



Assicurazioni Generali

RESEARCH DEPARTMENT

Participation to Pension Funds in Italy: the Role of Expectations and Financial Literacy



2013

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June 25, 2013

Abstract

This paper seeks to assess the role of expectations on pension income and financial literacy in the decision of joining a pension fund, using a large household survey for Italy. The results confirm past evidence on the role of income and education, and find a strong role played by financial literacy. Forward looking thinking about the sources of income after retirement and forming not overly optimistic expectations on replacement rate are tightly related to enrollment. Finally participation to pension funds is found to depend strongly on the industry of employment. The results provide further evidence for the role of public powers in enhancing participation by providing information and financial education.

1. Introduction

During the last two decades Italian pension system has been overhauled by a series of reforms which greatly reduced entitlements for new employees. As a consequence, the burden of saving enough resources to fund consumption after retirement has shifted to a large extent to workers. The 2005 pension fund reform was meant to induce future pensioners to channel savings into long term products, but the results in terms of participation have so far proven disappointing. The aim of this paper is to assess the extent to which information on pension income and financial literacy in determining individual propensity to enroll. In Section 2 I briefly describe the most important aspects of the 2005 reform and document the overall low level of pension fund enrollment. Section 3 provides a quick review of the literature on the link between financial literacy, expectations and household financial choices, focused especially on long

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term/pension products. The econometric analysis and its results are presented in detail in Section 4, and their policy implications sketched in Section 5. Section 6 concludes.

2. The (slow) development of pension plans in Italy: Facts and tentative explanations

In the 1990s Italy underwent a series of radical reforms to its pension system, aiming to secure its financial viability¹. The transition from a Defined Benefit scheme to a Notionally Defined Contribution one entailed a sharp reduction of pension entitlement for young workers. This raised the need to foster participation to private pension schemes, in order to channel the relatively high level of household saving into long term financial products and to develop in Italy a strong pension fund industry which has proved elsewhere to be beneficial to capital allocation and growth. A major reform of private pensions was passed into law and went into force in 2007. The aim was to reshape the second pillar of the pension system by channeling the contribution for the “Trattamento di Fine Rapporto” (TFR)² into pension funds and to strengthen the third one by offering tax incentives to voluntary participation. The main points of the reform can be summarized as follows:

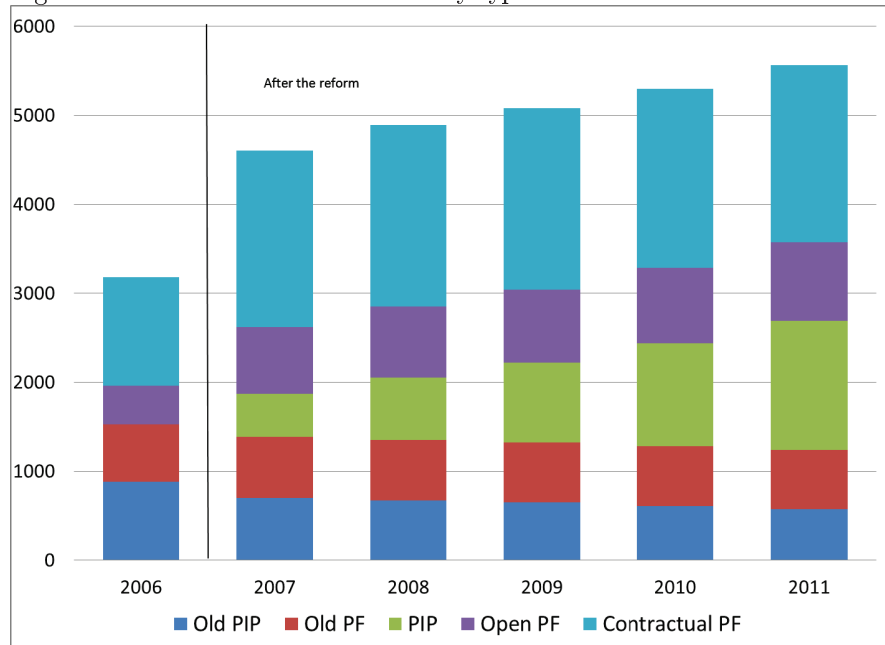
1. All private sector employees were enrolled by default in newly created pension funds, managed at the industry or regional level and whose characteristics are dictated by collective agreements. All employees would have to contribute the new flows of compulsory contributions to these funds. At the beginning of 2007 workers were given six months to decide whether to opt out and continue to invest contribution in the TFR.
2. A favorable tax treatment of pension fund returns was introduced. Moreover the law foresees, the deductibility from the income tax base of additional contribution up to €5,164 per year. Additionally, agreements at the industry or company level foresaw mechanism by which the employer would top up voluntary contributions by the employees.
3. Fiscal benefits for firms to compensate for the loss of the TFR contributions which were a low cost source of financing
4. On top of collective funds, new products were introduced, such as open pension funds open to all workers and a new version of Piani Individuali Previdenziali (PIP), individual pension funds managed and sold by insurance companies.

¹See Franco (2002) [16] for a comprehensive account of the reform

²TFR is a form of deferred wage. The employee contributes 7.4% of his/her gross wage to a fund managed by the employer. Contributions are capitalised at 1.5% plus $\frac{3}{4}$ of the inflation rate per year and returned to the employee upon retirement or resignation.

In theory joining a pension funds and benefiting from the employer’s additional funding would provide a very strong complement to public pension, as shown by Cesari et al. (2008) [10] However so far enrollment has remained well below expectations: in particular setting enrollment as the default options did not delivered the increase in participation rates seen in other countries (such as New Zealand) which implemented similar schemes. Figure 1 reports the number of pension fund members before and after the 2007 reform, by type of product.

Figure 1: Number of workers enrolled by type of fund



Source: COVIP, Annual Reports

At the end of 2011, according to COVIP (the pension fund regulator) only 28.9% of private sector employees were enrolled, and membership rate among self-employed was even lower: 24.3%. Overall participation rate (which includes also public sector employees) was 24.1%. Table 1 shows how slow the development of the sector has been so far, especially among private sector employees and self-employed, whose future pension entitlements will suffer the most from public pension reforms.

More worryingly take up rate is extremely low among younger workers which would benefit the most from enrolling a pension fund, given the dim prospects they have for public pensions adequacy. According to COVIP, in 2011 only 18% of workers aged below 35 were enrolled. Cappelletti and Guazzarotti ([8]), using survey data for 2008 show that nearly 20% of worker aged below 35 year have an expected public pension replacement rate below 60% and a saving rate which is in the lowest quartile of the distribution.

Table 1: Pension fund enrollment (% of eligible workers)

	2008	2009	2010	2011
Employees				
Private	26.0	26.9	27.8	28.9
Public	3.8	3.9	4.0	4.4
Self-Employed	18.7	21.7	23.0	24.3

Source: COVIP, Annual reports

Several explanations have been put forward to explain the apparent poor appeal of pension funds on top of the “trivial” ones related to the sharp reduction in the ability to save seen in recent years³, especially among medium and low income households. First of all the high level of contribution to social security (currently 33% of gross wage for employees) reduces drastically the amount of resources that can be invested in alternative pension or saving products. Moreover TFR retains a strong appeal among workers; first of all it is (or is perceived as) risk free and provides an automatic hedging to inflation; the ongoing financial crisis and the low level of trust placed in financial intermediaries is likely to have reinforced this perception.

The choice of investing the compulsory contribution to a pension fund is irreversible while a worker can stop channeling its contribution to TFR and join a pension fund at any time. This is likely to increase the perceived illiquidity of funds compared with TFR: Additionally, in small and medium sized firms TFR contribution have been historically a fundamental source of cheap funding and, despite the incentives provided by the government presumably there is a strong pressure by employers to convince workers to shift to pension funds: to consider an admittedly extreme example, Boeri and Brugiavini (2006) ([6]) observe that in a small firm it can be profitable to replace workers enrolled in pension fund with others lending TFR contribution to the firm if the compensation of the contributions moving to pension funds is not full. Larger firms have an easier and less expensive access to bank credit and find easier to replace TFR contributions.

In principle commission charges could deter the shift from TFR (which has no additional costs): however management costs are on average relatively low compared with other saving products⁴ and moreover workers does not seem very sensitive to costs *per se*; between 2007 and 2011 the fastest growing pension fund class has been PIPs, which features on average the highest level commissions charges. Finally, the evolution of the labour market occurred since the end of the 1990, with the sharp increase of fixed term jobs, which raise the prospects of discontinuous carriers and labour market participation, especially among younger generation and women, may discourage any investment in illiquid products such

³See also Rinaldi (2011)[32]and Ceccarelli and Rinaldi (2011)[9]

⁴According to COVIP estimates, given a relatively short (10 years) investment period, the average commission charges varies between 0.4% of the amount invested for a contractual fund to 1.9% of a PIP. This compares with 1.2% for a fixed income mutual fund and 2.3% for a fund invested 100% in equity.

as pension funds (Cesari et al. 2008[10])

There is another set of factors, related to individual capabilities and attitudes. First of all the expected replacement rate granted by public pension may still be considered high enough, leading individuals not too think about how to sustain consumption in old age. Moreover workers may lack the financial knowledge and skills needed to save adequately (both in terms of amount and products) for old age. In this paper I will mainly focus the analysis on these determinants.

3. Expectations, Literacy and Long-Term Savings: literature review

Trivially, the higher the public pension wealth the lower will be the level of private savings one would need to smooth consumption after retirement. A long strand of literature seeks to estimate the degree of crowding out of public pension on private wealth accumulation, the most important references are probably Feldstein (1974) [13] and Gale (1998) [17]; a few papers have employed Italian micro-data to assess the impact of pension reforms on household saving. For example, Attanasio and Brugiavini (2003) [2] consider the changes in pension entitlement rules induced by the 1992 reform to analyse the effects of the change in social security wealth relative to income on the saving rate, finding robust evidence of a high degree of responsiveness especially among relatively younger workers⁵.

However almost all the contributions find a less than perfect offset between pension and private wealth, a sizable departure from what the standard life-cycle model posits. Thaler (2004) [37] points to misinformation as one of the key explanation of suboptimal saving behavior, based on empirical evidence on the U.S. about how badly informed workers are on their pension benefits. Poor information easily translates into unrealistic expectations about future pension income and wealth. Expectations, therefore, are likely to be a crucial variable in understanding (long term) saving and portfolio allocation decisions. Individual expectations are normally elicited directly from survey respondents, asking them, for example, at what age they expect to retire or their belief about the public pension social security rate. Subjective expectations proved to be able to explain important phenomena whose analysis was hampered by lack of data, such as the retirement consumption puzzle (i.e. the sharp decline in consumption around retirement, which is at odds with the mainstream theory of consumption smoothing); For example Rohwedder and van Soest (2006) [33] find that those who overestimated their retirement income are more likely face a larger drop in consumption upon retirement and report a lower subjective level of well-being. Haider and Stephens (2007) [19] use expected income as instruments for actual retirement income in consumption regression, finding that the drop in consumption upon retirement is significantly lower than what suggested by

⁵For an earlier contribution see Jappelli (1995) [21]

estimations made without instruments.

Concerning Italy, Guiso, Jappelli and Padula (2010)[18] use a large survey of bank's customers to elicit expectations on the subjective distribution of social security wealth, finding that variability across individuals mirrors in a predictable way heterogeneity in the available information set and financial literacy. Moreover, and most importantly for my analysis, expectations about the mean and variability of the replacement rate strongly affect the demand for long term savings products: a 10-percentage point increase in the expected replacement rate reduces the probability of enrolling in a pension fund by one percentage point, while a one standard deviation increase in the subjective distribution leads to a 1.6 points hike in probability. Bissonnette and van Soest (2010) [5] provide a throughout review of these issues. Moreover, studying a survey of Dutch workers, they find that adding subjective expectations on the generosity of the public pension pillar improves significantly the predictive power of standard econometric models of savings behavior.

Another series of papers adopts a different angle, and seeks to explain the causes and consequences of the divergence in expectations on social security wealth and replacement rate with respect to a benchmark calculated using actual pension rules. Bottazzi et al. (2006[31]) use several waves of the Bank of Italy Survey of Household Income and Wealth (SHIW) and apply to each individual the corresponding statutory pension rules, under plausible assumption on real wage and GDP growth, derive the replacement rate and compare it to the point estimations elicited in the survey. They find that the workers who, because of age and type of employment, are most affected by the reform have a better understanding of the direction in which minimum retirement age and replacement rate will go (i.e. their expected replacement rate is close to the one calculated with the pension rules). However, at least up to 2002, the revision of expectations which was much lower than the actual (downward) change in pension generosity implied by the reform. Moreover they find that the reduction in pension wealth is only partially offset by the increase in savings, but the offset is higher for the individual whose expectations are closer with the "true" value. In a subsequent paper (Bottazzi et al. (2011[7])) they use the 2004 and 2006 waves of SHIW to assess the impact of pension reform to asset allocation. They find that the reduction in social security wealth do modify asset allocation (especially among those who better estimates their replacement rate), but the offset occurs mostly through an increase in real estate wealth. Most importantly, they do not find any relationship between pension reforms and an increasing likelihood of investing in those products aimed at topping up public pension income (life insurance and pension funds).

While individual expectation can be defined and measured in quite a precise way, the operational definition of financial literacy (FL) is more vague and its measurement potentially difficult. The standard definition of financial literacy (FL) provided by the OECD is

“Knowledge and understanding of financial concepts, and the skills, motivation and confidence to apply such knowledge and understand-

ing in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life.”

The most widely used way to measure FL is to relate it to the answer to the three questions first introduced in the 2004 Health and Retirement Study in the US. Survey respondents were asked to make simple calculations about compound interest rates, inflation and the effect of portfolio diversification.

This kind of questions offers a simple and relevant way to assess whether an individual possesses the skills needed to understand even simple financial products. However, as any the measure of FL, it is likely to suffer from some sort of measurement error. For example the answers to the question on portfolio diversification appear to be sensitive to the wording of the question, as documented by Lusardi and Mitchell (2007)[27] and van Rooij et al (2012) [39]. This calls for some caution in interpreting some results and for robustness checks in the econometric analysis. However badly measured, FL has proven to matter for wealth accumulation, as shown by several recent papers⁶. First of all, a higher degree of financial literacy helps planning, stimulating the accumulation of wealth: studying a sample of Dutch households van Rooij et al. (2012) [39] find a strong positive correlation between FL and net worth, after controlling for several usual determinants of wealth accumulation; they discover two channels through which literacy works. First of all more literate individuals are more likely to invest in stock and in general have a more diversified portfolio and secondly they are more keen to plan for retirement and decide accordingly. According to the authors FL lowers the cost of gathering and processing information. These results echo the outcomes of other studies: In for example, using a sample of people aged 50 or more in 11 European countries Christelis et al. (2010) [11] show that high numeracy and a better ability to grasp financial issues is correlated with a more diversified portfolio. Moreover, FL appears to be correlated with choosing more cost effective financial products as shown by Hastings and Mitchell (2011) [20]. Turning to the issue of planning for retirement Alessie et al. (2011) [1] show that financial literacy helps in all the stages of pension planning. Higher levels of FL are associated with more realistic expectations about replacement rate and make investors keener to acknowledge its uncertainty and enables them to form more precise estimates about retirement age. These results hold also when an instrumental variable estimation is undertaken, to account for measurement errors in the FL measure and its possible endogeneity. The issues of a possible joint determination of financial literacy and saving choices has been first investigated empirically by Behrmann et al (2010) [4], who study wealth accumulation choices of a sample of Chilean households find that the impact of FL of saving is much higher empirically once the fact that the positive correlation between FL and saving is driven by common factors is accounted for. Jappelli and Padula (2013)[22] set up a theoretical framework in which FL is treated as a specific form of human capital, whose costly acquisition allows the individual

⁶See Lusardi and Mitchell (2011) [28] for a synthetic overview of the issue and a comprehensive reading list

to access more sophisticated and higher yielding investment product. The level of investment in FL and saving will be then jointly determined by individual features such as the inter-temporal elasticity of substitution and by costs and returns of acquiring FL. They test the prediction of the model estimating saving equation first over a sample of people aged 50 or more in several EU countries and then on a cross section of aggregate country data. They find that the impact of FL on savings is much stronger when Instrumental Variables estimation rather than OLS is performed. Fornero and Monticone (2011) [14] study the relationship between FL and pension plan participation in Italy, using the 2006 and 2008 waves of SHIW. They find that the impact of FL on the probability of joining a pension fund increases significantly once FL is instrumented.

Evidence on the relationship between awareness of the long term development of income and financial choices can be found in the results of economic psychology, showing that the choice to save is linked to psychological determinants related with the thought of one's own condition when old and after retirement. Loibl et al. (2011)[26], using a sample of US households, show that attitude to planning is strongly and positively correlated with savings. More relevant for the issues analyzed here, Croy et al. (2010) [12], analyze the behavior of 2,300 Australian workers enrolled in a pension fund. They find that personal attitude to planning, together with basic financial literacy are a good predictor of long term, pension related, savings.

4. Econometric Analysis

In this paper I use data from the 2010 wave of SHIW. I consider a sub sample of respondents, namely those aged between 20 and 50 and employed at the time of the interview, and consider, for each household, only the reference person, defined as the one who is in charge of the financial decision. The dependent variable is the probability of each reference person being enrolled in any type of pension fund issued after 1998⁷.

4.1 Choice of variables and Descriptive Statistics

In what follows I detail and motivate the choice of regressors, I organize the discussion around the set of key drivers identified by the literature and the additional hypotheses I want to test. At the end of the section I present a few descriptive statistics as a preliminary step before the econometric analysis.

4.1.1 Demographic and socioeconomic characteristics

The first set of explanatory variables includes those normally used in this kind of analysis. I take household after tax income⁸, net of housing expenses (mortgage

⁷Before that date PF were almost uniquely sold part of benefit packages for financial sector workers.

⁸I also tried household's equivalent income, calculated using the Italian National Statistics Office's scale. The results were not markedly different. However, using equivalent income

repayment or rent); instead of using the amount in euros, i split all the respondents into quartiles, to mitigate the impact of likely measurement errors⁹. Then I use the number of the household components (direct and squared): household income and size provide a proxy of the ability to save. The other variables considered are individual level of education, sex, age (both direct and squared) and type of employment (employees vs self employed). I also add an interaction term of these two variables, which enables to better gauge the diffusion of pension funds among the younger workers, which, since the labor market reforms of the late '90 have been often hired as self employed.

I complement these variables with dummies for the sector in which the respondent works. These are meant to account for both supply and demand factors: collective pension funds are established at the industry level, and there may be large differences in the characteristics of the contracts and its appeal vis-à-vis the TFR; moreover, since trade unions are directly involved in managing and distributing the collective funds, and therefore the variability in the level of unionization across industries may translate into differences in participation to collective plans. Finally, average firm size may vary across sectors, and with that the cost to the employer to replace TFR funding.

4.1.2 Expectations about retirement age and replacement rate.

In SHIW, expectations about retirement conditions are measured using by the answers to two questions about respectively the planned retirement age¹⁰ replacement rate provided by the public pension, namely

At what age does (respondent name) expect to retire ?

and

When (respondent name) retires what percentage of his/her per-retirement income will his/her state pension represent?

Consider the state pension only and exclude any supplementary pensions or pension funds

In order to measure the expectation errors I have to construct a benchmark. For retirement age I take the pension rules in force in 2010, calculate the minimum statutory retirement age, and compute the difference between expected and “true” value. Concerning the replacement rate I use two methods. the first is similar to the one proposed by Bottazzi et al. (2006) [31]: they use the pension rule applicable to each individual, and based on assumptions on GDP and wage growth to compute the “true” replacement rate. I take more up-to

amounts to an untested restriction on the coefficient on income and family size and therefore I preferred to perform an unrestricted estimation.

⁹Net income and expenses are self-reported by the respondent and not necessarily cross-checked against payslips or bills.

¹⁰The questionnaire does not specify whether it is seniority or old age pension. This could be potentially important, as, in case of seniority pension, the expected replacement rate should be related to the expected retirement age.

date and somehow more realistic expectations on GDP growth over the 2010 - 2015 horizon (1% per year instead of 1.5% used in their paper) and of real wage increase based on long term projections for labor productivity.¹¹

Moreover annuitisation coefficients are taken from long term simulation obtained from CAPP-DYN a detailed microsimulation model of the Italian economy¹² This method, while computationally very simple, hinges on a set of very restrictive assumptions on individual development, namely that of continuous employment throughout the carrier and a constant real-wage growth. Moreover while the replacement rate calculated using pension rules is gross of income tax and contribution, it is fair to assume that the expected one elicited in the questionnaire is net; as a consequence, part of the expectation errors could be the results of distortions due to progressive income taxation. As a partial remedy to these problems, I split the sample into four quartiles, and in the regression I use a dummy indicating in which class of expectation error the respondent is; alternatively I split the sample into two groups according to whether the expectation error is above or below the median, and run two separate regressions. I also construct an additional measure of expectation bias. I split respondents into clusters according to age, sex, education and type of employment. For each cluster I compute the median expected replacement rate and then, for every individual, I compute the difference between the expected rate and the cell's median. This measure does not measure an error, but just optimism/pessimism with respect to a homogeneous group of individuals. This variable is used directly as a regressor.

The 2010 wave of SHIW contains, for the first time, some questions about expected income after retirement. The most relevant for the purpose of this paper is the following.

Have you ever thought about how to arrange for your household's support when you retire? (Yes/No)

I use a dummy taking value 1 if the answer is “yes” and 0 if it is “No”.

4.1.3 Financial literacy

The Reference person's level of FL is gauged by the answers to the following three questions

1. *Which of the following types of mortgage do you think would allow you from the very start to fix the maximum amount and number of installments to be paid before the debt is extinguished?*
 - (a) *Floating-rate mortgage*
 - (b) *Fixed-rate mortgage*

¹¹Data are taken from long term forecasts contained in the BASELINE database maintained by CEPII and described in Fourè et al. (2012)[15] and in the OECD long term projections contained in Johansson et al. (2012) [23]

¹²See Mazzaferro and Morciano (2012)[29] for a description of the model.

- (c) *Floating-rate mortgage with fixed installments*
 - (d) *Don't know*
 - (e) *No answer*
2. *Imagine leaving 1,000 euros in a current account that pays 1% interest and has no charges. Imagine that inflation is running at 2%. Do you think that if you withdraw the money in a year's time you will be able to buy the same amount of goods as if you spent the 1,000 euros today?*
- (a) *Yes*
 - (b) *No, I will be able to buy less*
 - (c) *No, I will be able to buy more*
 - (d) *Don't know*
 - (e) *No answer*
3. *Which of the following investment strategies do you think entails the greatest risk of losing your capital?*
- (a) *Investing in the shares of a single company*
 - (b) *Investing in the shares of more than one company*
 - (c) *Don't know.*
 - (d) *No answer*

I use this information in three ways. Firstly I construct a dummy for a correct answer to each question, then another one for correct answers to all three questions, and a variables with the number of correct answers.

I also consider other measures possibly related to familiarity with financial issues. One is an index of portfolio diversification used in Guiso and Jappelli (2002) [25] counting the number of assets classes in which the household's financial wealth is invested¹³. I also add a dummy taking value one if the household has a life insurance policy, this is meant to measure familiarity with long term investment products.

Several studies on Italian household's financial choices conducted using SHIW just considered demand variables, given the lack of proxies for supply conditions.¹⁴ These are clearly very difficult to measure, however the large amount of information contained in SHIW allows for the construction of some reasonable proxy. In particular there is information about which bank services are used. I construct dummies for whether or not the household uses the bank counter to either buy insurance policies and for individual portfolio management. This

¹³It is equal to 0 if the household portfolio only includes cash, 1 if it has cash and deposits, 2 if it contains also bonds, 3 if all asset classes are present

¹⁴One notable exception is Guiso and Jappelli (2002)[25] where an index of bank diffusion (i.e. number of ATM in the city of residence) is added to the individual characteristics

variable is potentially important to measure the impact of financial intermediation (and in particular the role they play as providers of financial advice) on the development of pension funds.

Finally I add the average unemployment rate between 2004 and 2009 in the region of residence as a proxy for background risk¹⁵ which may deter the investment in long term , illiquid assets such as pension funds.

As a preliminary step before the econometric exercise, a simple descriptive analysis useful to see if there are systematic differences in these and other relevant variables between people joining or not a pension fund: the results are shown in Appendix A.

This analysis shows sharp differences in individual characteristics between those who enrolled in a pension fund and those who have not. This type of savings products appears to be more popular among very rich households, whose reference person is aged between 41 and 50 and has a middle to high level of education. Employees are more likely to have joined a pension fund than self employed. Concerning industries, PF are far more diffused among those employed in Manufacturing and Financial Services. Participation to a pension fund is also correlated with higher financial literacy and awareness of the problem of funding consumption after retirement; however the differences in terms of replacement rate expectations and use of bank to purchase insurance products or for wealth management do not seem to be very pronounced. A multivariate analysis is however required to assess the importance of each factor.

4.3 Estimation results

4.3.1 Probit model

I first start fitting a probit model of the probability of being enrolled in a pension fund, using as regressor the variables described in the previous section. Table 2 present the results (in terms of marginal effects) of two models , which differ only in the measure of expected replacement rate; in Model 1 i use the quartile distribution of the individual “error”, in Model 2 I take the difference of each respondent’s expectation with respect to the cluster median.

Table 2: Probit estimation

	(1)	(2)
	Model 1	Model 2
HH income 2nd qt.	0.0700** [2.85]	0.0493* [2.13]
HH income 3rd qt.	0.134*** [5.25]	0.109*** [4.57]
HH income 4th qt.	0.141*** [4.91]	0.123*** [4.68]
HH size	-0.128*** [-5.36]	-0.112*** [-5.09]

¹⁵Here I follow Guiso and Jappelli (2002)[25]

HH size(squared)	0.0169***	0.0138***
	[4.56]	[4.13]
Age	0.0419***	0.0377***
	[4.48]	[4.99]
Age (squared)	-0.000457***	-0.000423***
	[-4.51]	[-5.15]
Employee	0.274*	0.226*
	[2.26]	[2.10]
Age x Employee	-0.00336	-0.00249
	[-1.29]	[-1.07]
Female	-0.0132	-0.0320*
	[-0.79]	[-2.20]
Manufacturing/Utilities	0.211***	0.220***
	[4.20]	[4.63]
Construction	0.179**	0.188***
	[3.24]	[3.59]
Non-Financial Services	0.155**	0.165***
	[3.17]	[3.55]
Financial Services	0.240***	0.267***
	[4.19]	[4.99]
Public Administration	0.0413	0.0679
	[0.80]	[1.40]
High-School Degree	0.0524**	0.0491**
	[2.90]	[3.00]
University Degree or more	0.0739**	0.0686**
	[2.92]	[3.00]
Thinks about retirement income	0.113***	0.101***
	[7.51]	[7.48]
Correct answer to interest rate question	0.0581**	0.0590**
	[2.83]	[3.11]
Expectation error: 2nd quartile	-0.0315	
	[-1.50]	
Expectation error: 3rd quartile	-0.0251	
	[-1.16]	
Expectation error: 4th quartile	-0.0458	
	[-1.95]	
R.r.: difference from cluster median		-0.00125*
		[-2.36]
Underestimates retirement age	0.0211	0.0102
	[1.26]	[0.71]
Index of portfolio diversification	0.0293**	0.0274***
	[3.21]	[3.33]
HH has life insurance	-0.00592	-0.0174
	[-0.29]	[-0.95]
HH uses bank to buy life insurance	-0.0590*	-0.0475
	[-1.99]	[-1.80]
HH uses bank to manage wealth	-0.0712	-0.0746
	[-1.00]	[-1.11]
Unemployment rate in region	-0.0150**	-0.0162**

	[-2.74]	[-3.26]
Observations	2659	3250

t statistics in brackets

Robust standard errors

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Many results of the univariate analysis are confirmed. Participation is markedly higher in households in the upper quartiles of the income distribution and among those with higher education. Household size, which in conjunction to income provides a better measure of ability to save enters negatively but with a strong evidence of non-linearity. Non-linearity is also found in the relationship with age, consistent with the age profile shown by the univariate analysis. Employees are more likely to participate in pension fund and the type of industry in which the respondent is employed has a non negligible impact on the probability of enrollment.

Turning to the variables on which this study is focused, the impact of awareness appears to be strong. Other things being equal, a respondent which thinks about his/her source of income after retirement is 11 percentage points more likely to enroll into a PF, regardless of the specification used. As far as literacy is concerned, I tried all the measures described below; it turns out that only the correct answer to the real interest rate has a statistically significant correlation. This is in line with the findings of Cappelletti and Guazzarotti (2010) [8] and seems to be reasonable: this is the question more tightly related with the idea of yield on long term savings, where the knowledge of the role of inflation is especially important. Financial sophistication (defined as having a more diversified portfolio) appears to be tightly correlated with the probability of participation.

Turning to expectations, underestimating retirement age does not seem to have any effect on the choice of enrolling a fund. The effect of expectations on replacement rate is somehow harder to pin down. In the first model (table 4, first column) only a very strong overestimation has a negative and statistically significant (at slightly less than 5%) effect on the probability of having a PF, while in the second model, being more optimistic than the peers has a small, but significant effect on participation. Finally, financial intermediaries play a small, but significant role: turning to a bank for buying life insurance products (which may appear as substitutes to pension fund) has a negative impact of probability.

Table 3 shows the results of the alternative method of dealing with expectation deviations. I split the sample between those whose expectation error is above or below the median; I define these two groups respectively “Optimists” and “Pessimists”.

Table 3: Probit estimation on subsamples (marginal effects)

	(1)	(2)
	Pessimists	Optimists

H income 2nd qt.	0.046	0.089*
	[1.39]	[2.44]
H income 3rd qt.	0.186***	0.077*
	[5.48]	[2.02]
H income 4th qt.	0.178***	0.096*
	[4.52]	[2.33]
HH size	-0.190***	-0.055
	[-5.58]	[-1.69]
HH size(squared)	0.025***	0.007
	[4.74]	[1.31]
Age	0.032*	0.054***
	[2.37]	[3.77]
Age (squared)	-0.000**	-0.001***
	[-2.72]	[-3.41]
Employee	0.144	0.383*
	[0.75]	[2.35]
Age x Employee	-0.001	-0.006
	[-0.16]	[-1.73]
Female	-0.008	-0.011
	[-0.32]	[-0.51]
Manufacturing/Utilities	0.352***	0.060
	[4.22]	[0.87]
Construction	0.274**	0.081
	[3.09]	[1.05]
Non-Financial Services	0.294***	0.017
	[3.56]	[0.26]
Financial Services	0.330***	0.159*
	[3.53]	[2.06]
Public Administration	0.158	-0.078
	[1.80]	[-1.14]
High-School Degree	0.073**	0.024
	[2.93]	[0.96]
University Degree or more	0.029	0.094**
	[0.76]	[2.86]
Thinks about retirement income	0.112***	0.119***
	[5.16]	[5.83]
Correct answer to interest rate question	0.084**	0.031
	[2.94]	[1.10]
Underestimates retirement age	0.008	0.025
	[0.30]	[1.14]
Index of portfolio diversification	0.045***	0.016
	[3.30]	[1.35]
HH has life insurance	-0.044	0.026
	[-1.49]	[0.96]
HH uses bank to buy life insurance	-0.049	-0.075
	[-1.15]	[-1.89]
HH uses bank to manage wealth	-0.134	-0.017
	[-1.38]	[-0.18]
Unemployment rate in region	-0.019*	-0.017**

	[-1.99]	[-2.59]
High-discount rate	0.025	
	[1.14]	
Low risk aversion	0.039	
	[1.56]	
Observations	1297	1362

t statistics in brackets

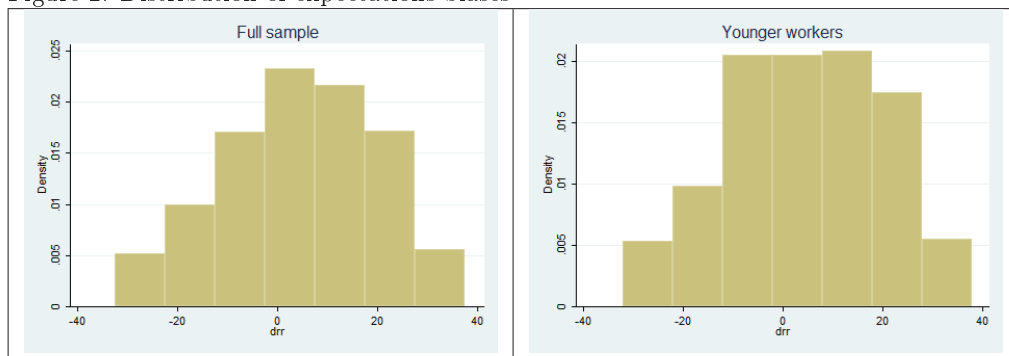
Robust standard errors

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

It is clear that behavior differs substantially across groups. “Optimists” appear to be much less responsive to the variables driving the decision to enroll a PF for the sample as a whole. Decision is determined by by just income (with a markedly lower impact than among the “Pessimists”, education and awareness of the sources of income after retirement. The response is much stronger among those who have lower expectations on replacement rate.

Is this linked with information? A tentative response is “yes”, as expectations errors are skewed on positive values, especially for workers subjected to the post reform pension system as shown by Figure 2.

Figure 2: Distribution of expectations biases



The implication is that providing more information would lead workers to revise downwards their expectations¹⁶

4.3.2 Instrumental variables estimations

The estimations presented in the previous are based on the assumption of exogeneity of all regressors. However, it may be argued that being enrolled into a PF may change the perception on the public pension replacement rate and induce the worker to increase its level of financial literacy in order to better understand how his contribution are invested; or that acquiring information on fiance and retirement is driven by the same motivation as purchasing long term financial products. Then the measures of FL and pension income awareness are

¹⁶Bottazzi et al. (2011) [7] use the terms “More informed” and “Less informed” instead of “Pessimists2 and “Optimists”

likely to be endogenous. Therefore, building from the results of Fornero and Monticone (2011) [14] and Jappelli and Padula (forthcoming)[22] I therefore re-estimate the model using an instrumental variables method, namely GMM¹⁷ and testing for the endogeneity of FL, awareness or both.

Given that the variables to be instrumented are discrete I have to turn to a linear model, whose results can be benchmarked against those of a Linear Probability model (Table 4).

Table 4: Linear Probability Model

	(1)	(2)
	Model 1	Model 2
HH income 2nd qt.	0.061** [2.90]	0.063** [3.00]
HH income 3rd qt.	0.124*** [5.52]	0.126*** [5.64]
HH income 4th qt.	0.130*** [4.86]	0.132*** [4.94]
HH size	-0.126*** [-4.87]	-0.126*** [-4.88]
HH size(squared)	0.017*** [4.14]	0.017*** [4.16]
Age	0.037*** [4.95]	0.036*** [4.77]
Age (squared)	-0.000*** [-4.94]	-0.000*** [-4.70]
Employee	0.193* [2.22]	0.230** [2.75]
Age x Employee	-0.002 [-0.89]	-0.003 [-1.39]
Female	-0.018 [-1.06]	-0.016 [-0.92]
Manufacturing/Utilities	0.175*** [5.49]	0.172*** [5.42]
Construction	0.129*** [3.56]	0.127*** [3.50]
Non-Financial Services	0.109*** [3.92]	0.104*** [3.80]
Financial Services	0.231*** [4.53]	0.223*** [4.38]
Public Administration	-0.004 [-0.14]	-0.014 [-0.46]
High-School Degree	0.051** [2.91]	0.048** [2.76]
University Degree or more	0.071** [2.75]	0.064* [2.48]
Thinks about retirement income	0.115*** [7.34]	0.116*** [7.42]

¹⁷I use the ivreg2 package for STATA, see Baum et al. (2010) [3]

Correct answer to interest rate question	0.057**	0.057**
	[3.15]	[3.15]
Expectation error: 2nd quartile	-0.032	
	[-1.48]	
Expectation error: 3rd quartile	-0.029	
	[-1.26]	
Expectation error: 4th quartile	-0.044	
	[-1.84]	
R.r.: difference from cluster median		-0.002**
		[-2.74]
Underestimates retirement age	0.019	0.010
	[1.11]	[0.63]
Index of portfolio diversification	0.033**	0.033**
	[3.02]	[3.03]
HH has life insurance	-0.005	-0.005
	[-0.20]	[-0.20]
HH uses bank to buy life insurance	-0.061	-0.062
	[-1.77]	[-1.83]
HH uses bank to manage wealth	-0.078	-0.078
	[-0.92]	[-0.93]
Unemployment rate in region	-0.014*	-0.014*
	[-2.57]	[-2.58]
Constant	-0.745***	-0.745***
	[-4.35]	[-4.39]
Observations	2659	2659
Adjusted R-squared	0.106	0.108

t statistics in brackets

Robust standard errors

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In order to choose the instrument for FL and awareness I follow the articles mentioned above and use:

- A dummy for whether the household has a mortgage for the house where they live: this is likely to have pushed the reference person to acquire information on interest rates. Moreover, having a long term liability may facilitate the reflection on related issues, such as how to finance consumption after retirement.
- A dummy for whether at least one of the reference person's parents had a college degree and one or whether one of the parents was self-employed: in this case financial literacy and the attitude to forward looking thinking may be transmitted by parents.
- A dummy for whether at least one of the household member has a degree in Economics or Business Studies.
- The number of bank counters for 100,000 inhabitants in the Region: a large diffusion of banks may spread financial knowledge.

- A dummy for whether the Reference Person’s parents live (or were living) within the RP household. Direct knowledge of how life (economically) after retirement is very likely to affect the awareness of how many resources are needed.
- Indicators of risk aversion and subjective discount rates taken from answer from specific questions of the survey

Using these instruments I first test whether each of the variable is endogenous (Table 5). I first test the joint exogeneity of both variables ; the Durbin-Wu-Hausman test clearly rejects it. I then test for the exogeneity of FL alone, which is rejected too. Finally, the hypothesis of awareness alone being exogenous is not rejected.

Table 5: Exogeneity tests

	(1)	(2)
	Model 1	Model 2
<i>Both awareness and FL exogenous</i>		
Durbin Wu Hausman endogeneity test	10.9	10.9
p-value	.00428	.00421
<i>FL only exogenous</i>		
Durbin Wu Hausman endogeneity test	8.46	8.36
p-value	.00363	.00383
<i>Awareness only exogenous</i>		
Durbin Wu Hausman endogeneity test	2.01	2.06
p-value	.156	.151

The endogeneity of financial literacy found in Fornero and Monticone (2011) [14] and Jappelli and Padula (forthcoming) is then confirmed and I run a GMM estimation using the specifications outlined in Section 4.3.1. In order to assess the validity of the model I consider four different tests:

- An usual test of overidentification: more specifically, given that I use robust errors, I use the Hansen J test.
- A test of underidentification to assess whether the equation is identified, i.e. that the excluded instruments are strongly correlated with the endogenous variables. In order to take into account potential heteroskedasticity I use the LM version of the test developed by Kleinbergen and Paap¹⁸.
- A test of weak identification, to see whether the instruments are only weakly correlated with the endogenous regressors. In case of weak instruments, estimators such as GMM tend to perform poorly¹⁹.

¹⁸For more details see Kleinbergen and Paap (2006)[24]

¹⁹See Stock and Yogo (2005) [36]

- A test of the significance of the structural correspondent of the equation being estimated. In this case the null hypothesis being tested is that, in the structural equation, the coefficients of the endogenous regressors are both equal to zero, and, that the over-identifying restrictions are valid. I use the S statistics developed by Stock and Wright (2000) [35], which is robust to weak identification.

The results of the first stage regression (presented in Appendix A), show that having a mortgage, having a very high discount rate and living in a region with a high bank density have some predictive power on the probability of knowing the concept of real interest rate. Table 6 shows the results of the GMM estimations.

Table 6: GMM estimation.

	(1)	(2)
	Model 1	Model 2
HH income 2nd qt.	0.010 [0.41]	0.026 [0.96]
HH income 3rd qt.	0.069** [2.77]	0.097*** [3.66]
HH income 4th qt.	0.081** [2.84]	0.103*** [3.35]
HH size	-0.124*** [-4.84]	-0.145*** [-5.13]
HH size(squared)	0.015*** [3.93]	0.019*** [4.44]
Age	0.038*** [5.74]	0.040*** [4.85]
Age (squared)	-0.000*** [-5.81]	-0.000*** [-4.73]
Employee	0.154 [1.83]	0.287** [3.01]
Age x Employee	-0.001 [-0.31]	-0.003 [-1.59]
Female	-0.032* [-2.01]	-0.006 [-0.29]
Manufacturing/Utilities	0.195*** [5.94]	0.197*** [5.29]
Construction	0.153*** [4.07]	0.170*** [3.96]
Non-Financial Services	0.118*** [4.20]	0.122*** [3.73]
Financial Services	0.245*** [5.01]	0.215*** [4.01]
Public Administration	0.019 [0.61]	-0.003 [-0.10]
High-School Degree	0.038* [2.16]	0.034 [1.75]
University Degree or more	0.053* [2.02]	0.039 [1.32]

Thinks about retirement income	0.094***	0.108***
	[6.29]	[6.44]
Correct answer to interest rate question	0.443**	0.450**
	[3.28]	[3.11]
Expectation error: 2nd quartile	-0.020	
	[-0.94]	
Expectation error: 3rd quartile	-0.015	
	[-0.65]	
Expectation error: 4th quartile	-0.028	
	[-1.18]	
R.r.: difference from cluster median		-0.001*
		[-2.26]
Underestimates retirement age	0.017	0.012
	[1.06]	[0.69]
Index of portfolio diversification	0.014	0.016
	[1.16]	[1.21]
HH has life insurance	-0.032	-0.018
	[-1.53]	[-0.74]
HH uses bank to buy life insurance	-0.053	-0.074*
	[-1.69]	[-2.10]
HH uses bank to manage wealth	-0.098	-0.093
	[-1.25]	[-1.11]
Unemployment rate in region	-0.011*	-0.011
	[-2.10]	[-1.87]
Constant	-0.975***	-1.114***
	[-5.20]	[-4.94]
Observations	3250	2659
Hansen J Statistics (overidentification)	6.687	4.251
p-value	0.351	0.643
Kleimberger-Paap underidentification test	59.478	52.515
Weak identification F test	8.510	7.567
Stock-Wright S test	19.939	16.048
p-value	0.006	0.025

t statistics in brackets
Robust standard errors
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The diagnostic tests overall confirm the validity of the GMM approach, with just some doubts raised by the relatively low value of the F statistics in the weak identification test²⁰

Turning to the results, they are not widely different from those of the probit or LPM specification as long as income, household size type and industry of employment are concerned. The coefficient on the index of portfolio diversification is no longer significant, nor the role of financial intermediaries. The size of the coefficient on financial literacy increases eightfold: the magnitude is comparable

²⁰Critical values for this test and the under identification one have not been tabulated for the case of non i.i.d distributed residuals.

with what found by Fornero and Monticone (2011)²¹ [14], while the impact of awareness remains roughly similar as in the LPM estimation. The impact of the expectation error on the replacement rate is in line with what found previously. Finally, I split the sample into “Optimists” and “Pessimists” and run the GMM regressions (the results are shown in Table 7). As in the case of the probit model, pessimist are shown to be more responsive, although the results are less clear cut than previously, especially for FL and awareness.

Table 7: GMM estimation.

	(1) Optimists	(2) Pessimists
HH income 2nd qt.	0.035 [0.87]	0.032 [0.99]
HH income 3rd qt.	0.026 [0.66]	0.177*** [5.28]
HH income 4th qt.	0.029 [0.63]	0.173*** [4.34]
HH size	-0.079* [-2.03]	-0.203*** [-5.34]
HH size(squared)	0.011 [1.86]	0.026*** [4.49]
Age	0.050*** [4.28]	0.031** [2.63]
Age (squared)	-0.001*** [-3.87]	-0.000** [-2.97]
Employee	0.291* [2.14]	0.161 [1.03]
Age x Employee	-0.004 [-1.32]	-0.001 [-0.24]
Female	0.006 [0.22]	-0.014 [-0.54]
Manufacturing/Utilities	0.119 [1.48]	0.236*** [6.59]
Construction	0.129 [1.49]	0.164*** [3.88]
Non-Financial Services	0.046 [0.62]	0.166*** [5.58]
Financial Services	0.207* [2.17]	0.227*** [3.44]
Public Administration	-0.047 [-0.63]	0.025 [0.63]
High-School Degree	0.022 [0.81]	0.063* [2.28]
University Degree or more	0.073 [1.96]	0.016 [0.36]
Thinks about retirement income	0.114*** [4.98]	0.111*** [4.89]

²¹The coefficient they found in the IV estimation are around 0.3.

Correct answer to interest rate question	0.447*	0.221
	[2.33]	[1.23]
Underestimates retirement age	0.018	0.019
	[0.75]	[0.72]
Index of portfolio diversification	-0.001	0.048**
	[-0.06]	[2.69]
HH has life insurance	0.018	-0.043
	[0.56]	[-1.27]
HH uses bank to buy life insurance	-0.077	-0.059
	[-1.66]	[-1.14]
HH uses bank to manage wealth	-0.009	-0.168
	[-0.08]	[-1.43]
Unemployment rate in region	-0.012	-0.014
	[-1.74]	[-1.41]
Constant	-1.350***	-0.686*
	[-4.13]	[-2.20]
Observations	1362	1297
Hansen J Statistics (overidentification)	2.951	7.910
p-value	0.815	0.245
Kleimberger-Paap underidentification test	28.642	33.873
Weak identification F test	4.209	4.757
Stock-Wright S test	9.488	9.748
p-value	0.219	0.203

t statistics in brackets

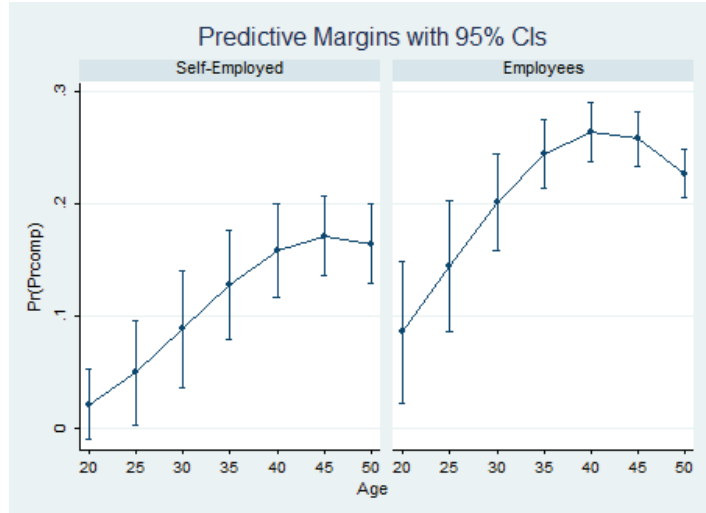
Robust standard errors

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. Discussion

The slow and uneven development of pension fund in Italy is becoming a critical policy issue, in order to secure a sufficiently high level of pension to current workers. The problems appears particularly acute for younger people, who, on top of receiving a much lower level of public pension, as a consequences of the reforms enacted in the last two decades, offer work as self employed, with the possibility of discontinuous carriers and large fluctuations in labour income. Figure 3, shows the age participation profile obtained using the probit regression estimates and confirms that enhancing younger worker's participation should be a policy priority.

Figure 3: Marginal effects of age on enrollment



What measures can the public sector take to foster participation in pension funds? From the regression results it appears clearly that, *ceteris paribus*, participation is tightly correlated with income. This may be a signal that the current system of tax treatment, based on the possibility to deduct part of the contributions paid from taxable income is not very effective to spread participation across low/middle income household. Income data contained in SHIW are self-reported and net of taxes and therefore a direct testing of this proposition is not feasible. Salera (2013)[34], using a large household survey combining answers to interviews with administrative data income and taxation ²² finds that tax deduction have only a very limited power in increasing participation.

The econometric results show that the working in some industries has a bigger impact on enrollment than others. This can be due partially to the structural differences across industries (for example size of firms, type of ownership), but it is also likely to reflect variability in the type of contracts proposed to workers and in the strength of the union and the effort they make to promote them. If this is true, probably, leaving to trade unions the task to inform people about PF is not enough and some additional and, possibly more centralized, effort is in order. A central issue, then is what the state should provide, basic financial education, information on public pension or both?

A clear message that emerges from this paper is that, as far as pension fund participation is concerned, the answer is that both should be provided. Financial literacy plays a key role in determining participation, as shown by the tight correlation shown in by the econometric estimates and indirectly from the much stronger probability workers in the financial sector have to enroll in a

²²It is the Italian module of the Eurostat EU-SILC (European Union Survey on Income and Labour Conditions) database. Its main strength is to have a very precise break down of individual before and after tax incomes, but it lacks soft information on expectations, financial literacy and other relevant “soft” information. Combining it with SHIW and use the resulting database to study household financial choices is an ongoing research project.

Pension Fund.

The same applies to awareness: thinking about how consumption will be financed after retirement is a relatively strong predictor of participation in a pension fund. Several contributions in economic psychology have shown that awareness is linked to specific personal traits, but it is also likely to be heavily influenced also by the provision of clear information on the working of the pension rules, and especially on the income that is to be expected after retirement.

Information plays a key role in enhancing participation also by influencing expectations on future replacement rate. More pessimists (and arguably better informed) workers tend to be more responsive to the variables affecting participation. Therefore providing clearer information about the replacement rate, should make them more concerned about how to finance consumption once retired. Overall, this paper confirms quantitatively the role of information and education as important policy tools to promote long term savings²³.

6. Conclusion

Using data from the 2010 wave of the Bank of Italy SHOW database this paper has sought to estimate what drives the decision to enroll a pension fund. In line with previous studies, household ability to save (measured by income and number of components) and the individual level of education have a strong predictive power. The econometric estimations uncover a strong role of the sector of employment in predicting participation, which can be interpreted as a supply (linked to the availability of suitable collective funds) or demand (working in a specific sector may provide skills needed to understand the problem) factor. Another important novelty of this study is the consideration of both financial literacy and expectation on pension income. While the impact of FL is some what weaker than what found in other studies, awareness on the sources of income after retirement and not too optimistic expectations about the replacement rate are tightly linked to PF participation. On the policy side this paper underlines the importance of public provision on information to increase participation to the current very low level.

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²³However Theiler and Sunstein (2008)[38] point out that education and information are not enough to promote “good” choices, and a key role is how these are presented. Concerning information, a recent paper by Prast et al. (2012)[30], based on a survey of Dutch workers, document that information in itself, even though if presented in the simplest and most direct way (“Would you change your behavior if you were informed that your real pension income will be 25% lower than you had expected so far?”) does not alter much savings choices

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1 Appendix A - Descriptive analysis

	Owns a Pension Fund		
	No %	Yes %	Total %
Household income quartile			
First	90.4	9.6	100.0
Second	78.9	21.1	100.0
Third	78.0	22.0	100.0
Fourth	73.2	26.8	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(3) =	71.4545		
Design-based F(2.97, 9651.90) =	12.6138	Pr =	0.000
Sex			
Female	80.7	19.3	100.0
Male	78.3	21.7	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(1) =	2.8934		
Design-based F(1.00, 3251.00) =	1.4771	Pr =	0.224
Age brackets			
20 to 30	83.9	16.1	100.0
31 to 40	78.5	21.5	100.0
41 to 50	75.7	24.3	100.0
51 to 59	84.5	15.5	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(3) =	28.1071		
Design-based F(2.95, 9582.24) =	4.7405	Pr =	0.003
Level of education			
Compulsory Education	85.9	14.1	100.0
High-School Degree	76.0	24.0	100.0
University or more	75.6	24.4	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(2) =	45.3967		
Design-based F(2.00, 6497.78) =	11.8426	Pr =	0.000
Type of employment			
Self-Employed	87.3	12.7	100.0
Employee	77.6	22.4	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(1) =	27.3949		
Design-based F(1.00, 3251.00) =	17.5762	Pr =	0.000
Industry of Employment			
Agriculture and Mining	96.6	3.4	100.0
Manufacturing and Utilities	72.9	27.1	100.0
Construction	84.1	15.9	100.0
Non-financial services	80.5	19.5	100.0
Financial services	49.2	50.8	100.0
Public administration	83.3	16.7	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(5) =	133.9726		
Design-based F(4.77, 15502.89) =	15.4849	Pr =	0.000
Sample size	2,591	660	3,251

	Owns a Pension Fund		
	No %	Yes %	Total %
FL: correct answer to all questions			
No	81.4	18.6	100.0
Yes	76.2	23.8	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(1) =	13.1152		
Design-based F(1.00, 3251.00) =	6.7629	Pr =	0.009
FL: Number of correct answers			
0	90.8	9.2	100.0
1	80.9	19.1	100.0
2	79.4	20.6	100.0
3	76.2	23.8	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(3) =	30.9943		
Design-based F(2.94, 9552.72) =	4.6180	Pr =	0.003
FL: correct answer to mortgage question			
No	79.0	21.0	100.0
Yes	79.6	20.4	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(1) =	0.1462		
Design-based F(1.00, 3251.00) =	0.0691	Pr =	0.793
FL: correct answer to real interest rate question			
No	87.1	12.9	100.0
Yes	77.3	22.7	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(1) =	31.0848		
Design-based F(1.00, 3251.00) =	14.3898	Pr =	0.000
FL: correct answer to differentiation question			
No	84.6	15.4	100.0
Yes	76.1	23.9	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(1) =	33.5072		
Design-based F(1.00, 3251.00) =	16.8773	Pr =	0.000
Thinks about income when retired			
No	85.3	14.7	100.0
Yes	72.8	27.2	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(1) =	77.5333		
Design-based F(1.00, 3251.00) =	40.2322	Pr =	0.000
Expectation error on replacement rate			
Below median	80.0	20.0	100.0
Above median	78.7	21.3	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(1) =	0.8781		
Design-based F(1.00, 3251.00) =	0.4472	Pr =	0.504
Sample size	2,592	660	3,252

	Owns a Pension Fund		
	No %	Yes %	Total %
Household uses banks to buy insurance			
No	80.0	20.0	100.0
Yes	72.6	27.4	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(1) =	7.8891		
Design-based F(1.00, 3251.00) =	3.9481	Pr =	0.047
Household uses banks for wealth management			
No	79.4	20.6	100.0
Yes	75.9	24.1	100.0
Total	79.4	20.6	100.0
Pearson: Uncorrected chi2(1) =	0.1881		
Design-based F(1.00, 3251.00) =	0.0930	Pr =	0.760
Sample size	2,592	660	3,252

2 Appendix A - First Stage Regression

Table 8: Table A1: First stage regression

	(1)
	Correct answer to interest rate question
HH has mortgage for home	.0425*
	[2.3]
HH saved during the year	-.0151
	[-.909]
At least one of RP parents graduate	-.00599
	[-.187]
At least one of RP parents self-employed	.00163
	[.0929]
At least one in HH has degree in Economics or Business	.0156
	[.409]
Bank counters per 100k people in Region	.00075***
	[5.98]
High discount rate	-.0473*
	[-2.17]
Low discount rate	-.0814***
	[-3.73]
Very low discount rate	-.0418*
	[-2.04]
Low risk aversion	.127
	[1.8]
High risk aversion	.136
	[1.94]
Very high risk aversion	.113
	[1.61]
Observations	2659
Adjusted R2	.0891

t statistics in brackets

Robust standard errors

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$