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# **Does homeownership partly explain low participation in supplementary pension schemes?**

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## Abstract

We used nine waves of the Bank of Italy's Survey on Household income and Wealth (1995-2012) to investigate a possible trade-off between homeownership and individual participation in a supplementary pension scheme. Italy lends itself to this type of investigation because the Italian public pension system has been heavily reformed in the period, providing in principle incentives for participation, and the homeownership rate is very high. The impact of homeownership is captured in two ways: by a dummy for being homeowner and by an index defined as the share of housing wealth over total wealth. Our results show that indeed, after controlling for a vast array of socio-economic characteristics and allowing for unobserved individual heterogeneity, both measures of homeownership are negatively associated with participation in supplementary pension schemes and that such an effect does not disappear even after the 2007 reform.

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Keywords: pension plan participation, retirement planning, housing investment

JEL Classification: D91, H55

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## 1. Introduction

Compared to other European countries, the Italian supplementary pension system is still underdeveloped in terms of membership, returns, and organisation. The latest reports from the supervisory board of pension funds, *Commissione di vigilanza sui fondi pensione* (Covip, 2008, 2009, and 2010), show a critical situation with low returns and low take up rates. Indeed, participation in pension funds has remained low despite generous tax incentives<sup>1</sup> and despite the strong default option introduced by the 2007 reform.

With the 2007 reform, workers in the private sector had the option to choose whether to maintain their severance payments (Trattamento di Fine Rapporto, TFR) with the firm or divert them to a pension fund<sup>2</sup>. Furthermore, the reform introduced a default option for new employees, who would be automatically enrolled in an occupational fund and have six months to decide whether or not they intend to switch. The default option did not, however, produce the expected results, since participation increased only by approximately 10 percentage points, from 14 to 24 per cent (Rinaldi, 2011).

Several reasons can explain the low take-up rate: generous public pension benefits, high social security contribution rates, a general mistrust towards financial markets, a lack of financial education/pension information (Fornero and Monticone, 2011; Rinaldi 2011); the relative attractiveness of the TFR as a savings vehicle compared with more conservative investment options since the TFR offers a risk-free rate which, albeit low in nominal terms, still exceeds inflation (Rinaldi, 2011). Finally, employers, especially in firms with up to 50 employees, may pressurize workers into leaving their TFR with the firm, since historically it

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<sup>1</sup> Dlgs. n. 252/2005, law n.296/2007 and Budget law 2007 introduced tax incentives both for employees and for firms in favour of the devolution of firms' occupational funds (TFR) to private pension funds or treasury. The incentives for firms, called "compensation measures" are of fiscal and contribution nature: a 6%/4% tax deduction of the funds; and a reduction in employers' pension contributions to the state. Moreover, contributions (both from employee and employer) up to €5,164.57 are entirely deductible. The reform also reduced the tax rate on income from complementary pension funds to 15% progressively decreasing by 0.30% for each of participation in a pension fund in excess of 15. The tax regime is particularly advantageous if compared to the 23% tax rate of the TFR.

<sup>2</sup> If workers decide to leave the TFR with the firm, then the 2007 reform prescribes a differential treatment according to the size of the firm. Firms with 50 workers or fewer can keep the TFR, while smaller firms (>50 workers) will have to devolve the TFR to the treasury.

has been a source of cheap financing (Boeri and Zingales, 2007; Rinaldi, 2011). From a behavioural perspective, the irreversibility of choosing a pension fund over the TFR may have posed yet another barrier by increasing anxiety and procrastination among workers: an irreversible choice can be seen as losing an option, and people are willing to pay a price to avoid the emotion of loss (Ariely and Shin, 2004). Finally, we should recall the impact of the crisis, which on one side tightened liquidity constraints and, on the other, increased risk aversion and mistrust towards financial markets (Rinaldi, 2011).

Our study explores another plausible explanation analysed in a strand of literature that developed from the original intuition of Kemeny (1981), namely the possibility of a trade-off between pension plan participation and housing investment. Because homeownership is a form of asset accumulation (arguably the most important in southern European countries), homeowners secure themselves a valuable asset which can be drawn upon to provide economic well-being in old age. Housing investment can therefore be seen as an alternative, not necessarily the most efficient given its illiquidity, to a private pension.

The trade-off between homeownership and the generosity of pension systems has been explored at the macro level (Fahey, 2003; Dewilde and Raeymaeckers, 2008), but, to the best of our knowledge, the present study is the first to analyse this relationship at the individual level and with a specific focus on supplementary pension plans.

We study Italy for two main reasons. First, the Italian public pension system has been heavily reformed<sup>3</sup>, with less generous public pensions for future generations; therefore higher participation in supplementary pension schemes may be desirable, from a normative viewpoint, as shown by theoretical models of optimal lifetime portfolio choices under

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<sup>3</sup> Dini 1995 marked the passage from the defined benefits system to the notional defined contributions system; Prodi 1997 introduced stricter seniority requirements; Maroni 2004 increased retirement age from 61 to 62; and Fornero 2011 extended defined contribution pro rata to all and increased both retirement age and seniority requirements.

specific assumptions (e.g. labour income risk).<sup>4</sup> Second, homeownership in Italy is widespread, reaching a rate of 73% in 2013 according to Eurostat data<sup>5</sup>, with housing assets representing a substantial share of household portfolios, therefore it is likely to have an impact on other portfolio choices.

The rest of the paper is organised as follows: Section 2 reviews the literature and provides a conceptual framework. Section 3 illustrates the data and some descriptive evidence. The methodology used and the results are presented in Section 4, including a sample robustness check and the effect of the 2007 reform. Last Section concludes.

## ***2. Literature Overview***

Many authors investigate the determinants of participation in pension funds in different countries and generally find consistent results. Munnell et al. (2000) and Huberman et al. (2007) analyse the determinants and contribution rates of participation in Defined Contribution (401)k pension plans in the US. Munnell et al. (2000) find a positive impact of age, income, wealth and job tenure; Huberman et al. (2007) also find large positive income and wealth effects, as well as a positive gender effect, with women 6.5 percentage points more likely to participate than men. At a comparative level, Antolin (2008) analyses the determinants of participation in supplementary pension schemes for 8 OECD countries and finds that coverage is unevenly distributed across individuals, thus advocating the need to increase it, at least among the young and the mid-to-low income.

One of the mostly investigated issues in the recent literature is the role of education, whereby low education in general and low financial education in particular are often found to have a negative impact: Lusardi and Mitchell (2006, 2011) in the US, Fornero and Monticone (2011) and Rinaldi (2011) in Italy; Coppola and Lamla (2013) in Germany. Conversely, Duflo and Saez (2003) find a small positive effect of information when choosing to

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<sup>4</sup> For a survey of models see Torricelli (2009). For an all-round treatment of the issue see Bertocchi et al. (2010).

<sup>5</sup> Eurostat: Distribution of population by tenure status, type of household and income group (source: SILC)

participate in employer sponsored tax deferred accounts, and a larger effect of social interactions. Cappelletti and Guazzarotti (2013) use Italian data and confirm a lack of knowledge of complementary pension schemes even among those who participate in one, to the point that many cannot recall their investment strategy or the amount of their annuity. Secondly, they find that participation rates are particularly low among those who would benefit from it the most, namely younger workers. Unsurprisingly, the authors also find that income is the strongest predictor of participation, as individuals who earn more have more resources to subscribe to private pension funds.

Another strand of literature looks at a possible trade-off between pension plans participation and homeownership. Kemeny (1981) was the first to stress the link between pensions and homeownership, with the implication highlighted by Fahey (2003) that “ if home owners regard their housing assets as a quasi pension fund, they will devote less to standard pension provision because they have lack the need or incentive to do so rather than because they cannot afford to”. Castles (1998) pointed to a possible trade-off between the extent of homeownership and the generosity of old-age pensions and shows that, with some exceptions, OECD countries have a negative relationship between homeownership levels and pension provision levels. Fahey (2003) and Fahey et al. (2004) test the idea that by promoting outright ownership, housing policies can reduce poverty in later life. Similarly, Dewilde and Raeymaeckers (2008) test if and how the trade-off between pensions provision and housing policies influences old-age poverty.

Although providing empirical evidence mostly in favour of a trade-off, these studies look at the issue by focusing on public pension systems and at a macro level only. The present study fills the gap by analysing the relationship between pensions and homeownership at the individual level and with a specific focus on supplementary pension plans for a country, Italy, where homeownership is very high.

### 3. *Data and descriptive evidence*

Our investigation draws from the Survey on Household Income and Wealth (SHIW), waves 1995-2012. The SHIW is a biannual survey conducted by the Bank of Italy on a representative sample of the Italian population and includes rich and detailed information on socio-demographic variables, households' assets, work histories, and whether or not they participate in a supplementary pension scheme. We use a combination of individual and household level data; in our estimation sample, we keep only individuals present in at least two waves, so as to exploit the panel component, and we restrict our sample to those aged between 20 and 60 and who are not yet retired. The final estimation sample consists of 56,737 observations for 18,322 individuals / 8,234 households. Summary statistics of the estimation sample are provided in the appendix.

We build the dependent variable *Participation* as a binary variable equal to 1 for individuals who participate in a supplementary pension scheme and 0 otherwise. The necessary information was gathered combining the following two survey questions:

1. "In [year] did you or a member of the household pay into a personal retirement plan or supplementary pension fund? Bear in mind that personal pensions (pension funds or retirement plans) pay the holder an income only when he/she becomes eligible for a state pension. Please also consider the transfer of your severance pay entitlement to a pension plan."<sup>6</sup>
2. Member (holder of pension plan - for each pension plan if more than one).<sup>7</sup>

Table 1 reports the participation rates by educational attainment, marital status and employment status. For simplicity, we recoded educational levels into three categories: *Low*

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<sup>6</sup> The wording of this question changed slightly in 2008. Before 2008 it read: "In [YEAR] did you or another member of your household, individually or with the help of your, his or her employer, pay premiums for a private (or supplementary) pension, an annuity or simply to receive a lump sum in the future (e.g. under children's saving plans)?"

<sup>7</sup> Note that because of the wording of the question we had to recode the variable so that each individual was assigned the appropriate score.

if the individual had either no or elementary education, *Medium* if the individual has lower or upper secondary education, and *High* if the individual had a degree or higher educational levels. We also recoded employment status into four broader categories (recall that pensioners are excluded from the sample), i.e. *Employee*, which includes all payroll workers, such as production workers, clerical workers, teachers etc.; *Self-employed* which includes members of a profession, individual entrepreneurs, self-employed workers, and owners or employees in a family business., as well as workers as on atypical contracts; *Unemployed* which also includes first job seekers and *Not employed* which includes homemakers, students, voluntary workers and individuals living on independent means. Note that, even though supplementary pension schemes are aimed mainly at employed individuals, the unemployed/not-employed can participate in individual plans, and for this reason we keep them in our sample<sup>8</sup>. However, we carry out some robustness checks excluding unemployed/not employed individuals from our estimation sample in the next section.

A first glance at Table 1 shows the level of heterogeneity in supplementary pension plan participation for different categories. First, participation in a supplementary pension scheme is more common among men and the more educated, which is in line with previous research. The participation rate for highly educated men is 1.9 times higher than for the low educated; the participation rate for women is lower at all educational levels, however, higher educated women are 3.8 times more likely to participate than the low educated ones, suggesting a much stronger effect of education for women than men. Quite interestingly, participation is lowest among singles, but this is likely to be due to age effects, which we will control for in the multivariate regression. The remarkably low participation rate among unemployed and not-employed men and women is also not surprising.

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<sup>8</sup> [http://www.covip.it/wp-content/uploads/guida\\_introduttiva.pdf](http://www.covip.it/wp-content/uploads/guida_introduttiva.pdf)



**Table 1: Participation in supplementary pension funds by gender, educational attainment, marital status and employment status**

	Male		Female		All	
	%	obs	%	obs	%	obs
<b>Education</b>						
Low	7.6%	11,978	3.5%	13,262	5.4%	25,239
Medium	12.5%	12,546	8.4%	12,572	10.5%	25,118
High	14.8%	2,924	13.4%	3,456	14.1%	6,379
<b>Marital Status</b>						
Couple	13.3%	16,749	7.0%	19,574	9.9%	36,323
Single	5.8%	9,840	5.4%	7,554	5.6%	17,394
Divorced	12.7%	756	11.5%	1,367	11.9%	2,122
Widow (er)	18.0%	104	6.0%	795	7.4%	898
<b>Employment status</b>						
Employee	12.8%	17,174	11.6%	12,472	12.3%	29,646
Self employed	13.1%	5,029	11.2%	2,264	12.5%	7,293
Unemployed	1.0%	3,036	1.9%	2,421	1.4%	5,457
Not employed	1.4%	2,209	2.0%	12,133	1.9%	14,342
All	10.6%	27,448	6.8%	29,289	8.6%	56,737

*Source: SHIW 1995-2012. Data are weighted using sampling weights.*

Some of the heterogeneity apparent from Table 1 may be imputed to income and/or wealth. In Table 2 we show how the participation in supplementary pension plans varies with income and wealth quartiles. Predictably, participation rates increase with income and wealth, as the percentage of participants is more than five times higher in the top income quartile as opposed to the first one, while it is roughly 2.7 times higher in the top wealth quartile compared to the bottom one. Again, participation appears to be higher for men at every income and wealth level.

**Table 2: Participation in supplementary pension funds by gender, income and wealth quartile**

	Male		Female		All	
	Income	Wealth	Income	Wealth	Income	Wealth
I	3.7%	6.0%	2.1%	4.0%	2.8%	5.0%
II	8.0%	8.0%	4.8%	4.7%	6.3%	6.3%
III	11.3%	12.3%	7.5%	7.6%	9.4%	9.8%
IV	16.6%	16.2%	11.6%	10.8%	14.2%	13.5%

*Source: SHIW 1995-2012. Data are weighted using sampling weights.*

Finally, in Table 3 we report participation rates by gender and homeownership status. Because housing tenure is mainly a household choice, regardless of who legally owns the dwelling, we decided to consider homeownership at the household, not the individual level. Participation rates, both for men and for women, are higher among owners rather than renters. Because homeowners usually have higher wages and more wealth, the positive relationship may be due spurious correlations, therefore we will account for it in the next section.

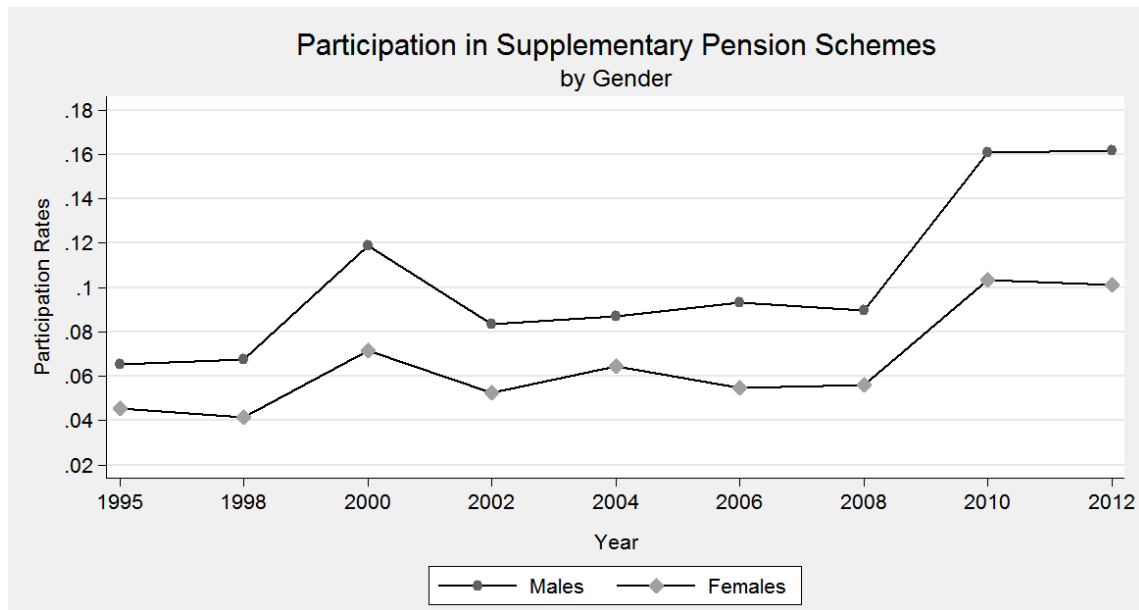
**Table 3: Participation in supplementary pension funds by gender and homeownership**

	Male		Female		All	
	%	obs	%	obs	%	obs
Renter	8.0%	8,272	5.4%	8,667	6.6%	16,938
Owner	11.8%	19,176	7.4%	20,623	9.5%	39,799
All	10.6%	27,448	6.8%	29,289	8.6%	56,737

*Source: SHIW 1995-2012. Data are weighted using sampling weights.*

As per the evolution of participation rates over time, Figure 1 clearly shows the strong impact of the 2007 reform, with participation rates nearly doubling, from 7.2% in 2006-2008 to 13% in 2012. The trend for men and women is roughly the same, except for the biennium 2006-2008 which sees women's participation rates increase while men's decrease.

**Figure 1: Evolution of participation in supplementary pension schemes over time, by gender**



Source: own elaborations from SHIW 1995-2012

#### 4. Econometric Specifications and Results

Let  $y_{it}$  be a binary variable equal to 1 if the individual participates in a supplementary pension scheme, and 0 otherwise. We then estimate the probability of participating using the following linear probability model:

$$P(y_{it}) = \beta x_{it} + \alpha_i + u_{it} \quad [1]$$

Where  $x_{it}$  is a vector of regressors including socio-demographic variables, income and wealth quintiles, years of contribution in a public pension fund (which can be considered as a rough measure of pension wealth and is likely to have an impact on the dependent variable), time and regional fixed effects and, information on homeownership;  $\alpha_i$  is the individual fixed effect; and  $u_{it}$  the error term.

Information on homeownership is fundamental for capturing a possible trade-off between supplementary pensions and housing, and we define it in two different ways: a binary variable, *Homeowner*, equal to 1 for owners and 0 for renters, and a continuous indicator,

$HW$ , equal to the ratio of gross housing wealth (only the residential home) over total wealth (real and financial). Moreover, we consider separately the presence of a mortgage using a dummy (and for this reason we do not consider net wealth).<sup>9</sup>

We first assume that idiosyncratic errors are uncorrelated with the  $x$ 's and with the heterogeneity term  $\alpha_i$  and estimate equation 1 as a linear probability model (LPM) on a pooled sample.

We then exploit the panel nature of our sample to eliminate time invariant individual heterogeneity  $\alpha_i$ . To do so we de-mean our data, i.e. we calculate time averages of equation [1] for each individual (between transformation) and subtract them from the main equation. The equation can thus be estimated by the fixed-effects (FE) or within estimator. By taking out time averages, time invariant individual heterogeneity will disappear (Wooldridge, 2007).

Because our dependent variable is binary, we also check robustness by estimating an unobserved effects probit by maximum likelihood:

$$Pr(Y_{it} = 1 | X = x_{it}, \alpha_i) = \Phi(x'_{it}\beta + \alpha_i) \quad [2]$$

Where  $\Phi$  is the CDF of the standard normal distribution; we deal with the unobserved heterogeneity  $\alpha_i$  by assuming that it is linear in the means of all the time-varying covariates, i.e.  $\alpha_i = \rho_0 + \rho_1 T^{-1} \sum_{t=1}^T x_i + v_t$  and estimate a Mundlak-Chamberlain Correlated Random Effects (CRE) probit<sup>10</sup>.

Both linear and non-linear estimation techniques have their limitations and advantages: while the LPM within estimator has the advantage of not imposing any restrictions on the relationship between  $\alpha_i$  and  $x_{it}$ , its predicted probabilities are not bounded between 0 and 1; conversely, in the CRE framework the relationship between  $\alpha_i$  and  $x_{it}$  is restricted in some way, but the predicted probabilities are bounded. In both cases, we have to assume serial

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<sup>9</sup> The same indicator is used in Brunetti et al. (2012) to analyse whether excessive portfolio illiquidity due to homeownership is connected to financial fragility of Italian households.

<sup>10</sup> Note that we used the terms “fixed” and “random” effects in the Wooldridge (2007) meaning.

independence, i.e. no feedback effects. We use both estimation techniques to ensure our results are robust to functional form.

Since we are using a panel, our sample contains several observations on the same individuals which are not independent of each other, we thus control for it by clustering standard errors at the individual level.

#### **4.1. Results**

Table 4 and Table 5 show our results for all different econometric specifications. In Table 4 housing investment is represented by the binary variable *Homeowner* as previously described, while Table 5 considers housing investment as the share of housing wealth over total wealth, *HW*.

Despite the positive relationship in the descriptive section (Table 3), having accounted for socio-economic and demographic features, we find that being a homeowner has a negative and highly significant effect. Moreover, when we take into account individual unobserved heterogeneity, the coefficient increases in size, from -0.019 to -0.035 in the linear specification, and from -0.021 to -0.028 in the nonlinear one. Considering that the average participation rate in our sample is 8.4%, we can see a 3.5/2.8 percentage points' difference as a relatively large effect. Because with the fixed-effects/correlated random effects specifications we consider the deviation from the means of time-varying covariates, we might say that a change from renting to owner occupied housing is associated with a lower probability to participate in a pension fund<sup>11</sup>.

Similarly, when using the continuous indicator for homeownership, *HW*, we have a negative, highly significant effect as shown in Table 5.<sup>12</sup> Once again, the impact is larger

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<sup>11</sup> We cannot exclude reverse causality or feedback effects, however the possibility that an individual may decide to move to a rented accommodation following the decision to participate in a pension scheme seems unlikely.

<sup>12</sup> In cases where both numerator and denominator of the fraction were equal to zero (roughly 1,000 observations) we assigned a value of 0.

when we take into account unobserved individual heterogeneity (last two columns) suggesting that a simple regression on a pooled sample may underestimate the relationship of interest.

The marginal effects from the CRE probit regressions plotted in Figure 2 show how the probability to participate in a supplementary pension scheme declines steadily as the HW index increases, from roughly 16% at 0 to roughly 5% at 1. Two are the main explanations put forward in the literature on the pension/homeownership trade-off since Kemeny (1981) and Castles (1998): the budget constraint motivation and the need for incentives one. According to the former, given limited resources and a budget constraint, accumulating housing wealth is alternative to accumulating pension wealth. A complementary explanation is that homeowners lack needs or incentives for supplementary pensions, since they can take advantage of the security and implicit income provided by their real estate.

Table 4 and 5 also report estimates for the socio-economic control variables. The coefficients are very similar in all specifications, even though marital status, educational attainment and self-employed lose significance in the fixed effects/correlated random effects specifications. One possible explanation is that both marital status and educational attainment do not vary much over time in our sample, and are therefore close to being an individual fixed effect. Predictably, unemployed and not employed individuals are less likely to participate in a pension fund compared with employees; interestingly, the coefficient on self-employed is negative even though we might expect self-employed individuals to have a lower replacement rate and therefore be more likely to participate in a supplementary pension scheme. However, it is only significant in the pooled regressions. Despite the negative effect of homeownership, having a mortgage is significantly and positively associated with participation in a supplementary pension scheme. This result may be explained by the fact that households with mortgages are sound both from an economic and from a financial

viewpoint (due to the strict screening Italian banks apply to mortgage requests) and by the greater familiarity mortgage holder have with financial products.

For what concerns other socio-demographic determinants, we find some effects consistent with previous literature and some in contrast; for instance, participation is increasing in age (although in a concave fashion) and in income and wealth, as found by Huberman et al. (2007), Cappelletti and Guazzarotti (2013). Unlike Huberman et al. (2007) or Coppola and Lamla (2013) we find a negative gender effect, already mentioned in the descriptive analysis, which may be due the widespread lack of financial education among Italian women (Fornero and Monticone, 2011). The number of years of pension contributions<sup>13</sup> is positively and significantly associated with participation in a supplementary pension scheme. Theoretically, we might expect workers with more years of pension contributions to have a lower incentive to participate in a private pension fund; however, the same workers might have developed a higher sensitivity to the subject of retirement savings, and may therefore be more likely to understand the importance of complementary pensions.

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<sup>13</sup>Regarding the SHIW variable for pension contributions, we followed Ciani and Fresu (2011) and assumed no measurement error.

**Table 4: Participation in supplementary pension schemes and homeownership (dummy)**

	LPM b/se	Probit <sup>(a)</sup> b/se	FE-LPM b/se	CRE probit <sup>(a)</sup> b/se
Homeowner	-0.019*** (0.01)	-0.021*** (0.01)	-0.035*** (0.01)	-0.028*** (0.01)
Age	0.011*** (0.00)	0.014*** (0.00)	0.010*** (0.00)	0.007*** (0.00)
Age squared/100	-0.015*** (0.00)	-0.018*** (0.00)	-0.008*** (0.00)	-0.010*** (0.00)
Female	-0.013*** (0.00)	-0.013*** (0.00)	OMITTED -	-0.008*** (0.00)
Single	-0.020*** (0.01)	-0.018*** (0.00)	0.000 (0.01)	-0.002 (0.01)
Divorced	-0.005 (0.01)	-0.006 (0.01)	0.013 (0.02)	0.005 (0.01)
Widow(er)	0.006 (0.01)	0.018 (0.02)	0.019 (0.02)	0.012 (0.02)
Medium Education	0.024*** (0.00)	0.022*** (0.00)	-0.006 (0.01)	-0.001 (0.01)
High Education	0.034*** (0.01)	0.030*** (0.00)	-0.010 (0.01)	0.003 (0.01)
Household size	-0.008*** (0.00)	-0.010*** (0.00)	0.004 (0.00)	0.000 (0.00)
Head of household	0.040*** (0.00)	0.032*** (0.00)	0.008 (0.01)	0.008* (0.00)
Self-employed	-0.007 (0.01)	-0.008* (0.00)	-0.002 (0.01)	-0.002 (0.01)
Unemployed	-0.034*** (0.00)	-0.061*** (0.00)	-0.020*** (0.01)	-0.026*** (0.00)
Out of workforce	-0.023*** (0.00)	-0.046*** (0.01)	-0.013* (0.01)	-0.017*** (0.01)
Years of contribution	0.002*** (0.00)	0.001*** (0.00)	0.002*** (0.00)	0.001*** (0.00)
HH has a mortgage	0.034*** (0.01)	0.022*** (0.00)	0.021*** (0.01)	0.013*** (0.00)
II income quartile	0.010*** (0.00)	0.019*** (0.00)	0.006 (0.00)	0.009*** (0.00)
III income quartile	0.025*** (0.00)	0.031*** (0.00)	0.010* (0.01)	0.011*** (0.00)
IV income quartile	0.041*** (0.01)	0.047*** (0.01)	0.022*** (0.01)	0.018*** (0.00)
II wealth quartile	0.024*** (0.01)	0.024*** (0.00)	0.022*** (0.01)	0.015*** (0.00)
III wealth quartile	0.033*** (0.01)	0.035*** (0.01)	0.024*** (0.01)	0.018*** (0.00)
IV wealth quartile	0.051*** (0.01)	0.052*** (0.01)	0.042*** (0.01)	0.030*** (0.01)
Constant	-0.136*** (0.02)		-0.032 (0.12)	
Individual Effects	NO	NO	YES	YES
Macroarea	YES	YES	YES	YES
Year	YES	YES	YES	YES
# obs	52,218	52,218	52,218	52,218
# indiv	18,294	18,294	18,294	18,294
R <sup>2</sup> /pseudo R <sup>2</sup>	0.090	0.182	0.043	
F/ Wald $\chi^2$ / p-val	73.19 / 0.000	2,659.89 / 0.000	19.02 / 0.000	2,038.10 / 0.000
F/ Wald test $\alpha_i=0$ / p-val	-	-	1.88 / 0.000	115.52 / 0.000
$\rho$	-	-	0.580	0.481

Robust standard errors are clustered at the individual level; \*  $p < 0.01$ , \*\*  $p < 0.005$ , \*\*\*  $p < 0.001$

<sup>(a)</sup> Coefficients reported refer to average marginal effects



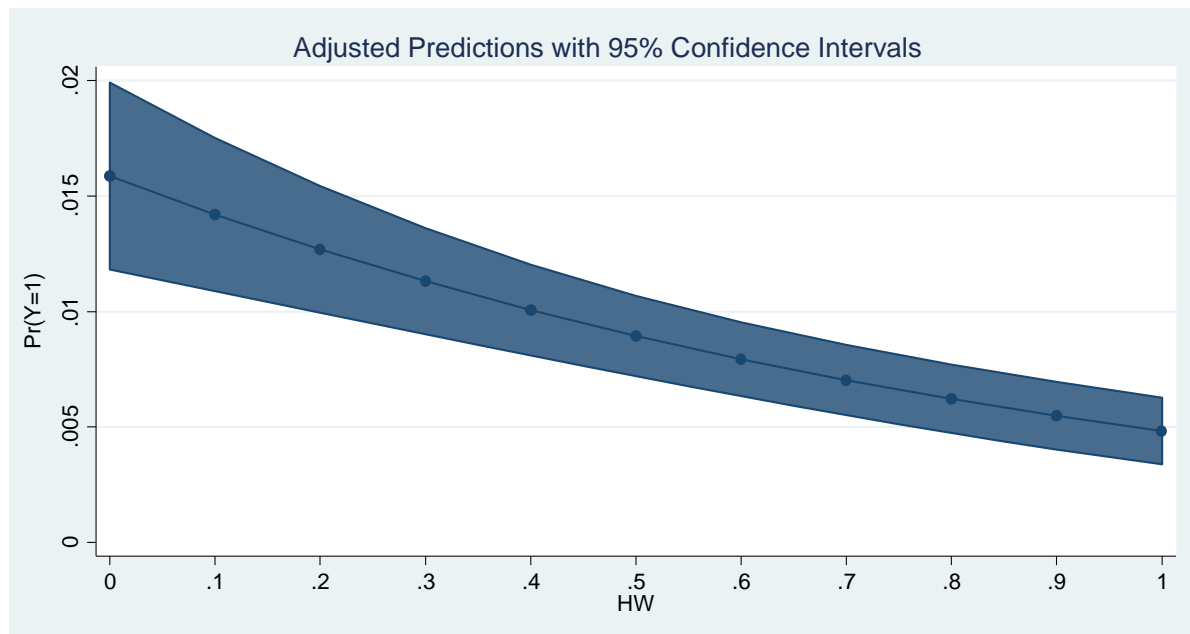
**Table 5: Participation in supplementary pension schemes and homeownership (index)**

	<b>LPM</b> <b>b/se</b>	<b>Probit<sup>(a)</sup></b> <b>b/se</b>	<b>FE-LPM</b> <b>b/se</b>	<b>CRE probit<sup>(a)</sup></b> <b>b/se</b>
HW	-0.024*** (0.01)	-0.027*** (0.00)	-0.041*** (0.01)	-0.032*** (0.01)
Age	0.011*** (0.00)	0.014*** (0.00)	0.010*** (0.00)	0.007*** (0.00)
Age squared / 100	-0.015*** (0.00)	-0.019*** (0.00)	-0.008*** (0.00)	-0.010*** (0.00)
Female	-0.014*** (0.00)	-0.013*** (0.00)	OMITTED -	-0.008*** (0.00)
Single	-0.021*** (0.01)	-0.019*** (0.00)	-0.000 (0.01)	-0.003 (0.01)
Divorced	-0.006 (0.01)	-0.007 (0.01)	0.009 (0.02)	0.004 (0.01)
Widow(er)	0.007 (0.01)	0.020 (0.02)	0.029 (0.02)	0.021 (0.03)
Medium Education	0.024*** (0.00)	0.022*** (0.00)	-0.007 (0.01)	-0.002 (0.01)
High Education	0.035*** (0.01)	0.031*** (0.01)	-0.011 (0.01)	0.003 (0.01)
Household size	-0.008*** (0.00)	-0.010*** (0.00)	0.003 (0.00)	0.000 (0.00)
Head of household	0.040*** (0.00)	0.033*** (0.00)	0.008 (0.01)	0.008* (0.00)
Self-employed	-0.010 (0.01)	-0.011** (0.00)	-0.004 (0.01)	-0.003 (0.01)
Unemployed	-0.035*** (0.00)	-0.062*** (0.00)	-0.020*** (0.01)	-0.027*** (0.00)
Out of workforce	-0.024*** (0.00)	-0.047*** (0.01)	-0.013* (0.01)	-0.017*** (0.01)
Years of contribution	0.001*** (0.00)	0.001*** (0.00)	0.002*** (0.00)	0.001*** (0.00)
HH has a mortgage	0.034*** (0.01)	0.023*** (0.00)	0.021*** (0.01)	0.013*** (0.00)
II income quartile	0.009*** (0.00)	0.018*** (0.00)	0.006 (0.00)	0.009** (0.00)
III income quartile	0.024*** (0.00)	0.030*** (0.00)	0.008 (0.01)	0.010** (0.00)
IV income quartile	0.039*** (0.01)	0.044*** (0.01)	0.020*** (0.01)	0.016*** (0.00)
II wealth quartile	0.025*** (0.00)	0.025*** (0.00)	0.022*** (0.01)	0.015*** (0.00)
III wealth quartile	0.033*** (0.01)	0.035*** (0.00)	0.022*** (0.01)	0.017*** (0.00)
IV wealth quartile	0.047*** (0.01)	0.048*** (0.01)	0.036*** (0.01)	0.025*** (0.00)
Constant	-0.137*** (0.02)		-0.026 (0.12)	
Individual Effects	NO	NO	YES	YES
Macroarea	YES	YES	OMITTED	YES
Year	YES	YES	YES	YES
# obs	52,076	52,076	52,076	52,076
# indiv	18,278	18,278	18,278	18,278
R <sup>2</sup> /pseudo R <sup>2</sup>	0.088	0.180	0.043	
F/ Wald $\chi^2$ / p-val	79.38 / 0.000	2604.96 / 0.000	19.42 / 0.000	2041.01 / 0.000
F test $\alpha_i=0$ / p-val	-	-	1.88 / 0.000	114.67 / 0.000
$\rho$	-	-	0.580	0.482

Robust standard errors are clustered at the individual level; \*  $p < 0.01$ , \*\*  $p < 0.005$ , \*\*\*  $p < 0.001$

<sup>(a)</sup> Coefficients reported refer to average marginal effects

**Figure 2: Probability of participating in a supplementary pension scheme at representative value of the index HW**



Source: own elaborations from SHIW 1995-2012

#### **4.2 Restricting the estimation sample to working people**

Because not working individuals are, usually, less likely to participate in a complementary pension plan, we carry out some robustness checks to ensure that our results are not driven by the presence of unemployed/not employed in our estimation sample, as already mentioned in section 3. We thus exclude all individuals who were never employed/self-employed during our sample period (14,646 observations for 5,602 individuals), since those who worked for at least some years might have chosen to participate in a pension scheme while employed.

The results of our robustness check are reported in table 6: column 1 and 3 report the same LPM-FE estimates of table 4 and 5 (third column) on the whole sample, while column 2 and 4 report the estimates on the restricted sample. We confirm the negative and highly significant impact of homeownership in both specifications; furthermore, by excluding all individuals who never worked during our sample period, the negative impact of homeownership appears stronger.

**Table 6: Participation in pension funds including / excluding who never worked**

	All b/se	Excluding who never worked b/se	All b/se	Excluding who never worked b/se
Homeowner	-0.035*** (0.01)	-0.050*** (0.01)		
HW			-0.041*** (0.01)	-0.056*** (0.01)
Age	0.010*** (0.00)	0.014*** (0.00)	0.010*** (0.00)	0.013*** (0.00)
Age squared / 100	-0.008*** (0.00)	-0.010*** (0.00)	-0.008*** (0.00)	-0.010*** (0.00)
Self-employed	-0.002 (0.01)	-0.004 (0.01)	-0.004 (0.01)	-0.006 (0.01)
Unemployed	-0.020*** (0.01)	-0.018** (0.01)	-0.020*** (0.01)	-0.018** (0.01)
Out of workforce	-0.013* (0.01)	-0.011 (0.01)	-0.013* (0.01)	-0.011 (0.01)
Years of contributions	0.002*** (0.00)	0.002*** (0.00)	0.002*** (0.00)	0.001*** (0.00)
HH has a mortgage	0.021*** (0.01)	0.026*** (0.01)	0.021*** (0.01)	0.026*** (0.01)
Constant	-0.032 (0.12)	-0.150 (0.12)	-0.026 (0.12)	-0.142 (0.12)
Individual Effects	YES	YES	YES	YES
Year	YES	YES	YES	YES
# obs	52,218	37,572	52,076	37,471
# indiv	18,294	12,692	18,278	12,681
Overall pseudo R <sup>2</sup>	0.043	0.036	0.043	0.036
F/ p-val	19.02 / 0.000	18.12 / 0.000	19.42 / 0.000	18.51 / 0.000
F test $\alpha_i=0$ / p-val	1.88 / 0.000	1.95 / 0.000	1.88 / 0.000	1.95 / 0.000
$\rho$	0.580	0.538	0.580	0.543

*Robust standard errors are clustered at the individual level; \*  $p < 0.01$ , \*\*  $p < 0.005$ , \*\*\*  $p < 0.001$*

*All specifications are estimated by LPM-FE and include the following control variables: household size, dummies for marital status, dummies for educational attainment, dummy for head of household, income and wealth quartiles. Macroarea and female dummies are omitted because of no variation.*

#### **4.3 Focusing on the effect of the 2007 reform**

Participation rates doubled since the 2007 reform, therefore it is worth checking whether the impact of homeownership remained unchanged by splitting our sample and re-estimating regression [2] for the periods 1995-2004 and 2006-2012. We start from 2006 rather than 2008 because of the vast informational campaign which took place during 2006/2007 and is likely to have had an effect during that time.

Homeownership has a negative and statistically significant sign in both periods, as shown in table 7. However, the less refined dichotomous indicator has lower explanatory power after the reform, while the continuous indicator, HW, remains highly statistically significant and,

moreover, increases in size. We are therefore prone to conclude that, even after the 2007 reform and the corresponding informational campaign, homeownership is negatively associated with participation in personal retirement plans or supplementary pension funds.

**Table 7: Participation in pension funds before and after the 2007 reform**

	<b>1995-2004</b>	<b>2006-2012</b>	<b>1995-2004</b>	<b>2006-2012</b>
	<b>b/se</b>	<b>b/se</b>	<b>b/se</b>	<b>b/se</b>
Homeowner	-0.030*** (0.01)	-0.028** (0.01)		
HW			-0.028*** (0.01)	-0.040*** (0.01)
Age	0.009*** (0.00)	0.012*** (0.00)	0.009*** (0.00)	0.012*** (0.00)
Age squared / 100	-0.007** (0.00)	-0.006 (0.00)	-0.007* (0.00)	-0.007 (0.00)
Self-employed	0.021* (0.01)	-0.027* (0.02)	0.020* (0.01)	-0.030* (0.02)
Unemployed	-0.005 (0.01)	-0.031*** (0.01)	-0.005 (0.01)	-0.031** (0.01)
Out of workforce	0.002 (0.01)	-0.022* (0.02)	0.004 (0.01)	-0.024** (0.02)
Years of contributions	0.001 (0.00)	0.004*** (0.00)	0.001 (0.00)	0.004*** (0.00)
HH has a mortgage	0.011* (0.01)	0.029*** (0.01)	0.010* (0.01)	0.032*** (0.01)
Constant	-0.231*** (0.06)	-0.144 (0.15)	-0.225*** (0.06)	-0.158 (0.15)
Individual Effects	YES	YES	YES	YES
Year	YES	YES	YES	YES
# obs	31,380	25,357	31,241	23,275
# indiv	12,944	10,121	12,933	9,981
Overall pseudo R <sup>2</sup>	0.019	0.051	0.052	0.052
F/ p-val	9.04 / 0.000	15.41 / 0.000	9.04 / 0.000	15.65 / 0.000
F test $\alpha_i=0$ / p-val	1.69 / 0.000	1.67 / 0.000	1.90 / 0.000	1.86 / 0.000
$\rho$	0.470	0.468	0.619	0.620

*Robust standard errors are clustered at the individual level; \*  $p < 0.01$ , \*\*  $p < 0.005$ , \*\*\*  $p < 0.001$*

*All specifications are estimated by LPM-FE and include the following control variables: household size, dummies for marital status, dummies for educational attainment, dummy for head of household, income and wealth quartiles. Macroarea and female dummies are omitted because of no variation.*

## 5. Conclusions

The objective of this study is to explore determinants of the participation in supplementary pension schemes and to provide an alternative explanation for the low take up rate of pension funds in Italy. Specifically, we investigate the possibility of a trade-off between housing investment and the participation in supplementary pension schemes.

Our results show that, after controlling for a wide range of socio-demographic variables and allowing for unobserved individual heterogeneity, investment in housing appears to crowd out investment in personal retirement plans or supplementary pension funds. We show that, despite the positive relationship in the descriptive statistics, being a homeowner has a negative and highly significant impact on the probability of participating in a supplementary pension scheme. The effect is larger when we take into account unobserved individual heterogeneity suggesting that a simple regression on a pooled sample may underestimate the relationship of interest. Moreover, the trade-off appears to be stronger for the subsample of working individuals and persists even after the 2007 reform and parallel informational campaign.

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## Appendix – Variables’ description and summary statistics

### SHIW DATA:

<https://www.bancaditalia.it/statistiche/indcamp/bilfait>

Variable	Description
$Y_{it}$ (Participation)	Binary variable equal to 1 if the individual participates in a pension fund, 0 otherwise
Homeowner	Binary variable equal to 1 if the individual lives in a household which owns its home, 0 otherwise
HW	Continuous variable ranging from 0 to 1 and is equal to the value of the first home over total (gross) wealth. The variable is lagged by one period
Female	Binary variable equal to 1 if the individual is a female, 0 if male
Age / Age <sup>2</sup>	Integer values representing the age of the individual (values between 15 and 65) and its squared term.
Marital status	Discrete variable equal to: 1 if the individual is married (baseline) 2 if the individual is single 3 if the individual is divorced 4 if the individual is widow(er)
Low education	Binary variable equal to 1 if the individual has no or elementary education, 0 otherwise
Medium Education	Binary variable equal to 1 if the individual has secondary education, 0 otherwise
High Education	Binary variable equal to 1 if the individual has a degree (3 years or more at university), 0 otherwise
Household Size	Discrete variable ranging from 1 to 12 representing the number of household components
Head of Household	Binary variable equal to one if the individuals is responsible for the financial decision making, 0 otherwise
Job Status	Discrete variable equal to: 1 if the individual is an employee (baseline) 2 if the individual is self employed 3 if the individual is unemployed 4 if the individual is out of the workforce
Years of Contribution	Integer values representing the number of years of contribution in a pension fund (self assessed)
Has a mortgage	Binary variable equal to 1 if the individual is a homeowner with a mortgage, 0 otherwise
Area	Discrete variable equal to: 1 If individual resident in the North of Italy (baseline) 2 If individual resident in the Centre of Italy 3 If individual resident in the South of Italy
Income quartiles	Discrete variable equal to: 1 if household income within the first quartile (baseline) 2 if household income within the second quartile 3 if household income within the third quartile 4 if household income above the third quartile
Wealth quartiles	Discrete variable equal to: 1 if household wealth within the first quartile (baseline) 2 if household wealth within the second quartile 3 if household wealth within the third quartile 4 if household wealth above the third quartile



**Summary statistics of the estimation sample (obs: 52,737)**

	<b>Mean</b>	<b>SD</b>	<b>MIN</b>	<b>MAX</b>
Participation	0.08	0.28	0	1
Homeowner	0.72	0.45	0	1
HW	0.54	0.39	0	1
Age	40.53	11.48	20	60
Female	0.52	0.50	0	1
Couple	0.62	0.48	0	1
Single	0.32	0.47	0	1
Divorced	0.04	0.12	0	1
Widow(er)	0.02	0.19	0	1
Low Education	0.43	0.50	0	1
Medium Education	0.44	0.50	0	1
High Education	0.12	0.33	0	1
Household size	3.53	1.17	1	12
Head of household	0.38	0.48	0	1
Employee	0.51	0.49	0	1
Self-employed	0.12	0.33	0	1
Unemployed	0.10	0.30	0	1
Out of workforce	0.26	0.44	0	1
Years of contribution	12.56	11.97	0	50
HH has a mortgage	0.12	0.33	0	1
Resident in the North	0.40	0.49	0	1
Resident in the Centre	0.19	0.40	0	1
Resident in the South	0.41	0.49	0	1
I income quartile	0.19	0.39	0	1
II income quartile	0.23	0.42	0	1
III income quartile	0.27	0.45	0	1
IV income quartile	0.31	0.46	0	1
I wealth quartile	0.24	0.42	0	1
II wealth quartile	0.24	0.42	0	1
III wealth quartile	0.26	0.44	0	1
IV wealth quartile	0.27	0.44	0	1

*Source: SHIW 1995-2012, estimation sample.*

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