CeRP
CENTER FOR RESEARCH ON PENSIONS AND WELFARE POLICIES

Working Paper 131/13

DO MORE FINANCIALLY LITERATE HOUSEHOLDS INVEST LESS IN HOUSING? EVIDENCE FROM ITALY

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PRELIMINARY DRAFT

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Using the Bank of Italy's Survey of Household Income and Wealth (SHIW) covering a 5-year panel, we measure the impact of the degree of households' financial literacy on their portfolio imbalance towards housing investment. We find that households with higher levels of financial literacy hold a relatively lower share of illiquid wealth, and the results are more pronounced at older ages, when according to the lifecycle hypothesis they are meant to decumulate their assets. Results appear robust to different specifications of the dependent variable and potential endogeneity of financial literacy.

Keywords: financial literacy, intertemporal consumer choice, housing, portfolio choice
JEL classification: D12, D91

1. Introduction

The impact of housing on the Italian economy is huge, both on a macro and on a microeconomic level: while the construction sector accounts for roughly 6 per cent of GDP, employing up to 10 per cent of the labour force – nearly two million workers (Eurostat, Statistics in Focus 7/2010), real assets represent over 60 per cent of household wealth. Unlike bonds, stocks and other financial assets, owner occupied housing also provides significant consumption benefits.

Several studies have shown that homeownership is related to a higher psychological well-being, better citizenship and better educational outcomes for

[°]We wish to thank Elsa Fornero, Maela Giofrè, Giancarlo and Marini, Mariacristina Rossi for the invaluable support and advice. We also thank the We also thank Collegio Carlo Alberto for the funding, the participants to the Winter School on Inequality and Social Welfare Theory 2013, and the Netspar International Pension Workshop 2013 in Amsterdam for the useful suggestions and Elisabeth Brüggen for the discussion.

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homeowners' children (Green and White, 1997; DiPasquale and Glaeser, 1999; this may partly justify public policies, such as the relaxation of down-payment constraints and the home mortgage interest deduction, carried out in most OECD countries to encourage it (Andrews and Caldera Sànchez, 2011); a drawback of these policies is that they may lead to unbalanced portfolios with illiquid assets seizing the lion's share (Henderson and Ioannides, 1983; Brueckner, 1997).

By questioning the "homeownership dream", Beracha and Johnson (2012), show that for most of the last 20 years renting has been the superior investment strategy in the US, as long as renters invested residual savings in other more remunerative assets rather than on consumption. If the reinvesting condition wasn't met, and renters spent all the extra money, then buyers would accumulate much more wealth. Buying a house in this case works as a commitment device or forced savings. A broad strand of literature, starting from Shefrin and Thaler (1988), ascribes the overinvestment in illiquid assets to self-control problems. According to the behavioural lifecycle model, assets are not fungible and differ from each other for the level of temptation they are associated with[1] – liquidity being the more tempting and housing the least; in this case, sufficiently self-aware individuals will lock part of their wealth in assets which are harder to deplete.

If a pre-commitment to saving can be seen as positive for individuals with a low propensity to save, it may turn into a hindrance at retirement age, when people are meant to decumulate their wealth and keep consumption smooth. Furthermore, elderly individuals are more at exposed to health shocks and healthcare related expenditures, and keeping most of their wealth in housing assets could translate into greater financial fragility, especially for the lowest percentiles of the wealth distribution (Lusardi and Mitchell, 2006).

Psychological and behavioural factors aside, individuals may overinvest in housing because of a lack of financial literacy (FL). Lusardi and Mitchell (2006) define FL as a set of tools enabling a better allocation of financial resources; it is often associated with numerical skills, such as the ability to calculate rates of return on investments and the interest rate on debt, or with the understanding of economic concepts such as the trade-off between risk and return, the benefits of diversification, and the benefits and risks associated with specific financial decisions. The crucial role of FL in predicting the accumulation of savings has been thoroughly documented by Lusardi and Mitchell (2006, 2007) and Lusardi

[1] The assumption in Shefrin and Thaler (1988) is that individuals are tempted to spend all their resources on current consumption instead of saving for the future.

(2008); other studies have shown how a lack of FL is associated with suboptimal investment decisions, like the failure to participate in the stock market or, in case of participation, home bias[2], poor portfolio diversification and employer stock puzzle[3] (van Rooji et al. 2011, Kimball and Shumway, 2007; Guiso and Jappelli 2009; Christelis et al. 2010).

To our knowledge, the impact of a low degree of FL on excessive housing investment has not been investigated yet. In this paper we show that financially sophisticated households hold a more balanced portfolio, with a lower share of wealth locked up in housing assets, and the effect appears to be stronger at older ages. We isolate the partial effects of FL on portfolio imbalance by controlling for individual heterogeneity, and try to assert a causal relationship by addressing potential endogeneity. Our results are robust to different specifications of FL, as well as different specifications of the dependent variable.

The rest of this paper is organised as follows: section 2 reviews the relevant literature on portfolio allocation in presence of housing investment, and the effect of financial literacy on portfolio allocation; section 3 describes the SHIW data and explains how the main indicators are built; section 4 introduces the econometric specification and discusses the main results; section 5 concludes.

2. Is there an overinvestment in housing?

Henderson and Ioannides (1983) were among the first to model the choice of housing tenure together with optimal portfolio allocation during the lifecycle. In order to explain the empirically observed homeownership rates, they assume the existence of a 'rental externality' associated with house depreciation and maintenance costs borne by the landlord, which led to expensive rental contracts. In this setting, with no uncertainty and no liquidity constraints, owner-occupied housing is always the dominant choice. The authors also reach the unlikely conclusion that the demand for housing investment is not dependent on wealth, and, as the demand for housing consumption increases with wealth, wealthier people are more likely to rent the housing they consume rather than own it. A correction arrived 8 years later from Fu (1991) who revised Henderson and Ioannides' comparative statics and demonstrated that, if the coefficient of absolute

[2] Home bias is the stylised fact that investors would rather hold only domestic stocks despite the diversification gains they could achieve by holding also foreign ones.

[3] When employees fail to diversify risk by holding their (retirement) savings in their company's stocks – so if they lose their job, they also lose their savings.

risk aversion is decreasing, housing investment demand responded positively to a change in wealth.

The analysis of Grossman and Laroque (1990) and Cocco (2005) highlights the role of illiquidity or transactions costs; they all solve a dynamic stochastic model in which consumers get both utility and dividends from a durable good/housing. The first two authors assume the existence of a transaction cost relative to durable assets, maintaining that financial assets can be bought and sold at no cost; conversely, Cocco assumes the existence of a fixed cost for stock market participation. Their conclusions are, in fact, similar as they all claim that housing investment crowds out investment in risky assets, and that even small transaction costs can have a large effect.

Many authors analyse households' portfolio in presence of housing to test for its efficiency in mean-variance terms. Brueckner (1997) elaborates on the housing constraint originally introduced by Henderson and Ioannides (1983), according to which the quantity of housing owned must be at least as large as the quantity of housing consumed. When the constraint is binding, portfolios are found to be mean-variance inefficient, i.e. homeowners could gain higher returns without bearing higher risks by reducing the housing investment and purchasing other assets, like stocks; of course, such problem does not arise for renters, since the housing they own can be smaller (or larger) than the housing they consume.

Flavin and Yamashita (2002) confirm that households' portfolios are mean-variance inefficient because of an excess of housing investment due to the housing constraint. A few years later, the same authors (Flavin and Yamashita, 2011) introduce another type of constraint, a collateral constraint on mortgage borrowing, to explain why the ownership of risky assets over the life-cycle follows a hump-shaped profile regardless of the levels of risk aversion. Pelizzon and Weber (2009) highlight the role of housing assets as a hedge against rent risk, and find that homeowners hold less efficient portfolios.

2.1. Potential interaction with financial literacy

If transaction costs have a role in deterring households from participating in the stock market (Cocco, 2005), so do information costs: by reducing information costs, higher levels of FL have a positive effect on stock market participation (Campbell, 2006; Christelis et al., 2010; van Rooji et al. 2011).

Guiso and Jappelli (2009) show that financially illiterate households own poorly diversified portfolios, but they do not take the presence of housing into account;

however, the consequences of holding a poorly diversified portfolio are more pronounced in case of excessive housing, since it is both expensive and time consuming to sell (Lusardi and Mitchell, 2006).

Illiquidity and information costs are more of an issue for older households: Pelizzon and Weber (2009) find that Italian elderly are 'over housed', i.e. their dwellings are too large compared to their age related needs, while Fornero and Monticone (2011) report that Italian elderly are less financially literate: a combination of 'over housing' and financial illiteracy could therefore lead to great financial fragility in old age.

In this paper we provide the first link between the literature on housing investment and the one on financial literacy, by carrying out an empirical analysis on Italian survey data.

3. Survey data and summary statistics

Our investigation draws from a 5 years panel dataset, Bank of Italy's Survey on Household Income and Wealth (SHIW) waves 2006, 2008 and 2010. The SHIW is a representative sample of the Italian population and includes information on socio-demographic variables, a detailed description of households' assets and, for the years considered, a list of FL tests. The analysis is conducted at household level; the panel is made up by 23,683 observations[4] for 14,730 households; it is unbalanced, since only 23.6 per cent of the households are present in every wave, 13.7 per cent in two, and 62.7 per cent in one wave only. The average head of household, i.e. the household member with the highest labour and transfer income[5], is aged 57; roughly 31.5 per cent of them are females, 62 per cent are married and 43 per cent are retired (see Table 1); the sub-sample of older respondents, aged 65 years and over, is approximately equal to 35 per cent. Over 69 per cent of head of households is a homeowner, with average net housing wealth[6] amounting to €216,447 (€158,690 for the entire sample); 90 per cent of households own at least one financial asset, most commonly bank or post office deposits, with average net financial wealth equal to €17,667.

If we look at the evolution of asset ownership for the years considered, we see that the proportion of homeowners has declined by roughly half percentage point,

[4] Head of households younger than 15 were dropped, losing only 13 observations.

[5] As defined by the Bank of Italy in the survey.

[6] Net housing wealth is calculated as the self-assessed value of respondents' first home multiplied by the fraction owned - only 2.85% do not have full ownership - net of any mortgages.

from 69.2 per cent in 2008 to 68.7 per cent in 2010[7]; the proportion of government bondholders has decreased by a more than a third, while the proportion of owners of risky assets has risen by one percentage point (see Table 2).

If we decompose asset ownership by socio-economic status, we find that the decrease in homeownership rates was mainly accounted for by the lowest quintile of income distribution; as Table 3 shows, homeownership rates in the first income quintile went down by 6 percentage points, from 45.1 per cent in 2006 to 39.1 in 2010, while they remained substantially unaltered among the top earners. Conversely, it is in the highest income quintiles that we witness the most sizeable reduction in government bonds ownership, which more than halved in the fourth quintile, from 12.4 per cent in 2006 to 5.9 per cent in 2010, and down by nearly 20 per cent for the top earners, from 23.3 per cent in 2006 to 18.9 per cent in 2010 (see Table 3).

Financial literacy

To gauge respondents' level of FL, we follow Lusardi (2011) and Fornero an Monticone (2011) and exploit three survey questions regarding inflation, interest rates and a basic understanding of stocks and bonds.[8,9]

We first create three binary variables taking the value of 1 for every correct answer for each individual, and then sum them up to build an indicator ranging from 0 to 3.

$$FL_i = \sum_{j=0}^{3} Q_{ij} \qquad i = 1,...N \qquad \text{and} \quad j = 0,..,3$$

As Figure 1 shows, the level of FL is quite low for Italian households, since less than one third of our respondents (28.8 per cent) is able to answer correctly all 3 questions, with the percentage of financially literate heads of household being

[7] This is the first time in 20 years: the percentage of homeowners in 1989 was 59.3%, and has been steadily increasing ever since (SHIW data).

[8] **Question 1**: Imagine leaving 1,000 euros in a current account that pays 1% interest and has no charges. Imagine that inflation is running at 2%. If you withdraw the money in a year's time do you think you will be able to buy the same amount of goods as if you spent the 1,000 euros today? Yes/Less (correct)/More/Don't know/No answer.

Question 2: Which of the following investment strategies do you think entails the greatest risk of losing your capital? Investing in the shares of a single company/ Investing in the shares of more than one company (correct)/ Don't know/No answer.

Question 3: Which of the following types of mortgage do you think would allow you from the very start to fix the maximum amount and number of instalments to be paid before the debt is extinguished? Floating-rate mortgage/ Fixed-rate mortgage (correct)/ Floating-rate mortgage with fixed instalments/ Don't know/No answer.

[9] Only 3,992 respondents, half of sample, are asked the FL questions in the 2006 wave.

considerably lower among the 65 years old and over (19.0 per cent vs. 32.4 per cent).

4. Econometric analysis of portfolio weighted housing

The relationship between FL and housing wealth *ex-ante* is ambiguous: more financially literate households accumulate more wealth (Lusardi and Mitchell 2006) both in terms of real and financial assets, suggesting that they might also accumulate greater housing wealth. However, in terms of share of housing assets over total net wealth, greater FL should lead to a better portfolio diversification and to higher stock market participation. A simple descriptive analysis shows that, indeed, individuals who could answer all FL tests correctly accumulate on average twice as much housing wealth as those who could answer none. The results are even more pronounced for households headed by over 65's (Table 4).

To investigate the relationship between FL and portfolio imbalance we define a new variable, housing weight (HW), as the ratio of net housing wealth over total net wealth, i.e. all real and financial wealth net of financial liabilities, such as debt or mortgages. HW only considers the value of the home of residence so that it is conceptually similar to the housing constraint in Brueckner (1997).

A simple cross-tabulation shows that HW increases with FL for the young and decreases for the old. If we plot the average HW by level of financial literacy and cohort, we see again that relationship between FL and HW is decreasing for the older cohorts and, increasing or constant for the younger (Figure 2).

To assess the impact of FL on HW, we use the 3 waves of the SHIW, 2006, 2008 and 2010 and the following regression model [1].

$$[1] \qquad HW_{it} = \eta_t + FL_{it}\beta_1 + x_{it}\beta_2 + c_i + u_{it}, \qquad t = 1,2,3$$

where HW_{it} is our dependent variable for individual i at time t, η_t is a separate time period intercept, $\mathbf{x}$ is the vector of covariates, c_i is the time-constant unobserved individual heterogeneity, and finally u_{it} are the idiosyncratic errors. Unobserved heterogeneity c_i is treated as a random variable, and small t's are treated as aggregate time effects or different intercepts to be estimated.

FL is measured in two different ways: the previously defined indicator, (summing up all correct answers) taking values from 0 to 3, and a dichotomous variable taking the value of 1 if respondents scored 3 points and 0 otherwise. The vector of covariates $\mathbf{x}_{it}$ includes a second order polynomial in age, dummies for marital status, the natural logarithm of household income, the natural logarithm of

average regional house prices[10], a dummy variable indicating whether the head of household is female[11], one indicating whether he or she has a university degree, one indicating whether he or she is a pensioner, regional dummies, subjective health status and finally a dichotomous variable indicating whether the head of household had inherited the house in which he or she lived. Year dummies are also included.

The first assumption we make is that idiosyncratic errors are uncorrelated with the x's and the individual heterogeneity term c_i as in equation [2].

[2] $$E(u_{it} \mid x_{i1},...,x_{iT},c_i) = 0 \qquad t = 1,2,3$$

This defines what we are interested in, i.e. the conditional mean.

[3] $$E(HW_{it} \mid x_{it},c_{it}) = \eta_t + FL_{it}\beta_1 + x_{it}\beta_2 + c_i \qquad t = 1,2,3$$

If we simply assumed that FL is uncorrelated with unobserved individual heterogeneity we could run an OLS regression on the pooled sample and consistently estimate the $\boldsymbol{\beta}$'s, but unfortunately it is quite likely that $Cov(FL_{it},c_i) \neq 0$. Indeed, c_i could represent innate individual ability or a taste for financial matters, which is very likely to be correlated with FL; endogeneity in this case would bias the coefficient upwards.

A first attempt to get consistent estimates is to find a proxy for c_i and plug it into the regression. Good candidates for proxying individual ability could be mother and father's education (dummy taking the value of one if with either of them is a university graduate) and father's occupation (dummy taking the value of one if high skilled), while a proxy for financial preference could be the presence of an economic graduate within the household.

A simple OLS regression on the pooled sample confirms the overall positive effect of FL on portfolio imbalance in terms of lower housing investment. Both indicators of FL have the same (negative) sign and high statistical significance; in particular, the first two columns of Table 6 show that giving an extra correct answer decreases the mean share of housing wealth by 0.010 points, while answering all three FL tests correctly is correlated with a 0.019 points lower share of housing wealth. When we add the potential proxies for innate ability or financial preference (column II and IV) we see that the sign and significance level

[10] This variable is build by taking the natural logarithm of average self reported housing value per square metre, by region and city size.

[11] It is not time-invariant because it refers to the gender of the head of household, which can change if the household composition changes, for instance with a separation/divorce or death of a spouse.

of both indicators of FL do not vary substantially, but the coefficient is slightly lower as expected.

If we run the same regression on a sub-sample of older respondents (65 years and over), we find that the correlation of FL with housing investment is even stronger in magnitude and robust to the inclusion of all different proxies. In particular, we find that an extra correct answer is correlated with a decrease of housing weight of 0.020 points from the average of 0.62, while answering all three questions correctly is correlated with a decrease of 0.057 points; the coefficients are essentially the same when we include proxies for individual unobserved heterogeneity (see Table 7).

A second step is to exploit the panel dimension of our data in order to obtain consistent estimates; we can do so as long as 1) both our dependent variable (HW) and our regressor of interest (FL) change over time, 2) c_i is constant over time and 3) errors are uncorrelated with the x's over time[12].

We eliminate time-invariant individual heterogeneity by de-meaning our data, i.e. by calculating time averages of equation [1] for each individual (between transformation)

$$[4] \qquad \overline{HW}_i = \overline{FL}_i\beta_1 + \bar{x}_i\beta_2 + c_i + u_i, \qquad t = 1,2,3$$

and then subtract equation [4] from equation [1], so we obtain

$$[5] \qquad HW_{it} - \overline{HW}_i = \left(FL_{it} - \overline{FL}_i\right)\beta_1 + \left(x_{it} - \bar{x}_i\right)\beta_2 + \left(c_i - c_i\right) + u_{it} - \bar{u}_i, \qquad t = 1,2,3$$

Equation [5] can then be estimated by fixed-effects (FE) or within estimator. By taking out time averages, time invariant individual heterogeneity c_i will disappear if and only if a strict exogeneity assumption holds[13].

4.1. FE estimates results:

Table 8 reports the FE results. The effect of a variation of FL on HW is negative as expected; the impact is significant, but, again, not too large in magnitude. An additional correct answer causes HW to decrease by approximately

[12] This raises a critical question: why is it that our indicator of FL is changing over time? One possibility is "measurement effect", that is, respondents learn from previous questionnaires. Since our panel is unbalanced, we can check whether this is the case, by comparing the mean scores between those who belong to the panel sub-sample, and those who were tested only once. A t-test comparing the two means shows that they are not statistically different, and the results are consistent with Fornero and Monticone (2011) for the years 2006-2008. Another possibility is that between 2006 and 2010 Italian households were more exposed to FL concepts because of the media coverage given to the financial crisis, and this led to a variation in their knowledge.

[13] The strict exogeneity assumption also implies that the model cannot contain lagged dependent variables: if $x_t = y_{t-1}$ then $x_{t+1} = y$ and we cannot assume that errors at time t are uncorrelated with y (feedback effect).

0.009 points from the mean value 0.57, while a positive variation in the second indicator is correlated with a 0.015 decrease in the dependent variable. The impact is larger in magnitude and stronger in terms of statistical significance for the older sub-sample. Only a few independent variables show statistically significant effects which are quite intuitive: getting a divorce has strong negative impact, -0.091 for the whole sample and -0.202 for the older sub-sample; inheriting a house has a strong positive impact, raising the average share of housing wealth by 0.178 points for the whole sample and 0.148 for the 65 year old and over; entering retirement also has a positive effect, which suggests that pensioners either start decumulating financial assets, and this would be in line with a lifecycle behaviour, or use their severance pay to accumulate more illiquid assets, and this would be worrying. The latter hypothesis finds some kind of corroboration in Borella et al. (2007), who perform an empirical analysis on the SHIW data and observe that Italian households spend part of their severance pay on durable goods (however the authors do not consider housing).

Interestingly, while within a cross sectional framework higher income is correlated with a higher share of housing wealth, the FE estimator tells us that a 1 per cent increase in income leads to a 0.033 points decrease in HW (0.06 for the over 65), so the extra money is invested in financial assets.

4.2. Reverse causality and fixed effects two stage least squares estimation.

Another source of potential concern is that the variation in FL could be the result of successive investment in stocks or improved portfolio allocation, rather than causing it, which would of course violate the strict exogeneity assumption. A fixed-effects instrumental variable (or fixed effects two stage least squares) approach can obviate to this problem. To use the IV approach we need to identify an observable variable z_1 not present in equation [5] which is highly correlated with FL but uncorrelated with the idiosyncratic errors, u_{it}.

The OECD 2005 report on FL documents the close relationship between FL and the use of payment instruments different from cash. Therefore a natural candidate to instrument the level of FL is the amount of credit/debit/cashline cards held by different households[14]. We first estimate the average number of cards held by head of households for each region and municipality size, and then calculate the

[14] While it is possible that an omitted variable, such as financial ability, has a causal relation with both higher FL and the number of cards held, it appears unlikely that stock ownership may have a causal effect on the number of bank cards.

difference between the number of cards each head of household owns and such average.

About 70 per cent of households have at least one payment card and the proportion of card owners between 2006 and 2010 has increased by nearly 7 percentage points.

The F-statistic on the first stage shows that the instrument is strong, however the correlation is much higher for the younger sample (18.62 vs. 11.82). Since only one instrument is used, the equation is exactly identified.

The results confirm the negative effect of FL on HW; the coefficient is larger than with OLS, but the significance is higher for the entire sample (see Table 9).

4.3. Robustness checks

Financially unsophisticated households are less likely to know or to understand the functioning of the stock market (van Rojii et al. 2007), so one might raise the objection that our results are driven by the presence of stocks in the portfolio: if higher financial literacy means larger proportion of stocks, then it follows that it also means a smaller proportion of other assets, like housing. In order to exclude this possibility we run a separate regression using as dependent variable the share of housing wealth over total net wealth net of stocks, but including government bonds, long-term financial positions and other less information intensive financial assets.

Table 10 confirms that our results are not driven by the presence of stocks in households' portfolios, as the sign and magnitude of the coefficient on FL remains roughly the same in both FE and FE-IV specifications.

5. Conclusions

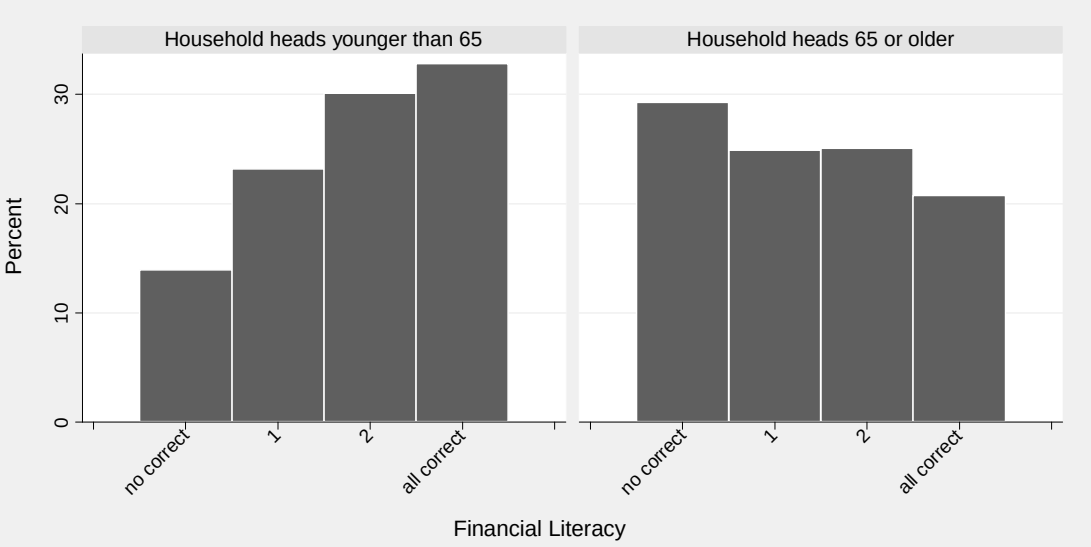
Individuals lacking financial literacy are not empowered to make the right choices when it comes to financial matters. Our study illustrates the impact of low financial literacy on one of such choices: the proportion of wealth one should hold in housing assets. Policy makers, both on the left and on the right hand side of the spectrum, have encouraged the homeownership dream in most OECD countries, regardless of the potential consequences of being 'over housed'. In theory, the accumulation of assets should not be a goal per se, but rather a means to accomplish a better standard of living in the old age. In fact, homeownership

seems to have become a goal in itself, and this, from a strictly economic point of view, is quite puzzling.

We show that, allowing for a vast array of individual characteristics, having higher levels of FL has a negative impact on the proportion of illiquid wealth on total net wealth, and the results are robust to potential endogeneity.

The effect of FL is stronger for the segment of the population we are more interested in: people aged 65 and over. Indeed, Italian elderly own a much larger share of housing wealth, compared to younger households, and continue accumulating more illiquid wealth after retirement, when, in fact, they should be decumulating. To make matters worse, Italy is plagued by a general lack of basic knowledge of financial concepts, particularly pronounced among the over 65, so that we cannot expect a behavioural shift in the near future. That behavioural shift is, however, necessary: because of the incipient budget cuts and reduction in public pension benefits, a growing number of Italian elderly will have to rely on accumulated wealth to provide for future consumption needs, and having a largely illiquid portfolio is bound to become an issue. Policy makers could increase the levels of financial literacy with educational programmes targeting the elderly, and hopefully mitigate this problem.

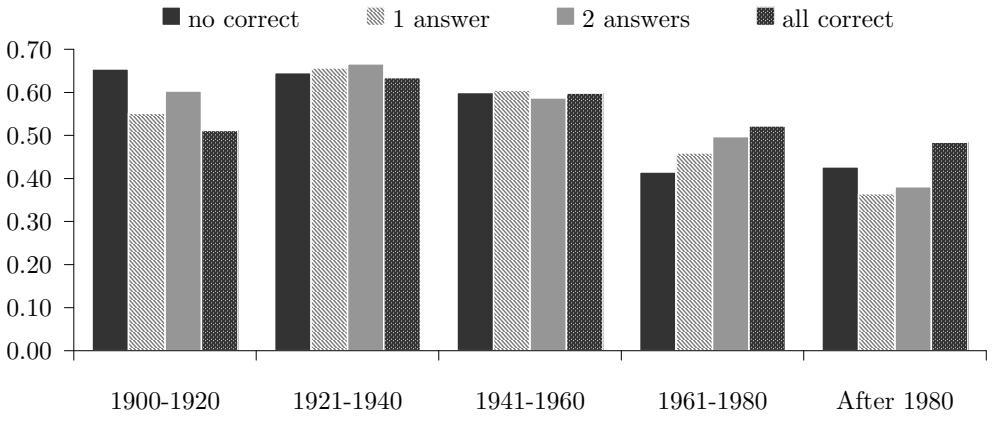
Figure 1: Distribution of FL by over/under 65



	No correct	1 answer	2 answers	All correct
Mean FL (<65)	14.7%	23.0%	29.9%	32.4%
Mean FL (>=65)	31.6%	24.9%	24.5%	19.0%
Mean FL (All)	20.0%	24.2%	28.5%	27.3%

Source: SHIW 2006 - 2010 – weighted data. Number of observations: 19,920.

Figure 2: Average HW, by FL and cohort



Mean	0.60	0.65	0.60	0.48	0.42

Source: SHIW 2006 - 2010 – weighted data. Number of observations: 19,920.

Table 1: Descriptive statistics – regressors

Variable	Mean	Std. Dev.	Min	Max
Housing weight	0.56	0.42	0.00	12.00
Financial Literacy (0-3)	1.66	1.09	0.00	3.00
Financial Literacy (Dummy)	0.29	0.45	0.00	1.00
Age	54.69	16.82	15.00	104.00
Female	0.31	0.46	0.00	1.00
University graduate	0.11	0.31	0.00	1.00
Pensioner	0.38	0.48	0.00	1.00
Married	0.60	0.49	0.00	1.00
Single	0.17	0.38	0.00	1.00
Separated/divorced	0.07	0.26	0.00	1.00
Widow/er	0.15	0.36	0.00	1.00
Average number of children	1.60	1.29	0.00	20.00
Log household income	10.17	0.68	0.99	13.61
Log of avg. Housing value[a]	7.58	0.39	6.70	8.42
House inherited	0.21	0.40	0.00	1.00
Resident in the south	0.31	0.46	0.00	1.00
Healthy	3.92	0.88	0.00	5.00
Risk averse	0.51	0.50	0.00	1.00
Instrumental variable[b]	0.04	1.34	-2.62	4.43
Mother college graduate	0.03	0.16	0.00	1.00
Father college graduate	0.01	0.10	0.00	1.00
Father white collar	0.08	0.27	0.00	1.00
At least one economics grad.	0.02	0.16	0.00	1.00

Source: SHIW 2006 - 2010 – weighted data.

[a] Mean housing wealth is estimated taking the natural logarithm of housing value per square metre, by region and municipality size.

[b] Difference between head of households' number of cards owned (outliers collapsed at 5) and the average by region and municipality size

Table 2: Descriptive statistics – percentage of assets owners and amount owned, by year and asset type

	2006	2008	2010
Homeowners (%)	69.1%	69.2%	68.7%
Average net housing value	152,593	156,690	166,842
Stock owners (%)	16.9%	15.6%	16.7%
Average stocks value	4,156	3,012	3,653
Deposits owners (%)	83.2%	81.3%	81.8%
Average deposits value	11,530	14,856	14,793
Long-term owners (%)[15]	3.1%	7.6%	6.8%
Average long-term assets value	1,186	1,148	1,478
Bond owners (%)	9.3%	9.0%	5.8%
Average bonds value	3,484	3,390	2,225

Source: SHIW 2006 - 2010 – weighted data. Number of observations: 23,683.

Table 3: Descriptive statistics – percentage of assets owners, by year and income quintiles

Income quintiles	Years	Home owners	Stock owners	Deposits owners	Long-term owners[15]	Bonds owners
I	2006	45.1%	2.1%	59.5%	0.2%	0.6%
	2008	41.4%	1.5%	53.9%	2.9%	0.6%
	2010	39.1%	2.2%	54.6%	2.9%	0.7%
II	2006	60.3%	7.2%	80.3%	1.1%	3.9%
	2008	61.5%	6.2%	78.9%	6.2%	3.6%
	2010	62.4%	6.6%	80.6%	4.5%	1.3%
III	2006	73.8%	14.1%	88.1%	2.0%	6.8%
	2008	75.4%	11.5%	88.1%	7.0%	6.0%
	2010	72.3%	13.3%	86.9%	5.7%	2.7%
IV	2006	79.5%	22.5%	93.2%	4.6%	12.4%
	2008	82.4%	19.8%	92.3%	9.7%	11.2%
	2010	83.4%	19.5%	93.0%	9.2%	5.9%
V	2006	87.6%	39.3%	95.8%	7.6%	23.3%
	2008	88.3%	39.9%	96.2%	12.6%	24.4%
	2010	88.7%	43.2%	95.8%	12.0%	18.9%

Source: SHIW 2006 - 2010 – weighted data. Number of observations: 23,683.

[15] Long-term government treasury bills, like postal bonds, or BTP. Also mortgages are classified as negative long-term.

Table 4: Descriptive statistics – distribution of net housing wealth, by FL and age category

FL	Age category					
	<=30	**31-40**	**41-50**	**51-65**	**>65**	**All**
No correct	71,016	76,444	101,220	128,153	112,585	105,853
1	72,335	98,285	123,633	184,734	166,346	144,463
2	84,535	116,597	152,205	198,016	192,297	163,458
All correct	120,817	139,989	187,159	256,854	244,198	205,432
Mean	*89,079*	*113,504*	*150,661*	*205,618*	*170,283*	*159,650*

Source: SHIW 2006 - 2010 – weighted data. Number of observations: 19,920.

Table 5: Descriptive statistics – distribution of HW, by FL and age category

	Age category					
FL	**<=30**	**31-40**	**41-50**	**51-65**	**>65**	**All**
no correct	0.28	0.39	0.45	0.63	0.65	0.59
1	0.32	0.42	0.52	0.62	0.64	0.58
2	0.36	0.47	0.54	0.60	0.66	0.58
all correct	0.39	0.48	0.57	0.59	0.61	0.57
Mean	0.34	0.45	0.53	0.61	0.64	0.57

Source: SHIW 2006 - 2010 – weighted data. Number of observations: 19,920.

Table 6: Pooled OLS regression analysis of housing investment decision. All ages.

Dependent variable: housing weight – fraction of net housing wealth over total net wealth

The second and fourth column report the coefficients obtained including the proxies for individual heterogeneity – mother and father's education, father white collar and at least one economics graduate within the household

	FL Specification I		**FL specification II**	
	b/se	**b/se**	**b/se**	**b/se**
FL index 0-3	-0.010***	-0.009***		
	(0.00)	(0.00)		
FL all correct			-0.019***	-0.017***
			(0.01)	(0.01)
Age	0.007***	0.007***	0.007***	0.007***
	(0.00)	(0.00)	(0.00)	(0.00)
$Age^2/1000$	-0.050***	-0.051***	-0.051***	-0.050***
	(0.01)	(0.01)	(0.01)	(0.01)
Single	-0.026**	-0.027**	-0.026**	-0.027**
	(0.01)	(0.01)	(0.01)	(0.01)
Divorced	-0.064***	-0.061***	-0.064***	-0.062***
	(0.01)	(0.01)	(0.01)	(0.01)
Widow	0.021*	0.022*	0.022*	0.023*
	(0.01)	(0.01)	(0.01)	(0.01)
Pensioner	0.091***	0.091***	0.091***	0.091***
	(0.01)	(0.01)	(0.01)	(0.01)
House inherited	0.249***	0.250***	0.249***	0.250***
	(0.01)	(0.01)	(0.01)	(0.01)
Log of household income	0.130***	0.133***	0.129***	0.132***
	(0.01)	(0.01)	(0.01)	(0.01)
Log of avg. Housing value[(a)]	-0.007	-0.003	-0.007	-0.003
	(0.01)	(0.01)	(0.01)	(0.01)
University graduate	-0.044***	-0.030***	-0.045***	-0.030***
	(0.01)	(0.01)	(0.01)	(0.01)
Risk averse	0.021***	0.020***	0.022***	0.020***
	(0.01)	(0.01)	(0.01)	(0.01)
Resident in the south	0.048***	0.049***	0.049***	0.050***
	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-1.052***	-1.099***	-1.048***	-1.096***
	(0.12)	(0.12)	(0.12)	(0.12)
Proxies	NO	YES	NO	YES
Year dummies	YES	YES	YES	YES
R^2	0.128	0.129	0.128	0.129
P-value	0.000	0.000	0.000	0.000
Number of observations	19,466	19,466	19,466	19,466

[(a)] Mean housing wealth is estimated taking the natural logarithm of housing value per square metre, by region and municipality size.

*The superscripts ***, **, and * indicate the 1%, 5%, and 10% levels of statistical significance, respectively. Cluster robust standard errors in parentheses. Unreported control variables without significant effects are: head of household female, average number of children, head of household healthy.*

Table 7: Pooled OLS regression analysis of housing investment decision. 65 years old and over.

Dependent variable: housing weight – fraction of net housing wealth over total net wealth

The second and fourth column report the coefficients obtained including the proxies for individual heterogeneity – mother and father's education, father white collar and at least one economics graduate within the household.

	FL specification I		**FL specification II**	
	b/se	**b/se**	**b/se**	**b/se**
FL index 0-3	-0.021***	-0.020***		
	(0.00)	(0.00)		
FL all correct			-0.057***	-0.056***
			(0.01)	(0.01)
Age	0.057***	0.058***	0.056***	0.057***
	(0.01)	(0.01)	(0.01)	(0.01)
$Age^2/1000$	-0.371***	-0.378***	-0.365***	-0.373***
	(0.09)	(0.09)	(0.09)	(0.09)
Single	-0.050**	-0.049**	-0.049**	-0.049**
	(0.02)	(0.02)	(0.02)	(0.02)
Divorced	-0.061*	-0.057*	-0.060*	-0.057*
	(0.03)	(0.03)	(0.03)	(0.03)
Widow	0.009	0.010	0.009	0.011
	(0.02)	(0.02)	(0.02)	(0.02)
Pensioner	0.165***	0.164***	0.164***	0.163***
	(0.02)	(0.02)	(0.02)	(0.02)
House inherited	0.227***	0.228***	0.227***	0.228***
	(0.01)	(0.01)	(0.01)	(0.01)
Log of household income	0.117***	0.121***	0.115***	0.119***
	(0.01)	(0.01)	(0.01)	(0.01)
Log of avg. Housing value[(a)]	-0.006	-0.003	-0.007	-0.004
	(0.02)	(0.02)	(0.02)	(0.02)
University graduate	-0.104***	-0.083***	-0.103***	-0.082***
	(0.02)	(0.02)	(0.02)	(0.02)
Risk averse	0.019*	0.017*	0.020**	0.019*
	(0.01)	(0.01)	(0.01)	(0.01)
Resident in the south	0.058***	0.059***	0.060***	0.061***
	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-2.836***	-2.944***	-2.804***	-2.913***
	(0.60)	(0.60)	(0.60)	(0.61)
Proxies	NO	YES	NO	YES
Year dummies	YES	YES	YES	YES
R^2	0.098	0.099	0.098	0.100
P-value	0.000	0.000	0.000	0.000
Number of observations	6,909	6,909	6,909	6,909

[(a)]Mean housing wealth is estimated taking the natural logarithm of housing value per square metre, by region and municipality size.

*The superscripts ***, **, and * indicate the 1%, 5%, and 10% levels of statistical significance, respectively. Cluster robust standard errors in parentheses. Unreported control variables without significant effects are: head of household female, average number of children, head of household healthy.*

Table 8: Fixed Effects estimation of housing investment decision

Dependent variable: housing weight – fraction of net housing wealth over total net wealth

All columns report the coefficients obtained including the proxies for individual heterogeneity – mother and father's education, father white collar and at least one economics graduate within the household.

	FL specification I		**FL specification II**	
	All ages	**65 and over**	**All ages**	**65 and over**
	b/se	**b/se**	**b/se**	**b/se**
FL index 0-3	-0.009***	-0.013**		
	(0.00)	(0.00)		
FL all correct			-0.015*	-0.033***
			(0.01)	(0.01)
Age	0.003	-0.008	0.003	-0.007
	(0.00)	(0.03)	(0.00)	(0.03)
Age2/1000	-0.037	0.058	-0.036	0.052
	(0.02)	(0.19)	(0.02)	(0.19)
Single	-0.028	-0.017	-0.028	-0.017
	(0.03)	(0.06)	(0.03)	(0.06)
Divorced	-0.092***	-0.202*	-0.094***	-0.202*
	(0.03)	(0.11)	(0.03)	(0.11)
Widow	-0.030	-0.040	-0.030	-0.039
	(0.02)	(0.04)	(0.02)	(0.04)
Pensioner	0.040***	0.101***	0.040***	0.100***
	(0.01)	(0.03)	(0.01)	(0.03)
House inherited	0.178***	0.149***	0.178***	0.148***
	(0.02)	(0.02)	(0.02)	(0.02)
Log of household income	-0.030***	-0.057*	-0.030***	-0.057*
	(0.01)	(0.03)	(0.01)	(0.03)
Log of avg. Housing value[(a)]	-0.008	0.031	-0.009	0.033
	(.04)	(0.06)	(0.04)	(0.06)
Constant	0.810**	1.151	0.813**	1.085
	(0.37)	(1.43)	(0.37)	(1.43)
Proxies	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
R^2	0.042	0.059	0.042	0.059
Rho	0.751	0.799	0.751	0.799
P-value	0.000	0.000	0.000	0.000
Number of observations	19,466	6,909	19,466	6,909

(a) Mean housing wealth is estimated taking the natural logarithm of housing value per square metre, by region and municipality size.

*The superscripts ***, **, and * indicate the 1%, 5%, and 10% levels of statistical significance, respectively. Unreported control variables without significant effects are: average number of children, head of household (hh) female (dummy), hh healthy (1-5 index), hh university graduate (d), h risk averse (d), hh resident in the south (d).*

Table 9: Comparing FE and IV results

Dependent variable: housing weight – fraction of net housing wealth over total net wealth

Instrumental variable: difference between the number of cards (0-5)[16] owned by each head of household and the average held by region and municipality size.

	All Sample		**65 years old and over**	
	FE	**IV**	**FE**	**IV**
	b/se	**b/se**	**b/se**	**b/se**
FL index 0-3	-0.009***	-0.175**	-0.013**	-0.153*
	(0.00)	(0.08)	(0.00)	(0.08)
Age	0.003	0.004	-0.008	-0.009
	(0.00)	(0.00)	(0.03)	(0.03)
$Age^2/1000$	-0.037	-0.049*	0.058	0.045
	(0.02)	(0.03)	(0.19)	(0.18)
Single	-0.028	-0.041	-0.017	-0.051
	(0.03)	(0.03)	(0.06)	(0.07)
Divorced	-0.092***	-0.076**	-0.202*	-0.160**
	(0.03)	(0.04)	(0.11)	(0.08)
Widow	-0.030	-0.047*	-0.040	-0.046
	(0.02)	(0.03)	(0.04)	(0.03)
Pensioner	0.040***	0.057***	0.101***	0.120***
	(0.01)	(0.02)	(0.03)	(0.03)
House inherited	0.178***	0.187***	0.149***	0.164***
	(0.02)	(0.01)	(0.02)	(0.02)
Log of household income	-0.030***	-0.017	-0.057*	-0.046**
	(0.01)	(0.01)	(0.03)	(0.02)
Log of avg. Housing value[(a)]	-0.008	0.005	0.031	0.049
	(0.04)	(0.05)	(0.06)	(0.07)
Proxies	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
First Stage				
Instrument		0.062***		0.109***
		(0.01)		
F		18.62		11.85
R^2 / centred R^2	0.042	-0.280	0.059	-0.291
P-value	0.000	0.000	0.000	0.000
Number of observations	19,466	11,627	6,909	4,022

[(a)] Mean housing wealth is estimated taking the natural logarithm of housing value per square metre, by region and municipality size.

*The superscripts ***, **, and * indicate the 1%, 5%, and 10% levels of statistical significance, respectively. FE: Clustered robust standard errors in parentheses; IV: Clustered s/e in parentheses. Unreported control variables without significant effects are: Unreported control variables without significant effects are: average number of children, head of household (hh) female (dummy), hh healthy (1-5 index), hh university graduate (d), h risk averse (d), hh resident in the south (d).*

[16] We collapsed all the outliers at 5.

Table 10: Robustness – different specifications of housing weight

Depvar in specification I: housing weight = fraction of net housing wealth over total net wealth

Depvar in specification II: housing weight = fraction of net housing wealth over total net wealth, excluding stocks and other information intensive assets.

Panel A: all ages

	Fixed Effects		**FE-IV**	
	Spec. I	**Spec. II**	**Spec. I**	**Spec. II**
	b/se	**b/se**	**b/se**	**b/se**
FL index 0-3	-0.009***	-0.010***	-0.175**	-0.187**
	(0.00)	(0.00)	(0.08)	(0.07)
Proxies	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
First Stage				
Instrument			0.062***	0.062***
			-0.01	
F			18.62	18.58
R^2 / centred R^2	0.042	0.051	-0.280	-0.389
P-value	0.000	0.000	0.000	0.000
Rho	0.751	0.782		
Number of observations	19,466	19,466	11,627	11,619

Panel B: 65 years and over

	Fixed Effects		**FE-IV**	
	Spec. I	**Spec. II**	**Spec. I**	**Spec. II**
	b/se	**b/se**	**b/se**	**b/se**
FL index 0-3	-0.013**	-0.013***	-0.153*	-0.150***
	(0.00)	(0.00)	(0.08)	(0.08)
Proxies	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
First Stage				
Instrument			0.109***	0.109***
F			11.85	11.85
R^2 / centred R^2	0.059	0.058	-0.291	-0.272
P-value	0.000	0.000	0.000	0.000
Rho	0.799	0.799		
Number of observations	6,909	6,909	4,022	4,022

*The superscripts ***, **, and * indicate the 1%, 5%, and 10% levels of statistical significance, respectively.*

FE: Clustered robust standard errors in parentheses;

IV: Clustered s/e in parentheses.

All controls as previously mentioned are included in the regression, but not reported.

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N° 5/01	Vincenzo Andrietti	Occupational Pensions and Interfirm Job Mobility in the European Union. Evidence from the ECHP Survey

N° 4/01	Peter Diamond	Towards an Optimal Social Security Design
N° 3/00	Emanuele Baldacci Luca Inglese	Le caratteristiche socio economiche dei pensionati in Italia. Analisi della distribuzione dei redditi da pensione (only available in the Italian version)
N° 2/00	Pier Marco Ferraresi Elsa Fornero	Social Security Transition in Italy: Costs, Distorsions and (some) Possible Correction
N° 1/00	Guido Menzio	Opting Out of Social Security over the Life Cycle