(Article begins on next page)

Behind the success of dominated personal pension plans: sales force and financial literacy effects

Journal:	*Journal of Pension Economics and Finance*
Manuscript ID	JPEF-18-1132.R1
Manuscript Type:	Article
Date Submitted by the Author:	n/a
Complete List of Authors:	Marotta, Giuseppe; University of Modena and Reggio Emilia, Economics Department
Keywords:	Pension system reform, Retail financial products distribution, Italy, Financial regulation, Private pension system, Insurance

SCHOLARONE™
Manuscripts

Online Appendix

1. The market of Italian personal pension plans

Besides the occupational schemes (Fondi pensioni chiusi or FPNs) for dependent workers grounded on collective agreements between trade unions and employers that determine also employers' compulsory matching contributions, there are two types of personal pension plans.

FPAs include different sub-funds, ranging from low-risk investment style to a riskier one (i.e. all-share). PIPs' subscribers can choose – and do for about three fourths of subscriptions - traditional life insurance products, invested almost entirely in low-risk (domestic) public bonds, or a portfolio of unit-linked investment plans, with different risk profiles, managed by the same company or by another one; a combination of both choices is also available[i].

2. New COVIP information system

The COVIP statistics until 2015 were unable to properly handle multiple memberships (i.e. a person could subscribe to several personal plans). In fact, according to the new COVIP information system, implemented provisionally since 2015 and fully operative since 2016, the effective membership of the private pension system at end-2015 – the year closer to the last SHIW wave used in this paper – amounted to 6,716 million (included 434,000 in old PIPs), with a reduction of almost 8% relative to the grand total of 7,235 million. The subscribers to only one sub-fund among FPNs, FPAs and PIPs were 5,744 million. The remaining 1,108 "subscriptions" referred to 538,000 individuals, mostly with double membership (only 6,000 individuals had triple or quadruple membership). Almost two thirds involved PIPs: they were taken by 172,000 enrollees in FPNs, 78,000 in FPAs, 90,000 in other PIPs (COVIP 2017).

3. Private pension plans participation in SHIW data.

The averaged subscription rates computed out of HHs' answers of the three waves for the balanced panel, adjusted for sample weights, reveal sizable differences within the SHIW data[ii] and compared with COVIP data as well (Table a.1) [iii].

The combined averaged subscription rates to all pension plans in each wave (24.8, 26.5 and 23.6 per cent) is roughly similar to the grand total only if the "real" FPNs subscribers are the ones acknowledging employers' matching contributions, an assumption that disregards that they include also the voluntary contributions for FPAs and PIPs. The underestimation of average participation rates in surveys may be due to several reasons, including respondents' tendency to mis-report financial decisions (Gustman et al. 2008). In the case of Italy, Cappelletti and Guazzarotti (2010) document a significantly lower participation rate in the private pension system in the 2008 SHIW, compared to COVIP data, possibly because of under-reporting and low sampling of workers in sectors with above-average participation rates, such as at large firms.

Worthy of note is that the much higher proportion of PIP subscriptions over all private pension plans (PENS) in the SHIW individual data (around 47%), compared to the reference universe (about one third in the 2015 COVIP revised data, net of multiple subscriptions; see above).

References

Cappelletti, G. and Guazzarotti, G. (2010) Le scelte previdenziali nell'indagine sui bilanci delle famiglie della Banca d'Italia. Banca d'Italia, *Questioni di Economia e Finanza* no 77.

Gustman, A. L., Steinmeier, T. S., and Tabatabai, N. (2008) Do workers know about their pension plan type? Comparing workers' and employers' pension information, in A. Lusardi (ed.) *Overcoming the Saving Slump: How to Increase the Effectiveness of Financial Education and Savings Programs*, Chicago, University of Chicago Press, 47–81.

Tables

Table a.1.   Private pension plans[a] subscription rate in the balanced panel (%)

	2010	2012	2014
Any private pension plans	23.7	23.2	23.7
FPNs	3.0	3.6	2.3
Matching compulsory and voluntary employers' contribution (all plans)	9.8	8.8	9.7
FPAs	2.2	3.0	2.9
PIPs	12.8	11.8	11.0

Source: Author's calculations from SHIW (various years). Data adjusted for sample weights. [a]SHIW data do not allow to distinguish between "old" and "new" PIPs.

Table a.2.   Positive savings by financial literacy levels *(%)*

	Correct answers	Wrong answers
One: Risk diversification	41.5	27.4
Two: Risk diversification & interest rate and inflation	41.3	30.0
At least two	38.5	29.6
Three	40.3	33.0

Source: Author's calculations from 2010 SHIW.

---

[i] A noticeable difference, on transparency ground for potential subscribers, is that FPAs and unit-linked based PIPs adopt a market price valuation and there is no guarantee on the sum of nominal contributions, gross of the management costs; PIPs that replicate traditional life insurance products are instead valued at historical cost and provide a guarantee on the cumulated contributions.

[ii] SHIW data do not allow to identify old and new PIPs and provide data on all private pension funds with employers' matching contributions that do not distinguish between FPNs and FPAs.

[iii] SHIW data do not allow to take into account how many subscribers have not paid contributions, in the year or at all. According to COVIP data, these subscribers amount to at least one fifth, and are more concentrated on personal pension plans, and especially among self-employed, with a proportion of almost one third (for data up to 2014 see COVIP 2015).

Behind the success of dominated personal pension plans: sales force and financial literacy effects

Abstract

The revealed preference for dominated insurance-based personal pension plans in Italy is a decade-long puzzle. I surmise that a motivation from the supply side is a sales force effect deriving from the geographical distribution of financial providers, including the countrywide network of the state controlled Post Office. I provide supporting evidence using three biennial waves of the Bank of Italy's survey on household finances from 2010 to 2014. The time interval includes a public pension system reform sharply raising the statutory age retirement, legislated in December 2011 to defuse a sovereign debt crisis. I show that the salience effect on the awareness of the benefits of supplementing lower perspective public pensions with personal pension plans strengthened the sales force factor. Exploiting a module on financial literacy in the 2010 wave I detect a small, but statistically significant, dampening effect of financial literacy on the sales force factor in the 2014 wave.

Behind the success of dominated personal pension plans: sales force and financial literacy effects

1. **Introduction**

The preference for the dominated alternative between two types of personal pension plans (PPPs) is a decade-long puzzle in the Italian private pension system, which includes also occupational schemes (Fondi pensioni chiusi or FPNs); for a recent overview see Ricci and Caratelli (2017).

"New" Personal Investment Plans (PIPs), a type of PPPs introduced in 2007 and sold only by insurance companies, are much more widely subscribed than the alternative open pension funds (FPAs), offered by insurance companies as well as by banks and bank controlled management saving companies. The increase of PIPs between 2007 and 2018 was 3.9 times the corresponding value for FPAs; the ratio was 4.3 times between 2010 and 2014, the period of our econometric investigation[1].

<div align="center">TABLE 1 APPROXIMATELY HERE</div>

The share of individual subscriptions accounted for about 85% of FPAs at end-2017; the share was equal to 72% among dependent workers (COVIP 2018). Subscriptions (only individually allowed) for PIPs were over three fifths for dependent workers, about one fifth each for self-employed and for others.

PIPs' averaged annual net returns were however consistently lower (Table 2). Moreover, PIPs' Synthetic Cost Indicator (SCI), estimated by the Supervisory Pension Authority COVIP) as a percent of the accrued capital, was also consistently higher (Table 3)[2].

<div align="center">TABLES 2-3 APPROXIMATELY HERE</div>

In an international comparison of costs for PPPs carried out by the International Organization of Securities Commissions (IOSCO), PIPs' costs (as a per cent of assets), already the highest in 2014, rose further in 2017; the differential between PIPs and FPAs increased as well (Han and Stańko 2018, Table 2). PPPs' costs increased between 2014 and 2017 only in three other countries – Hungary, Poland and Romania[3].

The preference for dominated PIPs is an example of investment mistakes of households paying in excess for some services. The topic of investment mistakes is central to the field of household finance (Campbell 2006). Interestingly, however, they are detected mostly among poorer and less educated households. The case investigated in this study refers instead to wealthier households, who voluntarily supplement their public pension entitlements. My suggested explanation for such investment mistake is a structural supply factor, namely the PPPs' geographical market structure skewed towards PIPs. This paper contributes therefore to the smaller but increasing literature on investment mistakes tied to supply side factors (Foà et al. 2015 for Italy; Gurun et al. 2016 for the US; Argyle et al. 2017 for the US; Hastings et al. 2017 for Mexico; Iscenko 2018 for the UK).

PIPs are an insurance-based product, with individual subscriptions, marketed only by insurance companies, though possibly controlled by banking groups, and by their financial agents. The market leader is Poste Vita, a subsidiary of the state-controlled Post Office, with 943,000 PIPs as of 2017 (more than 2.6 times the 2010 figure) and a market share of about 30%. The proprietary products are marketed through a countrywide network of post offices. The coverage rate of municipalities of the 13,000 (14,000 in 2010) post offices in 2017 ranges from 93% to 100% in different regions. One cross-selling strength of the Post Office is that the eventual pension generated by a PIP is credited in the subscribers' postal deposits, guaranteed in full by the State, as advertised in all ATMs outside the post offices.

3

The market structure for FPAs, with both individual and collective subscriptions for private employees and access that can be linked to employment and professional activities, is instead open to the competition among various financial providers: private insurance companies (with a market share larger than a half), bank controlled management saving companies (about two fifths of the market) and banks (only one, in fact, as of 2017).

As a way of comparison with the coverage rate of post offices, bank-served municipalities shrank between 2010 and 2014 from 5,905 in 2010 to 5,750 in 2014 (compared to a grand total of 7,900 municipalities, with a coverage rate of 75%); bank branches decreased by almost 9%. Understandably, municipalities without a bank are the smaller ones. To provide a simple indicator, the ratio between the shares of bank branches and of inhabitants in the six largest cities (more than 500,000 inhabitants) rose from 1.3 to 1.5 between 2010 to 2014.

The geographical market structure for PIPs and FPAs matters especially when investment choices cannot be delegated to employers or bodies able to vet financial providers and to negotiate better contractual terms.

The cost differential between PIPs and FPAs incorporates in fact a fee differential that is likely to induce financial promoters within a banking group to nudge investors towards higher fee-generating PIPs. A study on life insurance agents in India, who are largely commission motivated, finds that agents recommend products with higher commissions even if the product is suboptimal for the customer (Anagol et al. 2012).

Unfortunately, there is only anecdotal evidence on potential conflicts of interest that are likely hinted by COVIP when mentioning aggressive selling policies as a possible explanation for the preference for PIPs (COVIP 2011 55; 2015, 23; 2016, 43). The main focus in the econometric investigation is therefore on the geographical market structure for PPPs, crudely proxied with the size of the cities where households reside, because of data

4

constraints in the Bank of Italy's Survey of Household Income and Wealth (SHIW). However, in interpreting the findings relative to the force sales factor, I take into account also the fee-related incentives pertaining to private financial providers.

Financially literate individuals should be able to gather information on realized net returns and perspective costs of the two alternative PPPs and look through the advisers' and sellers' incentives. The sales force factor should therefore be countervailed to some extent, the more so if the investors' attention is heightened by a salient event, such as an unexpected public pension reform, hurriedly legislated in December 2011 to defuse a confidence crisis in sovereign debt.

In the empirical investigation I rely on the three biennial SHIW waves between 2010 and 2014. The waves from the balanced panel are used to explore the role of financial literacy (FL) levels computed from the answers to a module available only in the 2010 SHIW.

To anticipate the results, the main findings are two.

First, there is a strong and persistent sales force effect, whereby the probability of preferring PIPs to FPAs, conditional on the participation to the private pension system, is negatively correlated to the size of the city where respondent household heads reside.

Second, a higher FL level has the expected dampening effect on the supply push factor, but only in the 2014 SHIW wave, the one affected by the full implementation of the pension reform. The results are similar when probing into the effects of lower FL levels.

The remainder of the paper is organized as follows. Section 2 reviews related literature and develops testable hypotheses. Section 3 describes the SHIW data. Section 4 presents the econometric framework. Section 5 reports and interprets the empirical findings. Section 6 concludes and discusses policy implications, limitations of the study and directions for future research.

2.   Literature review and testable hypotheses

This paper relates to two strands of literature on household finance.

Investment mistakes, because of the discrepancy between observed and ideal behaviour, are central to the field (Campbell 2006) and an increasingly investigated topic in empirical household finance (Mullainathan et al 2012; Guiso and Sodini 2013; Hastings et al. 2013; Iscenko 2018 and the references therein for a supervisory perspective).

With reference to the focus in this paper, recent studies examine how features of the market structure can affect invidual choices. Gurun et al. (2016) show for the US how the market structure can affect individual choices for the case of expensive mortgages linked to the intensity of local advertising. Argyle et al. (2017) find for the US that borrowers are more likely to engage in searching for a better provider the higher the number of financial institutions within a 20-mile radius. Hastings et al. (2017), for the case of social security privatization in Mexico, document that many participants invest their account balances in financial products with high fees not offset by higher returns. The motivation offered is that their providers invest heavily in sales force and advertising, non-price attributes that substitute for competition on price.

FL literature has increasingly probed into how, from the supply side, providers' incentives can hinder, leaving aside behavioural biases, investors' exploitation of FL competencies, geared prevalently to the demand side. Various principal-agent or conflict of interest arguments motivate mixed findings of complementarity or substitutability between FL and financial advice when considering the outcomes of investors' choices (complement in Hackethal et al. 2012, Bucher-Koenen and Koenen 2015, Calcagno and Monticone 2015; substitute in Disney et al. 2015). These results lend support, from a policy point of view, to the idea that the option of a higher FL may be not an efficient use of public resources compared to the alternative of better structural and conduct regulation (Hastings et al. 2013).

This study relates also to literature on the relevance of different definitions of FL on retirement planning in the Italian case, though using different FL definitions: preference for an annuity rather than a lump sum (Cappelletti et al. 2011, using 2008 SHIW); private pension system participation (Fornero and Monticone 2011a, b, using 2006 and 2008 SHIW). A related paper is Luciano et al. (2016), which focuses mainly on life insurance subscriptions but includes also pension funds subscriptions in one robustness exercise, using selectively SHIW waves from 2004 to 2012.

This paper contributes to these literatures by focusing on the role of a structural sales force factor as an explanation for the investment mistake of preferring the dominated PPP. I take the view that such a factor combines various market structure features. First, an almost universal coverage of municipalities by the state controlled Post Office that provides its own insurance company's PIPs. Second, a comparatively reduced, and shrinking, coverage rate of municipalities by bank branches that compete, on their own and through the bank controlled management saving companies, with private insurance companies in offering FPAs. Third, fee-related compensations for advisers in banking groups controlling insurance companies bound to incentive nudging investors toward the higher-fee generating PIPs.

The econometric framework for the empirical investigation is organized around four testable hypotheses.

The first, and key for the purposes of this study, hypothesis in the cross-section multivariate analysis for full samples of the three SHIW waves is:

H1: conditional on being subscribed to the private pension system, the probability of dominated PIPs being preferred to FPAs decreases the higher the local coverage rate of PPP providers.

A new Government's reform, hurriedly legislated in December 2011 to defuse a sovereign debt crisis and implemented in 2012, sharply raised the statutory retirement age

and ended the slow phasing in toward a generalized notional contribution system. The ensuing widely debated reassessment of public pension adequacy was bound to raise the subscription rate for tax-incentived[4] voluntary PPPs, especially among wealthier households, to offset the perspective reduction of the public pension entitlement.

Hence, the second testable hypothesis:

H2: when comparing the 2010 SHIW wave to the 2014 post-reform one, the stability of estimates for the sales force effect across waves should be associated to an increased explanatory power for households' financial strength indicators.

In contrast with the ambiguous theoretical predictions of complementarity/substitution relations between FL and financial advice, a higher FL competency should unambiguously thwart the preference for PIPs induced by the exogenous geographical distribution of PPPs providers.

Accordingly, a third testable hypothesis in the cross-section multivariate analysis for the reduced samples of the three SHIW waves drawn from the balanced panel, assuming that respondent household heads have the identical FL level computed in 2010, is:

H3: the probability that participants in the private pension system subscribe PIPs decreases with the level of FL. The effect should be more statistically significant in the 2014 wave, owing to the reaction of wealthier households to the reform.

The indicator of the highest level of FL computed when all three questions are anwered correctly in the 2010 SHIW wave is likely not to fit adequately the decision process for pension investments. Lower FL levels could in fact be enough (Lusardi and Mitchell 2014 and references therein; Hastings et al. 2013, 2017). Hence the fourth hypothesis:

H4: lower FL levels could have effects similar to the highest FL indicator.

3.   The 2010-2014 SHIWs

The Section is organized as follows: a) an overview of SHIW and an assessment of the representativeness of household heads' self-reported subscription rates; b) an exploratory analysis of the association between FL levels computed for the 2010 SHIW wave and subscription rates to the private pension system.

a) Overview of SHIWs. *The* Bank of Italy's SHIW is a biennial survey on income and wealth with about 8,000 households as sampling units; the household head (HH) is the respondent who takes the main decisions on household finances. As in previous studies using SHIW on private pension participation, in the econometric investigation the estimation sample is restricted to 25-65 years old HHs, excluding those unemployed or out of the labour force.

Each survey, besides a fixed template, has modules that may or may not be replicated in the next wave. Only the three waves from 2010 to 2014 have an identical module on the participation to the private pension system. A module on FL is present only in the 2010 SHIW, and this is the reason for using a balanced panel of 2320 HHs when testing *H3* and *H4*.

The 2010-2014 interval, against the backdrop of a stable recession and of almost no inflation, allows to investigate the possible effects of one major, unexpected but widely discussed and resented reform. The only change for the private pension system was in fact a minor rise in the substitute tax rate on financial returns[5].

Wealthier HHs, who are likely to be more interested in – and financially capable of – subscribing PPPs, are also the ones more affected by under- and mis-reporting on (net of taxes) income and current value of wealth, real and financial (including pension funds and life insurance), as exhaustively documented by Baffigi et al. (2016, Section 4). I deal with these data issues as follows. First, I adjust household income[6] for the number of its

9

components, using the OECD equivalence weights; second, I split the resulting equivalised

income and financial assets by deciles; third, I use a binary variable owner/no owner of the

main home as an indicator of housing wealth[7]; fourth, I take into account the main household

debt with a binary variable on whether a HH is/is not a mortgagee. The drawback of these

choices, with all binary explanatory variables, except for age, is to shrink the variation in

micro data, already low over a time span of five years, and to have high correlation among

the indicators of equivalised income and financial assets. With respect to this last issue, to

reduce collinearity, I drop financial assets as an explanatory variable.

In order to take into account the fact that financial constraints could inhibit the

implementing of proper investment choices, I exploit the question, present in all three waves,

of whether the HH has been able to save in the reference year[8]. As expected, positive savings

are associated with higher subscription rates in the private pension system (Table a.2 in the

Online Appendix).

Caution is warranted in drawing policy implications from the results of an empirical

investigation based on SHIW individual data, unadjusted for sample sizes.

The sum of the averaged subscription rates to any private pension plan in each wave

(24.8, 26.5 and 23.6 per cent) is roughly similar to the grand total only assuming that the HHs

acknowledging employers' matching contributions subscribe only to FPNs. SHIW data on

employers' matching contributions include however also the voluntary ones for FPAs and

PIPs. The ratio of PIPs to FPAs is also much higher than in COVIP data (Tables 1 and A.1)[9].

It is worth noticing some differences in the cross section data when using full, rather

than reduced samples drawn from the balanced panel, under the assumption that the surviving

25-65 years old HHs in the successive waves do not change their self-reported FL in the 2010

wave.

By construction, the samples in the successive waves are modified because HHs aged 65+ exit but there are no entries. The changed composition yields an increasing average age and consequently, as suggested by a life-cycle framework, higher average equivalised incomes; the subscription rates to any private pension plans remain almost unchanged, in contrast with the downward trend in the full samples (Tables A.1-2).

b) Financial literacy and personal pension plans subscriptions.

FL requirements vary in relation to different instruments for retirement saving. As underlined in OECD (2016, 128), decision-making about retirement is likely to be more difficult and require better FL when making choices on PPPs. Indeed, a more diversified portfolio of investment alternatives requires greater financial skills when compared to the occupational plans, which have a narrower range of options as for the choices of the provider and of the plan.

The questions operationalizing the enquiries on the FL that have come to be known as the "Big Three" – interest compounding, inflation and real interest rate, risk diversification – (e.g. Lusardi and Mitchell 2011a, Klapper et al. 2016) are unlikely to fit the required competencies for retirement investment choices. In addition, how to map into a meaningful ranking score the number of correct answers to fairly different questions is an open issue (Hung et al. 2009). Finally, a necessary condition for financially literate potential subscribers to implement "optimal" choices is that they earn enough to save.

Against this backdrop I exploit the 2010 SHIW, which has a module with three questions closely resembling the Big Three (see Appendix for the wording). The first question combines concepts of fixed and variable interest rate mortgages and of variable or constant mortgage instalments; a second question is centered on nominal interest rate and inflation; a third one is on risk diversification. As is common in international comparisons on

11

FL (Lusardi and Mitchell 2014), around one third of HHs answer correctly to all three questions; the risk diversification issue is the least understood one.

As expected, the distribution of correct answers among subscribers of private pension plans is tilted towards a higher score, though no strong association is detected with different levels of FL (Table 4).

TABLE 4 APPROXIMATELY HERE

4. **The econometric framework**

The multivariate analysis relies on single wave cross-sections estimates in order to cope with the reduced variation of the binary variables in the short time span.

To test *H1* and *H2* I use a reduced form specification to explain the revealed preference for PIPs, conditional on participating in the private pension system. I deal with this sample selection problem using a standard two step Heckman probit procedure.

The probit specification in the first step (subscripts for the respondents omitted for simplicity) is:

$$\Pr (S = 1| \boldsymbol{D}, \boldsymbol{FS}, \boldsymbol{GS}) = F(\alpha \boldsymbol{D} + \beta \boldsymbol{FS} + \gamma \boldsymbol{GS}) + \varepsilon \qquad (1)$$

where:

S = binary variable for a HH subscribed to any private pension plan (PENS);

$\boldsymbol{D}$ = vector of binary controls, except for the continuous variables *age* and *age squared,* describing the socio-demographic profile: *second to tenth equivalised income decile, female, upper secondary degree, university degree, single, widowed, private employee, public employee, employed in a small firm* (5-49 workers), *medium firm* (50-99), *big firm* (100 and over), *household location in the North, household location in the Centre, home owner* and *mortgagee*;

FS = vector of binary variables for financial strength: *positive saving*, *risky asset owner*;

GS = vector of binary variables proxying the sales force factor with the size of the city households reside in: *medium city* (20,000 to 40,000 inhabitants); *large city* (40,000 to 500,000); *big city* (500,000 and over);

ε = error term;

F = cumulative distribution function of the standard normal distribution.

The reference characteristics of the omitted HH are *male*, *up to lower secondary degree*, *married*, *self-employed*, employed in a *micro firm* (1-4 workers), *household location in the South*, *first decile of equivalised income*, *no home owner*, *no mortgagee*, *no saving*, *no risky asset owner*, *small city* (less than 20,000 inhabitants).

The probit specification for the second step is:

$$\Pr(PIP = 1 \mid \boldsymbol{D'}, \boldsymbol{FS}, \boldsymbol{GS}) = F(\alpha'\boldsymbol{D'} + \beta'\boldsymbol{FS} + \gamma'\boldsymbol{GS}) + \eta \qquad (2)$$

where:

PIP = binary variable equal to 1 if the subscribed PPP is a PIP and 0 if it is a FPA[10];

D' = vector of binary controls for the employment status (*private employee*, *public employee)*, to control for the option of collective FPA subscriptions for private employees;

FS, GS = as in the first step specification;

η = error term.

The financial strength variables are expected to be positively signed, most especially for the self-reported saving ability, introduced for the first time, to the best of our knowledge, in the empirical literature on Italian private pensions. For given income levels, positive savings should enhance the feasibility of desired investments to supplement public pensions.

The estimates of interest in the second step are those for the city size variables, expected to be stable, negatively signed, coefficient estimates across waves. Given that PIPs and FPAs in the SHIW data account for almost a half of private pension subscriptions (Table A.1) I expect the sales force effect to be present, though subdued, also in the first step estimates.

Having obtained, to anticipate the results, evidence for the structural role of the sales force factor in explaining the preference for PIPs over the alternative of FPAs, I run one-shot probit estimates distinctly for the subscriptions to PIPs and FPAs as well as to any private pension plan. The main reason for this choice, besides a check for robustness of previous estimates, is to disentangle the sales force and financial strength effects separately for PIPs and FPAs. The specification (1) is thus modified as follows:

$$\Pr\ (P = 1|\ \textbf{\textit{D}}_, \textbf{\textit{FS}}_, \textbf{\textit{GS}}\ ) = \mathrm{F}(\alpha \textbf{\textit{D}} + \beta \textbf{\textit{FS}} + \gamma \textbf{\textit{GS}}) + \varepsilon \qquad (3)$$

where all explanatory variables are the same and

P = binary variable for a HH subscribed to any private pension plan (PENS), to a PIP or to a FPA, respectively.

In order to test *H3* and *H4* I augment (3) with a binary indicator, equal to 1 when all three FL answers are correct, interacted with the force of sales variables:

$$\Pr\ (P = 1|\ \textbf{\textit{D}}_, \textbf{\textit{FS}}_, \textbf{\textit{GS}}, FL\ ) = \mathrm{F}(\alpha \textbf{\textit{D}} + \beta \textbf{\textit{FS}} + \gamma \textbf{\textit{GS}} + \delta FL * \textbf{\textit{GS}}) + \varepsilon \qquad (4)$$

Finally, to assess whether different definitions of FL levels matter I run (4) substituting the indicator of top FL competence with each of the seven alternatives (indicator = 1 for correct answers to, respectively, one, two, or at least two questions; 0 otherwise; for descriptive statistics see Table A.2), on the assumption that a HH subscribed to a PPP should be able to answer correctly at least to one FL question.

14

5.   **Empirical findings and discussion**

5.1 Full sample cross sections.

The overall chi-square test significantly rejects the null of equations independence in two step Heckman probit procedure (Table 5).

The estimates in both steps broadly fit the expectations, with some interesting differences when comparing 2010 and 2014 SHIW waves.

<div align="center">TABLE 5 APPROXIMATELY HERE</div>

   i.   First and foremost, the second step estimates for the probability of choosing PIPs within the PPPs show highly significant coefficients for the sales force variables in all waves. This is a remarkable result, given that the coefficients are always negatively signed and highly significant also in the first step estimates for the probability of participation in the private pension system.

  ii.   To better interpret these findings, I compute the average marginal effects for HHs aged 45 years (a typical worker's prime age peak), to be interpreted as the change in probability of preferring PIPs when binary variables take a value of one, instead of zero (Table 6). Compared to the reference case of small city, the probability is always lower (about 13 per cent less for medium and large cities in 2010; 13 per cent for medium cities in 2012), with a peak in 2014 (almost 21 per cent for big cities). These results do therefore provide empirical evidence to *H1*.

 iii.   Positive saving is the only financial strength variable that is significant in the second step estimates, and only in 2010: the probability of choosing PIPs instead of FPAs is about 10 per cent higher compared to the case of no positive saving. The expected increasing role of financial strength indicators between 2010 and 2014 as an explanation for the choices of wealthier households after the reform does not seem confirmed. It is however useful to

consider also first step estimates: financial strength indicators are in fact always jointly statistically significant, with increasing values and statistical significance between 2010 and 2014. In addition, the positive effects of higher income deciles is detected starting from the sixth decile in the 2014 wave instead of the fifth one in 2010; the positive effect of housing wealth, proxied by home ownership, is (strongly) significant only in 2014. I surmise that these results provide adequate supporting evidence for *H2*.

The one-shot probit estimates of (3) add further evidence for *H1* and *H2*. To save space, I briefly comment on the average marginal effects computed from the one shot probit estimates with the binary variables PIPs and FPAs as dependent variables separately, as well as with the binary variable PENS, using the baseline complete specification above (Table 7).

The overall picture is of a 2014 wave that, in comparison with the 2010 one, has, for PIPs first of all and for PENS as well, a larger set of highly significant average marginal effects, negatively signed for the sales force indicators and positively signed for both financial strength variables. The probability of subscribing PIPs diminishes compared to the reference small city from about 3-4 percentage points in 2010 to 3-7 in 2014 as city size increases. Average marginal effects for FPAs are instead rarely significant.

TABLES 6-7   APPROXIMATELY HERE

5.2 Financial literacy in cross sections out of the balanced panel.

The one-shot probit estimates of (4), which includes controls for FL, yield remarkably similar average marginal effects for the sales force, in spite of the different composition of the sizably reduced samples factor (Table 8). The probability of choosing PIPs shrinks, compared to the reference variable of small city, from 6 to 9 percentage points in all waves; it decreases by 3 percentage points in the 2014 wave when the FL indicator, interacted with the city size binary variables, goes from 0 to one. These finding lend qualified support to *H3*,

namely to the hypothesis that financially literate investors reacted to the public pension reform by being more careful in their choice of PPPs.

The statistically significant average marginal effects estimated substituting the top FL indicator with each of the seven alternatives are similar, though with some intriguing differences (Table 9). For PIPs, the size of the average marginal effect for the indicator computed for the couple of questions on risk diversification and mortgage is identical and significant in 2014. This result fits the literature according to which, though risk diversification is the least understood concept in FL (Hastings 2013; Klapper et al. 2016), it is the one that matters most in retirement planning and precautionary savings (Lusardi and Mitchell 2011b; on US data, Lusardi 2015). A correct answer also to the question on mortgages could hint at the positive role of being acquainted with this bank product in helping potential investors to better assess advice also on other financial products. For FPAs there are significant and negatively signed average marginal effects, associated with lower levels of FL, mostly in the 2012 SHIW wave. These results have to be taken however with some caution, because 2012 is the year of the implementation of the reform. The negative sign is puzzling, because it is contrary to the expected role of FL in enhancing better financial choices. Though the quantitative effect of FL in explaining subscriptions to PPPs could look rather limited, it is worth noticing that a very recent paper finds no association between FL and the probability of private retirement saving account or private pension schemes subscription for Ireland (Nolan and Doorley 2019).

The evidence I provide is not easily comparable, given the focus on preference for the dominated PPP alternative, to the findings of previous studies that investigate the participation rate in the Italian private pension system as a whole, using SHIW editions with different wordings in the FL module. The correct answer to the question on the effect of inflation on the purchasing power is significant at the 10% level in the 2008 SHIW

(Cappelletti and Guazzarotti 2010). In the LPM estimates, the correct answer to the question on interest rate, which is also, surprisingly, the least understood, is significant, at the 1% level in the 2006 SHIW, whereas the correct answer to the question on inflation is not significant; in the probit estimates, being able to answer all three questions correctly is not statistically significant (Fornero and Monticone 2011a). Average marginal effects of FL on private pension subscriptions are highly significant, large and increasing with FL levels, especially with IV probit estimates in the 2010 SHIW (probability up to 42% to participate in the private pension with three correct FL answers), though there are no controls for positive saving (Ricci and Caratelli 2017). It is interesting to note that in this last study the size of the municipality has an explanatory role on the demand side, because it is one of the two variables chosen to instrument the endogenous FL, assuming that larger municipalities provide easier access to banking services, besides ICT and education.

The debate on FL and financial advice is mostly concerned with the issue of whether they are substitute or complement, considering the investment choices from the demand side perspective (Calcagno and Monticone 2015). The somehow sobering result of this paper on FL, though correctly signed and statistically significant, is similar to the findings of the investigation on FL in standard financial choices with a well defined dominated choice (timing in trading, investment in own banks' bonds, CAPM suggested portfolio allocation) using data from a survey conducted by an Italian bank on a sample of clients (Guiso and Viviano 2015). Though in principle affected by upward and downward biases, the estimates I commented upon provide a lower bound for the FL positive effects in helping to make educated choices among alternative PPPs (Lusardi and Mitchell 2014).

Due to the likely endogeneity of FL to the financial choices I cannot impute a causal interpretation to the estimated coefficients (Jappelli and Padula 2015).

6. **Conclusions**

This paper has investigated the reasons behind the preference of Italian workers for the dominated alternative of personal pension plans, i.e. insurance-based PIPs instead of open funds FPAs. This decade-long investment mistake à la Campbell (2006) offers a clue to the role of structural supply factors that need to be taken into account in order to assess the available set of choices for pension investment. An emerging literature has detected supply side factors countervailing the expected demand side determinants, be they marketing expenses or advisors' incentives or financial competence (Foà et al. 2015 for Italy; Gurun et al. 2016 for the US; Argyle et al. 2017 for the US; Hastings et al. 2017 for Mexico; Iscenko 2018 for the UK). I contribute to this literature by adding the factor of the geographical distribution of providers tilted towards the dominated instrument. One key component is the countrywide network of the state-controlled Post Office selling only PIPs of the subsidiary insurance company. A second component is the larger scope left to private insurance companies, providers of both PIPs and FPAs, in comparison to banks and bank-controlled management saving companies, providers of FPAs only.

The evidence of a structural supply factor tilted towards PIPs is robust across SHIW waves. This result is the more remarkable because the widely debated and politically controversial shock of a public pension reform in the midst of a sovereign debt crisis should have raised the salience of a proper choice in PPPs, especially among wealthier households. Indeed, the financial strength indicators are more statistically significant and economically relevant in the 2014 wave, after the full implementation of the reform.

This paper contributes also to the financial literacy literature. More financially literate investors should be more able to look through the effects of sales force for a better investment choice. We detect indeed a small but statistically significant effect of financial literacy in reducing the probability of subscribing PIPs in the 2014 wave.

I surmise that these findings have two main policy implications.

First, public policies aimed at improving consumer financial outcomes, whatever the level of financial literacy, have to encompass a wide variety of regulatory approaches, to avoid frictions in local markets because of an excessive pressure by suppliers. Structural regulation is called for, in order to let workers access a wide enough set of local financial providers and independent advisors. Regulation on transparency and consumer protection, designing more effective guidelines and supervision on how consultants inform and advise in pension choices, should restrain advisers' incentives, following the best practices of the bans on inducement towards in-house products in the Netherlands and the UK (European Commission 2018).

Second, on financial literacy, better policies should aim at designing more focused packages that, besides concepts more related to specific financial products, include also notions on how market structure features can narrow down the choices available to investors in the place where they reside.

This study has some obvious limitations, starting with the loose matching between SHIW and COVIP data. The crude proxying of geographical distribution of PPPs providers warrants for a special module in future SHIWs. The evidence gathered on the geographical market structure opens however an interesting avenue for research in an international comparative perspective on this supply side feature as well as on the range of financial products sold by state-controlled and private providers .

I view as a key shortcoming from a policy point of view the lack of microdata on self-reported subscription rates associated with no contributions in the year of reference. Missing contributions, on COVIP data, from one fifth of enrollees in the private pensions system, one fourth for subscribers to PPPs and almost one third for self-employed subscribers, raise

intriguing research questions on the role of financial literacy and saving of workers who have

to rely increasingly on their own investment to aim at an adequate pension income.

References

Argyle, B., Nadauld, T., and Palmer, C. (2017) Real Effects of Search Frictions in Consumer Credit Markets. *MIT Sloan Working Paper* No. 5242–17.

Baffigi, A., Cannari, L., and D'Alessio, G. (2016) Cinquant'anni di indagini sui bilanci delle famiglie italiane: storia, metodi, prospettive. Banca d'Italia, *Questioni di Economia e Finanza* No. 368.

Banca d'Italia (2012) I bilanci delle famiglie italiane nell'anno 2010. *Supplementi al Bollettino Statistico*, Nuova Serie, XXII (6).

Banca d'Italia (2014) I bilanci delle famiglie italiane nell'anno 2012. *Supplementi al Bollettino Statistico*, Nuova Serie, XXIV (5).

Banca d'Italia (2015) I bilanci delle famiglie italiane nell'anno 2014. *Supplementi al Bollettino Statistico*, Nuova Serie, XXV (64).

Bucher-Koenen, T., Hackethal, A., Koenen, J., and Laudenbach, C. (2019) *Do Seemingly Smarter People Get Better Advice?,* https://ssrn.com/abstract=2572961.

Calcagno, R. and Monticone, C. (2015) Financial literacy and the demand for financial advice. *Journal of Banking and Finance*, 50, 363-380.

Campbell, J.Y. (2006) Household Finance. *Journal of Finance*, 61(4), 1553-1604.

COVIP (various years) *Relazione Annuale.*

Disney, R., Gatherhood, J., and Weber, J. (2015) Credit counselling: A substitute for consumer financial literacy? *Journal of Pension Economics and Finance*, 14(4), 466-491.

European Commission (2018) *Distribution systems of retail investment products across the European Union.* https://ec.europa.eu/info/sites/info/files/180425-retail-investment-products-distribution-systems_en.pdf.

Finseraas, H. and Jakobsson, N. (2014) Does Information about the Pension System Affect Knowledge and Retirement Plans? Evidence from a Survey Experiment. *Journal of Pension Economics and Finance*, 13(3), 250–271.

Foà, G., Gambacorta, L., Guiso, L. and Mistrulli, P.E. (2015), The supply side of household finance. *CEPR Discussion Paper* No. 10714.

Fornero, E. and Monticone, C. (2011a) Financial literacy and pension plan participation in Italy. *Journal of Pension Economics and Finance*, 10 (4), 547–564.

Fornero, E. and Monticone, C. (2011b) Financial literacy and pension plan participation in Italy. *Netspar Discussion Paper* 01/2011–019.

Guiso, L. and Sodini, P. (2013) Household Finance: An Emerging Field, in G.M. Constantinides, M. Harris and R.M. Stulz (eds.) *Handbook of the Economics of Finance,* Elsevier, 2, Part B, 1397-1532.

Guiso, L. and Viviano, E. (2015) How much can financial literacy help? *Review of Finance*, **19**, 1347-1382.

Gurun, U.G., Matvos, G., and Seru, A. (2016) Advertising Expensive Mortgages. *Journal of Finance*, LXXI (5), 2371-2416.

Hackethal, A., Haliassos, M. and Jappelli, T. (2012) Financial advisors: a case of babysitters? *Journal of Banking and Finance*, 36(2): 509–524.

Han, T. and Stańko, D. (2018) 2018 Update on IOPS work on fees and charges**.** *IOPS Working Papers on Effective Pensions Supervision*, No. 32.

Hastings, J.S., Madrian, B.C., and Skimmyhorn, W.L. (2013) Financial Literacy, Financial Education, and Economic Outcomes. *Annual Review of Economics*, *Annual Reviews*, 5(1), 347-373.

Hastings, J.S., Madrian, B.C., and Skimmyhorn, W.L. (2017) Sales Force and Competition in Financial Product Markets: The Case of Mexico's Social Security Privatization. *Econometrica*, 85(6), 1723-1761.

Hung, A.A., Parker, A.M., and Yoong, J. (2009) Defining and Measuring Financial Literacy. *Rand Corporation*, WR-708.

Iscenko, Z, (2018) Choices of dominated mortgage products by UK consumers. *Financial Conduct Authority Occasional Paper* No. 33.

Jappelli, T. and Padula, M. (2015) Investment in Financial Literacy, Social Security, and Portfolio Choice. *Journal of Pension Economics and Finance*, 14 (4), 369-411.

Klapper, L., Lusardi, A., and van Oudheusden, P. (2016) *Financial Literacy Around the World: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey*, http://gflec.org/wp-content/uploads/2015/11/Finlit_paper_16_F2_singles.pdf.

Luciano, E., Rossi, M.C., and Sansone, D. (2016) Financial Inclusion and Life Insurance Demand: Evidence from Italian Households. *CERP Working Paper* 156/16.

Lusardi, A. (2015) Risk literacy. *Italian Economic Journal*, 1, 5–23.

Lusardi, A. and Mitchell, O.S. (2011a) Financial literacy and planning: implications for retirement wellbeing, in O.S. Mitchell and A. Lusardi (eds.) *Financial literacy: implications for retirement security and the financial Marketplace*, Oxford University Press, Oxford, 17–39.

Lusardi, A. and Mitchell, O.S. (2011b) Financial literacy around the world: an overview. *Journal of Pension Economics and Finance*, 10(4), 497–508.

Lusardi, A. and Mitchell, O.S. (2014) The economic importance of financial literacy: theory and evidence. *Journal of Economic Literature*, 52(1), 5–44.

Mullainathan, S., Noeth, M., and Schoar, A. (2012) The Market for Financial Advice: An Audit Study. *NBER Working Paper,* No. 17929.

Nolan, A. and Doorley, K. (2019) Financial Literacy and Preparation for Retirement. *IZA DP* No. 12187.

OECD (2016) *Pension Outlook 2016*, Paris.

OECD (2017), *Pensions at a Glance 2017: OECD and G20 Indicators,* OECD Publishing, Paris

Poste Italiane (various years) *Relazione finanziaria annuale*, https://www.posteitaliane.it/it/bilanci-e-relazioni.html#/

Ricci, O. and Caratelli, M. (2017) Financial literacy, trust and retirement planning. *Journal of Pension Economics and Finance*, 16 (1): 43–64.

SHIW (various years): see Banca d'Italia

Tables

Table 1.   Subscriptions[a] and subscribers[b] (in italics, years 2016 and 2017) to the Private Pension System (end-year data, thousands)[c]

	2007	2010	2014	2015	2016	2016	2017	2017	2018
Occupational Pension Funds (FPNs)	1,989	2,011	1,944	2,419	2,597	*2,561*	2,805	*2,762*	3,001
Open Pension Funds (FPAs)	747	848	1,056	1,150	1,259	*1,230*	1,374	*1,343*	1.462
PIPs	486	1,160	2,446	2,601	2,869	*2,759*	3,104	*2,969*	3,276
- Post Office[d]		367	711				943		
Grand Total[e]	4,560	5,272	6,540	7,235	7,787	*7,147*	8,299	*7,586*	8,747

Source: COVIP (2018). [a]Data on subscriptions may include double counting referred to members enrolled in more than one pension fund. [b]Data on subscribers in only one pension scheme available only since 2016 (see Online Appendix). [c]Data including also subscriptions with no contributions in the reference year. [d] Source: Post Office. [e] "Old" PIPs and other types of pension funds included.

Table 2.   Personal pension plans and sub-funds by investment – Compound net annual return rates (end-year percentages)

	2009-2014 5 years	2007-2017 10 years	2008-2018 10 years
FPAs	**5.2**	**3.0**	**4.1**
Guaranteed	*2.7*	*2.2*	*1.8*
Bonds	*3.2*	*2.7*	*2.1*
Mixed bonds	*4.5*	*3.0*	*3.1*
Balanced	*5.8*	*3.5*	*4.6*
All shares	*7.2*	*3.4*	*5.9*
PIPs			
Traditional Life Policies	**3.2**	**2.8**	**2.7**
Unit linked	**4.9**	**2.2**	**4.0**
Bonds	*1.9*	*1.6*	*1.2*
Balanced	*3.7*	*2.4*	*2.6*
All shares	*6.2*	*2.3*	*5.4*

Source: COVIP (2015, 2018). Return rates are net of management fees and of the substitute tax.

26

Table 3.   Personal Pension Plans. Synthetic Cost Indicator (SCI) by investment sub-funds over different investment periods (annual average percent of the accrued capital).

		SCI			
		2 years	5 years	10 years	35 years
Investment sub-funds					
Guaranteed	FPAs	2.3	1.4	1.2	1.1
	PIPs	3.7	2.4	1.9	1.4
Bonds	FPAs	1.9	1.3	1.1	0.9
	PIPs	3.5	2.4	1.9	1.6
Balanced	FPAs	2.4	1.6	1.4	1.3
	PIPs	3.6	2.6	2.2	1.9
All shares	FPAs	2.8	1.9	1.7	1.6
	PIPs	4.5	3.2	2.7	2.3
FPAs		2,3	1.6	1.3	1.2
min		*0.5*	*0.5*	*0.5*	*0.1*
max		*5.1*	*3.4*	*2.8*	*2.4*
PIPs		3,9	2.7	2.2	1.8
min		*1.0*	*0.9*	*0.6*	*0.4*
max		*6.5*	*4.9*	*4.1*	*3.5*

Source: COVIP (2018). SCI computed as simple average for each sub-fund.

Table 4. Correct answers on financial literacy: full sample and HHs in the BP 2010 wave subscribers to private pension plans (%)

	Full sample	Subscribers to		
		Any PPs	PIPs	FPAs
None	10.1	7.7	4.2	0.05
One	17.7	14.1	6.5	1.3
Mortgage	*64.6*	*15.6*	*8.1*	*1.8*
Interest rate and inflation	*75.6*	*17.5*	*8.7*	*2.0*
Risk diversification	*58.9*	*18.7*	*9.6*	*2.2*
Two	35.2	15.8	7.5	1.8
Mortgage & interest rate and inflation	*53.6*	*16.6*	*8.5*	*2.0*
Mortgage and risk diversification	*41.6*	*18.0*	*9.7*	*2.0*
Risk diversification & interest rate and inflation	*51.0*	*19.3*	*10.0*	*2.3*
At least two	68.9	17.6	8.8	2.1
Three	37.0	18.6	10.0	2.2

Source: Author's calculations from 2010 SHIW.

27

Table 5. Preference for PIPs' in personal pension plan subscriptions, conditional on participation to the private pension system. Heckman two step probit estimates (full samples)[a]

	2010	2012	2014
Second step:			
PIPs' share of private pension plans			
private employee	-0.429*	-0.028	0.264
	(-2.29)	(-0.17)	(1.54)
public employee	-0.514**	-0.221	-0.240
	(-2.68)	(-1.19)	(-1-15)
financial strength			
positive saving	0.256*	-0.039	0.015
	(2.45)	(-0.33)	(0.12)
risky asset owner	-0.190	0.017	0.092
	(-1.30)	(0.12)	(0.61)
local sales force			
medium city	-0.345*	-0.334*	-0.219
(20,000 to 40,000)	(-2.33)	(-2.09)	(-1.38)
large city	-0.343**	-0.002	-0.290*
(40,000 to 500,000)	(-2.78)	(-0.02)	(-2.12)
big city (500,000+)	-0.284	0.011	-0.538*
	(-1.53)	(0.04)	(-2.29)
constant	0.390	0.132	0.023
	(0.59)	(0.36)	(0.05)
First step:			
Subscription rate to the private pension system (PENS)			
income deciles			
2nd	0.0125	0.300	-0.072
	(0.59)	(0.98)	(-0.32)
3rd	0.0117	0.607*	0.089
	(0.05)	(2.13)	(0.42)
4th	0.0599	0.769**	0.026
	(0.30)	(2.72)	(1.27)
5th	0.0381*	1.007***	0.270
	(1,97)	(3.56)	(1.35)
6th	0.0312	0.848**	0.415*
	(1.62)	(3.00)	(2.11)
7th	0.0420*	1.173***	0.508**
	(2.19)	(4.16)	(2.57)
8th	0.455*	1.190***	0.407*
	(2.36)	(4.20)	(2.04)
9th	0.546**	1.310***	0.429*
	(2.82)	(4.59)	(2.15)
10th	0.630**	1.417***	0.547**
	(3.19)	(4.88)	(2.68)
demographics			
age	0.131***	0.164***	0.167***
	(4.91)	(5.33)	(4.98)
age squared	-0.001***	-0.002***	-0.002***

	(-5.16)	(-5.58)	(-5.05)
female	-0.205***	-0.192***	-0.232***
	(-4.17)	(-3.70)	(-4.20)
upper secondary	0.0225***	0.121+	0.083
	(3.83)	(1.89)	(1.31)
university degree	0.309***	0.196*	0.157+
	(3.89)	(2.34)	(1.87)
single	0.171*	-0.001	-0.044
	(2.43)	(-0.01)	(0.54)
widowed	0.0839	0.134*	-0.023
	(0.93)	(1.51)	(-0.25)
private employee	-0.0735	-0.0441	0.100
	(-0.64)	(-0.39)	(0.87)
public employee	-0.113	-0.048	-0.138
	(-1.47)	(-0.59)	(-1.46)
small firm (5- 49)	0.324***	0.240*	0.090
	(3.06)	(2.27)	(0.85)
medium firm (50-99)	0.477***	0.595***	0.398**
	(3.48)	(4.21)	(3.00)
big firm (100+)	0.770***	0.758***	0.553***
	(6.99)	(7.03)	(5.08)
household location in the North	0.242***	0.017	0.161*
	(2.60)	(0.25)	(2.18)
household location in the Centre	0.0755	-0.096	0.130
	(1.01)	(-1.27)	(1.52)
housing wealth			
home owner	0.0398	0.062	0.191**
	(0.64)	(0.90)	(2.62)
mortgagee	0.0528	0.111+	0.014
	(0.83)	(1.69)	(0.19)
financial strength			
positive saving	0.173+	0.219	0.185**
	(1.89)	(0.36)	(3.12)
risky asset owner	0.201***	0.231**	0.275***
	(4.29)	(3.05)	(3.75)
local sales force			
medium city (20,000 to 40,000)	-0.163**	-0.171*	-0.011
	(-3.30)	(-2.22)	(-1.45)
large city (40,000 to 500,000)	-0.148*	-0.098	-0.278***
	(-1.85)	(-1.57)	(-4.26)
big city (500,000+)	-0.249**	-0.292**	-0.367***
	(-2.70)	(-2.69)	(-3.30)
constant	-4.713***	-6.015***	-5.736***
	(-7.56)	(-7.64)	(-7.12)
Observations no.	4,908	4,730	4,446
Wald chi2 (7)	24.70***	7.72	15.61*
Wald test of indep. eqns chi2 (1)	12.89***	8.01*	3.98*

Source: Author's calculations from SHIW (various waves). t-statistics out of robust SEs within brackets; +p< 0.10, *p< 0.05, ** p< 0.01, *** p< 0.001. ª 25 to 65 years old employed household heads. Reference categories: first decile of equivalised household income, male, up to lower secondary degree, married, self-employed, micro firm (1-4 workers), location in the South, small city (up to 20,000 inhabitants), no home ownership, no mortgage, no saving, no risky assets ownership.

Table 6. Average marginal effects for preferring PIPs' in personal pension plan subscriptions, conditional on participation to the private pension system for 45 years old HH; Heckman second step probit estimates; only statistically significant effects[a]

	positive saving	medium city (20,000 to 40,000 inhabitants)	large city (40,000 to 500,000 inhabitants)	big city (500,000+ inhabitants)
2010	0.098*	-0.133*	-0.133**	
2012		-0.131*		
2014			-0.113*	-0.207*

Source: Author's calculations from SHIW (various waves). t-statistics out of robust SEs within brackets; *p< 0.05, ** p< 0.01. [a] 25 to 65 years old employed household heads. Reference categories: self-employed; no saving, no risky assets ownership, small city (up to 20,000 inhabitants).

Table 7. Average marginal effects (probit estimates at age = 45); only statistically significant effects[a]

	positive saving	risky asset holder	medium city (20,000 to 40,000 inhabitants)	large city (40,000 to 500,000 inhabitants)	big city (500,000+ inhabitants)
			2010 (Obs = 5347)		
PENS	0.02*	0.07***	-0.05***	-0.03*	-0.07***
PIPs	0.04**		-0.03*	-0.03***	-0.04**
FPAs		0.02**			
			2012 (Obs = 5158)		
PENS		0.07***	-0.04*		
PIPs			-0.03***		-0.04***
FPAs		0.01+			-0.02*
			2014 (Obs = 4810)		
PENS	0.03*	0.06***		-0.06***	-0.09***
PIPs	0.03*	0.04***	-0.03+	-0.05***	-0.07***
FPAs	0.01*				

Source: Author's calculations from SHIW (various waves). t-statistics out of robust SEs within brackets; +p< 0.10, *p< 0.05, ** p< 0.01, *** p< 0.001. [a] 25 to 65 years old employed household heads. Reference categories: see Table 5.

Table 8. Average marginal effects for cross sections out of balanced panel (probit estimates at age= 45; baseline specifications with financial literacy indicator interacted with city size; only statistically significant effects[a]

	saving	risky asset holder	medium city (20,000 to 40,000)	large city (40,000 to 500,000)	big city (500,000+)	financial literacy indicator (three correct answers)
			2010 (Obs = 1660)			
PENS			-0.12***	-0.08***	-0.10*	
PIPs	0.03+		-0.09***	-0.07***		
			2012 (Obs = 1653)			
PENS		0.06+	-0.10**	-0.06*	-0.07+	
PIPs			-0.08***	-0.06**	-0.09**	
			2014 (Obs = 1621)			
PENS			-0.06+	-0.08**	-0.12**	
PIPs			-0.06*	-0.09***	-0.09**	-0.03+

Source: Author's calculations from SHIW (various waves). t-statistics out of robust SEs within brackets; +$p < 0.10$, *$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. [a]See Appendix for wording of the financial literacy questionnaire. Reference categories: see Table 5.

Table 9. Average marginal effects of alternative financial literacy indicators interacted with city size. Only statistically significant estimates in cross sections out of balanced panel (probit estimates at age= 45); wave in brackets[a]

	Interest rate and inflation	Risk diversification	Mortgage & risk diversification	Interest rate and inflation & risk diversification	At least two correct answers	Three correct answers
PIPs			-0.03+ (2014)			-0.03+ (2014)
FPAs	-0.04* (2010)	-0.02+ (2012)		-0.03** (2012)	-0.03+ (2012)	

Source: Author's calculations from SHIW (various waves). t-statistics out of robust SEs within brackets; +$p < 0.10$, *$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. [a]See Appendix for wording. Reference categories: see Table 5.

31

Appendix.

The wording of the financial literacy questionnaire in the 2010 SHIW.

1)   Which type of mortgage allows you to determine the maximum amount and the number of instalments to pay in order to extinguish the debt? a. variable interest rate mortgage; b. fixed interest rate mortgage; c. variable interest rate and constant instalment mortgage; d. don't know; e. no answer.

2)   You have a no-costs deposit of 1,000 euro offering1 per cent interest rate. Assume 3 per cent inflation rate. Do you think that, when withdrawing your deposit one year later, you will be able to buy the same amount of goods that costs 1,000 euro today? a. yes; b. no, a minor amount; c. a greater amount; d. don't know; e. no answer.

3)   Which investment strategy is riskier: a. invest in one company; b. invest in many companies; c. don't know; d. no answer.

Tables

Table A.1　　Descriptive statistics (averages): employed household heads estimation full sample (% of observations)

	2010 obs = 5,347	2012 obs = 5,158	2014 obs = 4,810
PENS	0.2040396	0.1927104	0.1848233
PIPs	0.0978119	0.0878247	0. 0858628
FPAs	0.0246867	0.0224893	0.0237006
Explanatory variables			
equivalised income deciles			
2nd	0.0684496	0.0779372	0.0715177
3rd	0.0710679	0.084335	0.0814969
4th	0.090144	0.0911206	0.0891892
5th	0.0965027	0.1013959	0.1079002
6th	0.1095942	0.1157425	0.1079002
7th	0.1217505	0.1147732	0.1201663
8th	0.1344679	0.1213649	0.12079
9th	0.1322237	0.1221404	0.131185
10th	0.135216	0.1219465	0.129106
demographic characteristics			
age	46.55152	47.31873	48.58462
female	0.4346362	0.4290423	0.4405405
upper secondary	0.4572658	0.4567662	0.460499
university degree	0.1829063	0.191547	0.2
single	0.117823	0.1203955	0.1405405
widow(er)	0.0922012	0.0946103	0.1068607
private employee	0.5447915	0.565917	0.6130977
public employee	0.2545353	0.2382706	0.1925156
small firm (5- 49)	0.2605199	0.2557193	0.2650728
medium firm (50-99)	0.0475033	0.0407135	0.0575884
big firm (100+)	0.1421358	0.1475378	0.1746362
household location in the North	0.4729755	0.4682047	0.5072765
household location in the Centre	0.2208715	0.2200465	0.2066528
housing wealth			
home owner	0.6861792	0.7022102	0.712266
mortgagee	0.1673836	0.1903839	0.1754678
financial strength			
saving > 0	0.4043389	0.283637	0.3012474
risky asset owner	0.1406396	0.1101202	0.122869
sellers' local availability			
medium city (20,000 to 40,000)	0.1864597	0.1882513	0.1972973
large city (40,000 to 500,000)	0.4580138	0.475378	0.45634
big city (500,000+)	0.0979989	0.084335	0.0808732

Source: Author's calculations from SHIW (various waves).

Table A.2 Descriptive statistics (averages): employed household heads estimation in the sample out of the balanced panel (% of observations)

	2010 (obs = 1660)	2012 (obs = 1653)	2014 (obs = 1621)
PENS	0.2174699	0.2171809	0.2220851
PIPs	0.1072289	0.102843	0.102406
FPAs	0.0222892	0.029038	0.029611
Financial literacy level indicators: correct answers to 2010 SHIW three questions			
Three	0.4481928	0.4440411	0.4361505
At least two	0.7716867	0.7701149	0.770512
Risk diversification & interest rate and inflation	0.5903614	0.5898367	0.5848242
Risk diversification & mortgage	0.4783133	0.4742892	0.4663788
Mortgage & interest rate and inflation	0.6198795	0.61464	0.6125848
Risk diversification	0.6445783	0.6448881	0.6403455
Interest rate and inflation	0.8319277	0.8294011	0.8297347
Mortgage	0.696988	0.6908651	0.6890808
Explanatory variables			
+equivalised income deciles			
2nd	0.0771084	0.0786449	0.0666255
3rd	0.0680723	0.0816697	0.089451
4th	0.0939759	0.0931639	0.0808143
5th	0.1072289	0.0949788	0.1098088
6th	0.1120482	0.1028433	0.1030228
7th	0.1186747	0.1058681	0.114744
8th	0.1283133	0.1246219	0.1135102
9th	0.1289157	0.1361162	0.1264651
10th	0.1277108	0.1409558	0.1505244
demographic characteristics			
age	46.45361	48.38113	50.2992
female	0.4343373	0.4361766	0.4380012
upper secondary	0.4686747	0.4700544	0.4682295
university degree	0.1801205	0.1869328	0.1893893
single	0.0855422	0.0865094	0.0851326
widow(er)	0.0704819	0.0816697	0.0869833
private employee	0.5427711	0.5517241	0.5959284
public employee	0.2674699	0.2625529	0.2140654
small firm (5- 49)	0.253012	0.2450091	0.2646514
medium firm (50-99)	0.0638554	0.0429522	0.057372
big firm (100+)	0.1409639	0.1578947	0.1739667
location in the North	0.4481928	0.4506957	0.446021
location in the Centre	0.203012	0.200242	0.2048118
housing wealth			
home owner	0.7337349	0.7477314	0.7532387
mortgagee	0.1759036	0.1857229	0.1616286
financial strength			
saving > 0	0.4204819	0.322444	0.3103023
risky asset owner	0.1674699	0.1300665	0.1468229
sellers' local availability			
medium city (20,000 to 40,000)	0.1927711	0.1972172	0.2029611
large city (40,000 to 500,000)	0.4566265	0.4519056	0.4528069
big city (500,000+)	0.0656627	0.0653358	0.0623072

Source: Author's calculations from SHIW (various waves).

34

[1] The data are gross of the subscriptions with missing contributions. The proportion is sizable and increasing during the 2010-2014 period: almost one fourth, rising to over 30 per cent for PIPs and even more for FPAs, hitting mostly self-employed who can rely exclusively on their own contributions (COVIP 2011, 2013, 2015). On the overestimation of PIPs data, owing to multiple memberships, see Online Appendix.

[2] The SCI takes into account the expected averaged main recurring costs for subscribers (initial membership, annual administration and management fees, transfer of the individual position across sub-funds) over different investment periods.

[3] Interestingly, personal plans share of investment of private pensions is 100% in Hungary and 90 % in Poland, 25% in Italy, on 2016 data (OECD 2017).

[4] A subscriber to any private pension plan is entitled to an income tax break, up to 5,165 euros.

[5] The substitute tax rate was further raised retrospectively from 11.5% to 20% beginning on January 1, 2014, in the Financial Law for 2015, approved at the end of 2014. The survey data for the 2014 SHIW wave, collected during the year, before the unexpected innovation, should not therefore be affected.

[6] Nominal income is not adjusted given the low inflation rates experienced in the period 2010-14.

[7] Though even the number of dwellings – main residence and not – is sizably under-reported, the measurement issue should be plausibly less relevant when considering the main home (Baffigi et al. 2016, 81-83).

[8] I prefer this subjective information to the alternative of computing saving as income minus consumption expenditure, because the under- and mis-reporting in their nominal values, which affect especially the second variable, yield overestimated savings (Baffigi et al. 2016).

[9] The grand total in SHIW data includes also old PIPs and occupational pension funds existing before the general pension system reform in 1995. SHIW data do not allow to take into account how many subscribers have not paid contributions, in the reference year or at all. According to COVIP data, these subscribers amount to at least one fifth, and are more concentrated on PPPs, and especially among self-employed, with a proportion of almost one third (for data up to 2014 see COVIP 2015).

[10] In the three full sample waves there are only three (in 2010) and two (in 2012 and 2014) HHs subscribed to both FPAs and PIPs. In the estimates, these mixed cases have been imputed to FPAs.