squared Rep. Rate		-0.05	
		(0.06)	
T X Prior C.V.			-0.04
			(0.05)
Observations	1899	1899	1599

This Table shows the OLS estimates of equation (2). The dependent variables are the implied variance, the implied mean squared replacement rate and the coefficient of variation. The latter is defined as the implied standard deviation over the implied mean. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$