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“MONEY NEEDED” AND HOUSEHOLDS PORTFOLIOS

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Firma dello studente

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Introduction

Lack of participation in financial markets is a recurrent concern for economists: in accordance to standard theory, an expected utility maximiser individual should always hold a positive share of risky assets in his portfolio given a positive equity premium. However empirical data keep show a generalised reluctance towards financial markets. Many researchers identify as drivers of this unwillingness to invest, participation costs. However, it has been proved that such barriers are not enough to solve the puzzle: we cannot explain, for example, only through participation costs lack of investments in risky assets among wealthy people. To understand this economic outcome, we need to relax some rooted assumptions, e.g. full rational individuals.

Extending classic portfolio theory, Weber et al. (2013) have proposed a general risk-return framework, suggesting that changes in risk tolerance can be the result of changes in one or more of following three determinants: risk attitude, return expectations, and risk expectations. In turn, investors' return and risk expectations are likely to depend not only on their assessment of objective financial indicators, but also on their subjective trust in the fairness of the financial world as a whole (Buccioli et al(2019)).

Therefore we need to introduce into the standard model other variables able to better rationalise the lack of participation in financial markets. This can be considered the starting point of our study. In this framework we introduce a specific indicator Money needed, measuring the amount of income that households need in order to live reasonably comfortably but not in luxury.

This variable is supposed to show a negative correlation with the investment choice. The objective of this thesis is to understand if adding Money needed to a model with

risk aversion, financial literacy, and other demographic and economic controls, we are able to explain the unwillingness to invest.

As Money Needed can be considered a self-reported measure of financial difficulties, and then can be subject to under reporting bias, we also construct a financial hardship variable, based on objective indicators. Introducing also financial hardship into the model we perform our estimates and find coherent results.

This thesis is organized as follows. In Chapter 1 we introduce the purpose of our research and present a review of the relevant literature about it. Then, in Chapter 2 we briefly explain the Survey on Households Income and Wealth, in order to introduce discussion about main economic and demographic features of our sample in absolute terms and, next, conditional on participation in risky assets.

We finally present the definition of "Money needed", discussing its meaning and its consequent role into the model. In Chapter 3, we briefly review the econometric model, we explain how we constructed independent variables, and finally we discuss estimations results.

Chapter 1

Stock market participation puzzle

Lack of participation in financial markets is a robust feature of households' behaviour: observing microeconomic data, we realize that participation level is low at all ages and follow a hump shaped pattern. Nevertheless, given a positive excess return on stocks, non-participation choice is in contrast with portfolio theory. Haliassos and Bertaut (1995) show that indirect stockholding, risk aversion or borrowing constraints do not rationalize a zero investment in stocks.

The failure of the standard model to explain what we observe in the data has been defined in literature “stockholding puzzle” (Haliassos and Bertaut (1995)). Now we introduce a basic framework of portfolio choice and then we will analyse potential solutions of this puzzle.

According to portfolio theory, an expected utility maximiser investor chooses the optimal way to allocate his resources between a risky and a risk-free asset. Assuming that the agent is endowed with an initial amount of wealth $W > 0$, we consider a two period model where at the starting date $t = 0$ the agent has to invest without knowing the state of the world that will prevail at $t = 1$.

Also, no action is allowed once the investment choice is completed. Investor has increasing utility function in wealth, such that $U'(W) > 0$ and $U''(W) < 0$. The risk-free asset has a deterministic return $R_f > 0$ and the risky asset yields a random gross return \tilde{R} at $t = 1$.

The amount $E[\tilde{R}] - R_f$ denotes the risk premium. Investor chooses α [the share of wealth invested in risky asset) at $t = 0$ and the remaining quantity $(1 - \alpha)$ is invested in riskless bond. Thus, optimization problem can be written as:

$$\max V(\alpha) = EU[W(R_f - \alpha(\tilde{R} - R_f))]. \quad (1.1)$$

Deriving former equation with respect to α , it leads to:

$$EU'[W(R_f - \alpha(\tilde{R} - R_f))]W = 0. \quad (1.2)$$

Assuming a positive equity premium $(\tilde{R} - R_f) > 0$, Second Order Condition is always satisfied for a risk averse investor.

If agent chooses a share of risky asset $\alpha = 0$, First Order Condition becomes:

$$EU'(R_f W)(\tilde{R} - R_f)W = U'(R_f W)E(\tilde{R} - R_f)W = 0. \quad (1.3)$$

Equation (1.3) is satisfied only if $E(\tilde{R} - R_f) = 0$. The implication is that a value of $\alpha = 0$ violates optimality condition. We can conclude that each agent, whatever his degree of risk aversion, should participate in financial markets in order to take advantage of equity premium.

1.1 Participation costs and financial hardship

One rationalization of stockholding puzzle is the introduction of participation costs that investors must sustain when entering the financial markets. These charges can have different sources, e.g. trading commissions, learning costs about how markets operate, costs of monitoring portfolios and information costs.

Vissing-Jorgensen (2002) defines three different classes of these costs:

- fixed cost: for a first-time trader this is the effort of understanding basic investment theory and acquiring information about risk and returns, or the cost of

brokerage commissions;

- variable cost: for direct investor this is the cost of bid-ask spread; indirect investments produce transaction costs too. For most of households this category of fees has no significant impact, so we can conclude that variable costs have no effect in participation decision;
- per-period cost: the cost of time spent monitoring investments. Theory of dynamic hedging portfolio recommends to actively follow stock market return to decide if trading is optimal.

Since we analyse a one-period framework of standard model, we introduce in the former optimisation problem only fixed per-period participation costs. We assume that risk-free asset is costless, while investing in stocks entails fixed costs.

Let f be fixed costs, which household can avoid by not investing. As before, investor chooses the amount α that now maximise net initial wealth $(W - f)$. Thus, optimisation problem can be rewritten as:

$$\max V(\alpha) = EU[(W - f)(R_f - \alpha(\tilde{R} - R_f))]. \quad (1.4)$$

Taking the derivative of (1.4) with respect to α , we obtain the resulting first order condition. The underlying implication still holds: a value of α equal to zero violates optimal solution. However, in this framework households compare expected utility from participation and non-participation, and decide whether to enter or not the financial markets.

If we replace expected utility from participation with its certain equivalent return, investment choice can be rewritten as:

$$U[(W - f)(R_f - \alpha(R^{CE} - R_f))] \geq U(R_f W) \quad (1.5)$$

where R^{CE} is certain equivalent gross return of risky asset and $(R^{CE} - R_f)$ is risk adjusted equity premium assumed to be positive. The consequence is that a value of

fixed costs f greater or equal to benefits from participation (e.g. risk adjusted equity premium) is enough to discourage households from entering financial markets. Solving (1.5) for W we can define a wealth threshold of participation under which the optimal portfolio choice for a risk averse household is to invest all capital in the risk-free asset:

$$W = f \left(1 + \frac{R_f}{\alpha^*(R^{CE} - R_f)} \right). \quad (1.6)$$

The probability that household will invest in risky asset is affected by level of total wealth and the size of participation costs. Accounting for them, we provide an explanation to limited participation of poorer households: benefits from investing are below per-period costs, making risky asset less attractive.

If wealth is positive correlated with stockholding, we expect that financial troubles also will affect participation rate. Brown, Ghosh and Taylor (2013) defines financial hardship at household level as a multi-dimensional concept: so far literature has focused only on housing payment problems, ignoring the persistence and interdependence that exists between different type of financial distress. They observe that being unable to save on a monthly basis is positive correlated with other categories of financial problems, e.g. being able to buy new clothes or repay loans.

Demographic features also affect the probability of facing financial hardship: as in Giarda (2013), having a female as head of family increases the level of this potential suffering. Also belonging to youngest category of households is associated with a higher probability of experiencing financial problem: lower age-classes are usually characterized by credit constraints and uncertain labour income. They still find that having a head of family aged 35–44 or 65–74 is positive correlated with probability of facing financial distress. With respect to education, instead, there is no significant evidence of correlation between degree’s level and category of financial hardship.

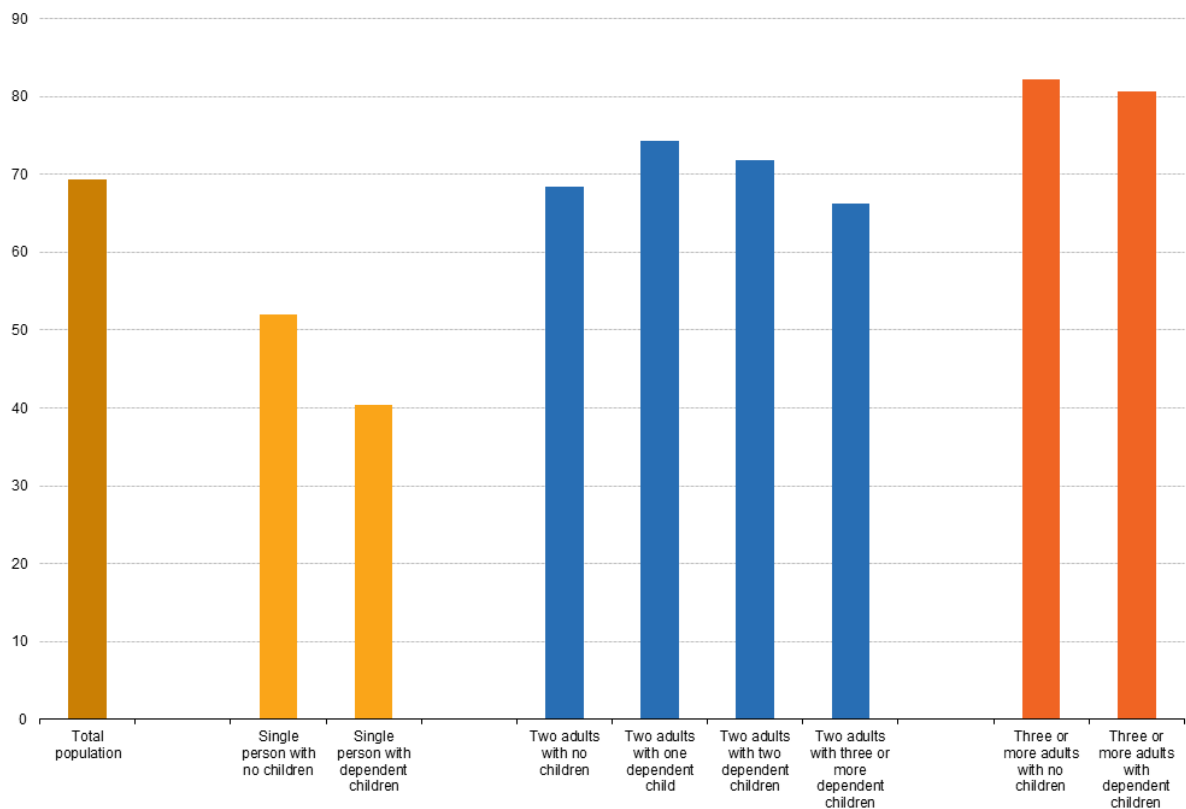
We can assume that rate of participation in risky assets will be affected by level of financial distress: even if this explanation still does not solve the puzzle, it’s able to rationalize the non-participation choice of lowest wealth quartile households. A funda-

mental result from Brown, Ghosh and Taylor (2013) is the negative correlation between probability of being unable to save monthly and homeownership.

According to a survey from the American Enterprise Institute for Public Policy Research, 80 percent of Americans view homeownership as an essential component of American dream. Observing Eurostat data on tenure status in Europe, we can realize that almost 70 percent of total population is homeowner, while a much lower proportion of single households live in owner-occupied dwellings (less than 50 percent).

The fraction is even lower for single persons living with dependent children: only 4 out of 10 live in an owner-occupied dwelling. We can suppose that this category suffers a higher level of financial instability with respect to family with two adults, which translates in a lower probability of being homeowner.

Figure 1.1: Proportion of owner-occupied dwellings in 2016 for a range of different household types.



Note: estimates.
Source: Eurostat (online data code: ilc_lvh002)

Source: Eurostat

Lerman and Zhang (2014) study the interaction between low and moderate-income households and the potential for homeownership to protect them from material hardship. By material hardship they mean the inability to pay bills, food insufficiency, and/or housing problems. Separating homeowners from renters, they estimate that initial housing status is correlated with material hardship: the probability of experiencing any financial problem is 25 percent lower for homeowners than for renters.

Accounting for different income-quartiles, the role of homeownership as shield against financial hardship results significant especially for low-income groups: owning a home is an important form of wealth accumulation and helps households build financial security in the long run. McKernan, Ratcliffe, and Vinopal (2009) show that among families that experience a tail event, asset-poor families are more likely to incur in financial hardship than non asset-poor families. Illiquid assets are also considered a source of emergency saving: homeownership helps households automatically save as they pay back mortgages and home price appreciates.

To summarize, financial distress is positive correlated with non-participation choice and homeownership reduces the impact of financial distress: then, we expect to observe a positive relation between being homeowner and investing in risky assets.

However the value of house as a share of total assets can also negatively affects the participation choice: houses are illiquid and indivisible and if combined with ambiguity of financial markets, can reduce the attitude of investing.

Manturuk, Riley and Ratcliff (2011) investigate hypothesis that homeownership provides households a sense of stability which decreases the effect of financial hardship. They focus on three indicators: psychological stress, financial hardship, and overall satisfaction with financial situation.

Homeowners and renters deal with same probability of experiencing financial stress during Great Recession of 2008: even if both groups face similar financial situation, condition of homeownership grants a higher satisfaction and an overall sense of life control.

They highlight also discordance between actual financial situation and reported level

of financial satisfaction: low-income owners face similar crunch to low-income renters, but yet they report lower level of financial stress. We can desume that benefits to homeownership go beyond wealth accumulation and residential stability.

1.2 Explanatory power of financial literacy

Financial literacy is typically an input to model the need for financial education and explain variation in financial outcomes such as savings, investing and debt behavior. Defining and appropriately measuring financial literacy is crucial to understand educational impact as well as barriers to effective financial choice.

While it is important to assess how financially educated people behave, in practice it is difficult to understand how people process economic informations and make informed decisions about household finances.

According to Van Rooij, Maarten, Lusardi and Alessie (2011) individuals have shown more interest in financial markets, and market participation has been driven and prompt by the advent of new financial products and services. However, some of these products are complex and difficult to understand, especially for financially unsophisticated investors.

Main concern is that usually households do not save enough, they use to accumulate insufficient resources, and do not take advantage of financial innovation. Some researchers have also proved that those who have no financial education are more likely to show problems with debt.

Also they are not expected to have a financial plan for retirement neither wealth accumulation. (Lusardi and Tufano, 2009).

Definition of financial literacy usually refers to a variety of meanings; it has been used to denote knowledge of financial products (e.g., the definition of a stock and a bond, the difference between a fixed and an adjustable rate mortgage), knowledge of financial concepts (inflation, interests compounding, diversification, credit scores), mathematical skills or numeracy required for successful financial choices, and engagement in certain activities such as financial planning.

Financial literacy should not be taken for granted. A majority of households possesses limited financial literacy and it differs substantially depending on education, age, and gender. This suggests that financial education programs are likely to be more effective when they are targeted to specific demographic groups of the households.

Finally, any privatization programs, as supplementary pension plans, should take into account that, when planning investments for retirement, financially unsophisticated individuals may not invest in the stock market.

Thus, in order to work efficiently, privatization policies need to be supported by appropriately designed financial education programs.

According to the OECD (2005) and Lusardi and Mitchell (2007), international evidence on financial literacy shows that financial illiteracy is common in many developed countries such as Australia, Japan, and Korea, as well as developed countries in Europe. These findings are similar to those of Christelis, Jappelli, and Padula (2006) who found that most respondents in Europe score low level in financial literacy questionnaires.

This led us to associate financial literacy to an important economic result: the stock-holding puzzle. While there are extensive research on this topic, it is still a puzzle why so many households do not invest in risky assets: some explanations that usually have been offered mention short sale constraints, participation costs, inertia, and departures from expected utility maximization. However, it still results difficult to account for all these factors in available micro data sets.

Others have argued that young people are borrow constrained and thus do not have wealth to invest in financial assets: this can be considered one hypothetical explanation of the hump shaped distribution of participation in risky assets.

Stocks ownership also increases sharply with education levels. However, even between those with a university degree, share of participation in financial markets remains quite low. Thus, reluctance towards risky investments goes beyond levels of schooling.

This may suggests that education alone is not automatically a good proxy for financial literacy and models of portfolio choice may need to introduce both variables in order to explain behaviour toward financial assets. However, all these explanations cannot fully

solve why such a large proportion of households do not invest in financial markets.

Although a financial literacy measure may be used to predict financial behaviours or outcomes, it does not necessarily imply that individuals will behave in a way that many researchers, policymakers or educators would predict as optimal. Other characteristics such as impulsiveness, behavioural biases, unusual preferences or external circumstances also contribute to what may appear to be poor financial decision making.

1.3 A behavioural approach: the role of trust

Over the last few years, an increasing number of studies have tried to identify the main determinants of financial risk-taking decision, with special regard to households' propensity to invest in risky assets.

According to Dimitris, Jappelli, and Padula (2010) transaction and information costs have been offered as the main reason why many individuals do not invest in financial assets (Haliassos and Bertaut (1995)). However, the exact nature of these costs is not well understood.

Managing a portfolio requires a specific human capital investment, in terms of time and effort needed to learn the notions of transaction costs, asset returns, volatility, and covariance between assets returns. Information costs represent therefore a significant barrier to entry in the stock market and low cognitive abilities are likely to raise such costs.

Campbell (2006) argues that information barriers to invest in stocks come from psychological factors that make stockownership uncomfortable for some households. Korniotis and Kumar (2006) point out that the perception of having limited abilities might also increase the cost of stock market participation.

Dimitris, Jappelli, and Padula (2010) explains how the lack of cognitive abilities (as measured by mathematical and verbal skills and memory functioning) may be a potential explanation for limited financial market participation.

There are several ways through which cognitive skills might affect the decision to invest in financial assets. First, the cost of gathering and processing information is cheaper

for educated individuals; so low skills can act as a barrier preventing stockholding. Second, cognitive skills used to be associated with specific attitudes, such as risk aversion, that have a strong influence on the willingness to tolerate financial risk. Third, the perception of risk is also likely to depend on cognitive abilities: low cognitive skills can make some investors overestimate the precision of the information that they possess. Overconfident investors trade more and assume more financial risk than rational agents with unbiased perceptions, which implies a negative relation between cognitive skills and stockholding.

Even though financial risk-taking seems to be transmitted, to some extent, genetically (Cesarini et al., 2010) and intergenerationally (Dohmen et al., 2012), individuals' prior life experiences (e.g., passing through a large macroeconomic shock or a major traumatic event, such as the death of a child) have been shown to play an important role. Some recent studies have investigated the link between portfolio choices and a variable able to capture the "social" individual attitude, such as an individual's "willingness to trust others" (or simply the degree of "generalized trust").

A crucial question that needs to be addressed in empirical work on trust is what is the best way to measure trust. In the last few decades, trust has been frequently assessed through laboratory experiments based on the classic "trust game" design (Berg et al., (1995); Houser et al., (2017)) or by means of survey data based on self-reported measures.

A large number of papers instead measure trust by relying on the answer to the following World Values Survey and General Social Survey question. "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?"

The trust-based explanation of household financial behaviour provides useful insights on the observed discrepancies in financial investments across households. (Guiso et al. (2008)) using Dutch survey data and customer survey data from a large Italian bank, find that trust has a positive and significant effect on stock-market participation, as well as on the share of income invested in stocks: they show that trusting others raises

Figure 1.2: Trust game


In the next question you can choose either Box K or Box U. Both hold 100 balls which can either be purple or orange.

For Box K, the exact mix of purple balls and orange balls is given below.
Box U also holds purple and orange balls, but the mix is unknown.

In other words, both boxes hold 100 balls with two different colors (purple and orange). The mix of purple and orange balls is known for Box K and unknown for Box U.

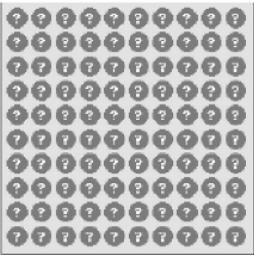
One ball will be drawn at random from the box you choose. You will win \$15 if a purple ball is drawn.

Box K



Chance	You win
■ 50%	\$15
■ 50%	\$0

Box U



Chance	You win
■ ?%	\$15
■ ?%	\$0

Box K
 Indifferent
 Box U

Source: Dimmock, Stephen G., et al. "Ambiguity aversion and household portfolio choice puzzles: Empirical evidence." *Journal of Financial Economics* 119.3 (2016): 562.

the probability of buying stocks by 50 % (relative to the sample's mean probability) and increases the share of income invested in stocks by 3.4 %.

While the role of trust in stock market participation has been well documented, the link between trust and insurance has been largely neglected.

De Meza et al. (2010) find that insurance demand depends on the extent to which the potential buyer trusts people in general as well as on the friendliness of the seller.

According to Sapienza et al. (2013), trust is a subjective belief in others' trustworthiness, i.e., the probability of being cheated by the counterpart in a financial transaction.

If general level of trust among households is low, we can reasonably suppose that also share of participants in financial markets will be the same.

Although our dataset does not include any variable able to catch trust, we cannot exempt from mention its central role in order to rationalise unwillingness to invest.

Chapter 2

Microeconomic data on Italian households

Selected dataset is the Survey on Household Income and Wealth (SHIW) conducted by the Bank of Italy: from 1960 the SHIW gathered information on socio-economic behaviours, wealth, income, and savings of Italian households. We will focus only on 2016 wave, which refers to 2015 data and covers 7,420 households composed of 16,462 individuals. We follow Faiella and Gambacorta (2007) to describe the composition and organization of SHIW.

The sample is drawn in two stages. Municipalities stand for the first stage, and households the secondary sampling units. Before the primary units are selected, municipalities are stratified by region and population size. Within each stratum, all municipalities self-representing (those where the number of populations exceeds 40,000) are included. The other towns are selected based on a probability measure proportional to the population size. Finally, households are drawn randomly within the selected municipalities. The survey is an important source of information on the households' financial condition and adds a significant contribute to social and political policies. Starting from the 1998, a large share (over 90 percent) of data are recorded with the support of computers, using the Computer-Assisted Personal Interviewing program (CAPI).

This method also performs several checks, making easier to find any inconsistencies

in the data. The remaining interviews are collected using paper questionnaires. The amount of imputed data is footnotesize and mainly relates variables for which it's not possible to provide a prompt answer, e.g. the value of financial assets.

The participation rate in the survey is around 50 per cent and results higher among panel households (about 80 per cent) than among the others (about 35 per cent). Non-participation can be a problem in statistical surveys because it may induce a selection bias if part of population is under-represented. For this reason, several measures have been adopted to reduce the effects of non-participation. The difficulty of acquiring an interview increases with the head of household's income, wealth and education. Although non-response can reduce data quality in this kind of surveys, the literature recognises other causes that are also potentially distorting the results.

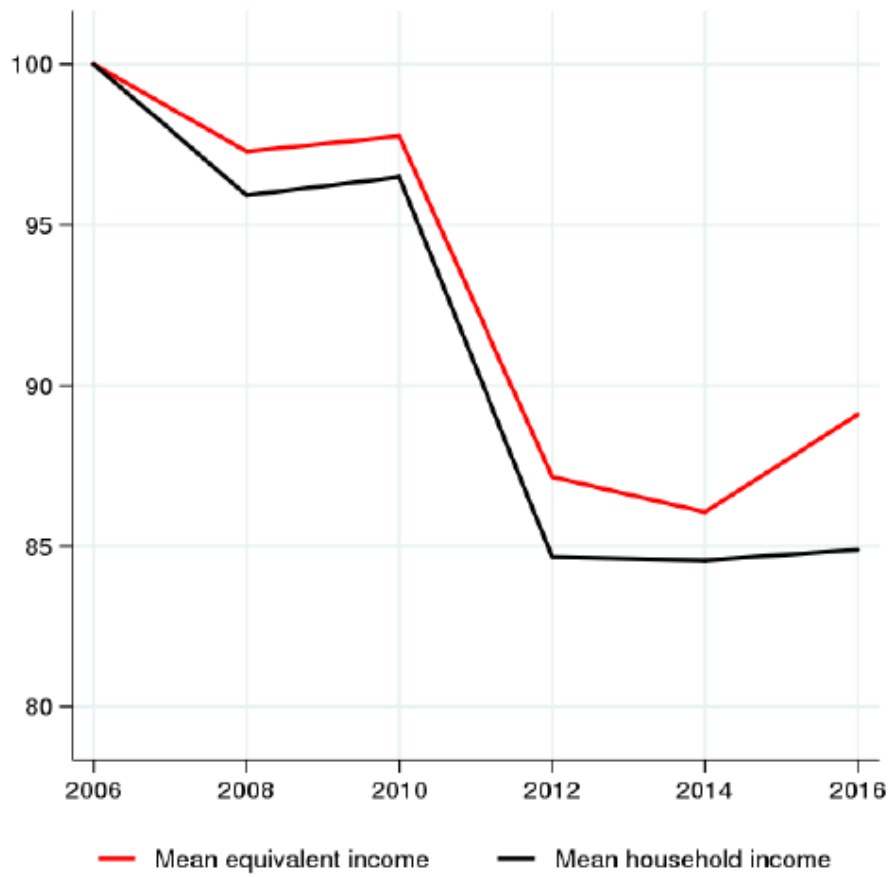
The quality of estimates may also be influenced by the unwillingness of households answering to 'sensitive' questions: even though participation is voluntary, they may be reluctant to report truthful values about income or wealth. In order to prevent such bias, interviewers are asked to give a valuation of the presumed reliability of responses at the end of the interview, comparing the information provided with actual evidence available to them.

2.1 The Survey on Household Income and Wealth

Here we introduce the principal socio-economic features of our selected sample, the 2016 wave of SHIW. We search for indicators that can contribute to explain the composition of households' portfolios and the lack of participation in risky assets. According to the data provided by the 7420 households interviewed, in 2016 there is a low increase in the mean equivalent income of Italian households, after an almost continuous fall since 2006. In Figure 2.1 we can observe the difference between the mean household income and mean equivalent income, a measure by which incomes are made comparable by taking into account shared consumption benefits.

While mean household income is constant from 2012, the mean equivalent income rises

Figure 2.1: Mean household income and equivalent income
(constant prices, 2006=100)

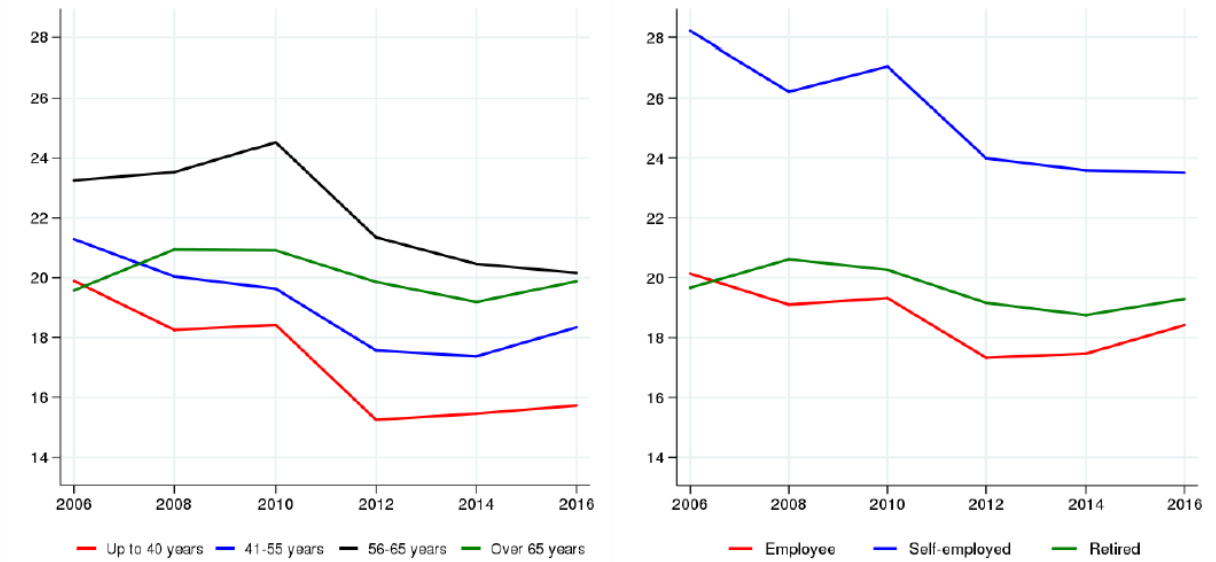


Source: Bank of Italy

of 3,5 percent for the first time from 2006. The positive trend in equivalent income (Figure 2.2) instead, is due to an increase in the share of households declaring that they have been able to save (on average, from 27 to 33 per cent). Households headed by an individual aged 56-65 benefit from higher level of equivalent income even if the trend is still decreasing.

We can notice same patterns for head of households self-employed: a quite decreasing equivalent income from 2010 but still higher than the other working status. Instead, households whose head is aged over 65 or under 56 benefit from an increasing trend of equivalent income.

Figure 2.2: Mean equivalent income by characteristics of head of household (thousands of euros, 2016 prices)



Source: Bank of Italy

In 2016 there is also an increase, with respect to 2014, in Gini index of equivalent income, a measure of inequality among values of income distribution; even more alarming is the share of individual that in 2016 can be defined “ at risk of poverty”, e.g. households with equivalent income of less than 60 per cent of the median income (around €830 per month in 2016).

Examining Table 2.1 we can compare the share of individuals at risk of poverty in 2006, just before global financial crisis, and in 2016: the probability of being at risk-

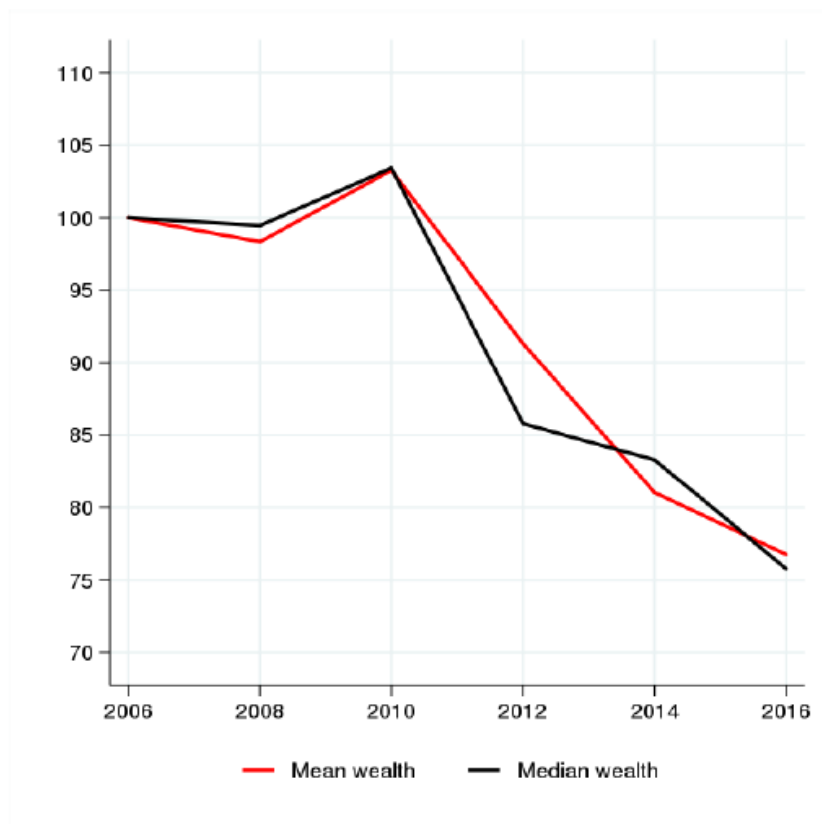
of-poverty decreases with age, principally in 2016, and increase for those living in the South or belonging to the working status "Other" that includes unemployed households.

Another interesting information that we can deduce from Table 2.1 is the decreasing rate of pensioner/over 65 households at risk of poverty: apparently, pension benefits seem to reduce poverty exposition compared with other age classes, e.g. "up to 35 years", usually borrow constrained. From mentioned results, we expect that, ceteris paribus, the participation rate in risky assets will then be higher for self-employed workers and for head of households aged 56-65.

Also, the increasing number of individuals at risk of poverty can be considered crucial for the scope of our study addressing the hypothesis of negative correlation between financial distress indicators and investments in risky assets.

Figure 2.3: Mean and median net household wealth

Mean and median net household wealth
(2016 prices; 2006=100)



Source: Bank of Italy

Now we consider net wealth computed as the sum of real and financial assets minus

Table 2.1: At-risk-of-poverty rate for individuals by characteristics of head of household

Head of households	2006	2016
Age		
Up to 35 years.....	22,6	29,7
35 to 45 years.....	18,9	30,3
45 to 55 years.....	20,2	24,1
55 to 65 years.....	16,6	20,9
Over 65 years.....	20,2	15,7
Geographical area		
North.....	8,3	15,0
Centre.....	9,7	12,3
South.....	39,5	39,4
Work status		
Payroll employee....	18,4	21,2
Self-employed.....	14,6	19,5
Pensioner.....	19,0	16,6
Other.....	75,9	83,0
Country of origin		
Italy.....	18,8	19,5
Foreign.....	33,9	55,0
Total	19,6	22,9

Source: My own elaboration of SHIW data.

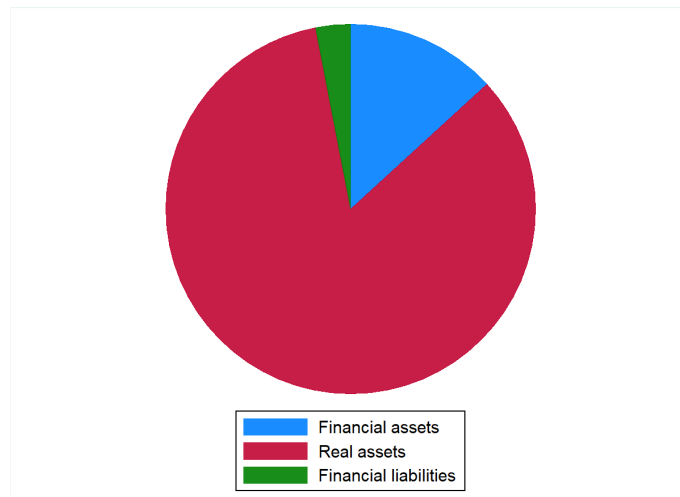
financial liabilities. The share of net wealth held by the lower deciles is 1 per cent of the total and 75 per cent of these households is at risk of poverty: this is not surprising, because distribution of wealth is not uniform but skewed towards highest deciles. The richest 30 per cent of households holds around 70 per cent of total wealth reported and more than 40 per cent of this wealth is held by the top 5 per cent. Focusing on 2016, we can see how real assets represent the main component of total wealth and main determinant of real assets are houses; share of households that hold financial assets, instead, is still low and financial liabilities count only 5 per cent of gross wealth. Financial assets are classified into deposits, government securities, other securities, and trade credit.

“Other securities” includes Italian bonds, Italian shares and equity, managed portfolios, foreign securities, and other financial assets. As this asset class is much riskier than deposits and government securities, looking at financial assets’ composition we have a first sight of households’ participation in risky investments: more than half of financial assets is composed by deposits and considering that financial assets is only a low share of net wealth, the percentage of investing households in risky assets will be even lower.

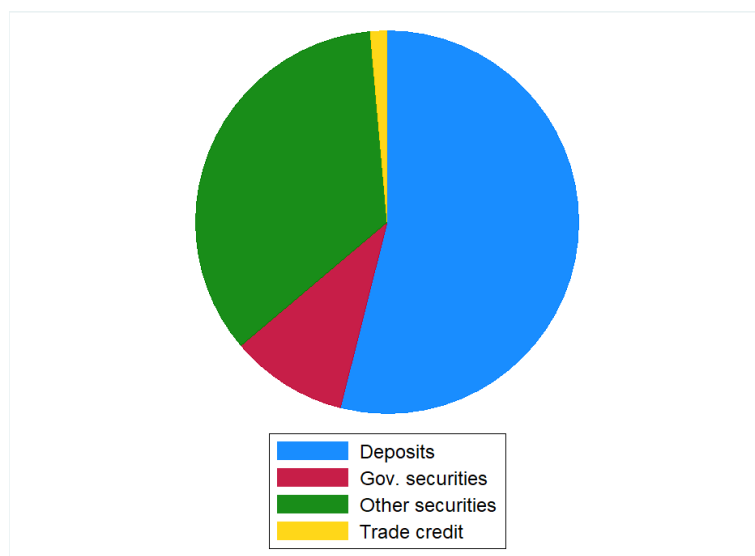
Now we start examining socio-demographic variables at households’ level. Before that, we need to explain the definition of head of family which we refer in the following analysis: Bank of Italy defines the head of households as the individual with the highest income; in our study, instead, we define as head of households in the couple, the male and as we consider also de facto couples, in a two males couples or in two females couples the head of household is the one with highest income.

The 44,85 per cent of households in the sample has over 64 years and only the 3,8 per cent has less than 34 years. This can be relevant for further analysis, because if in our sample there is a high share of pensioners, we can expect specific features, as homeownership and low mean level of education. Data about work status are coherent with age distribution: the 48,16 per cent of households is retired and only 9,55 per cent is self-employed.

Figure 2.4: Net wealth and financial assets composition



(a) Net wealth in 2016

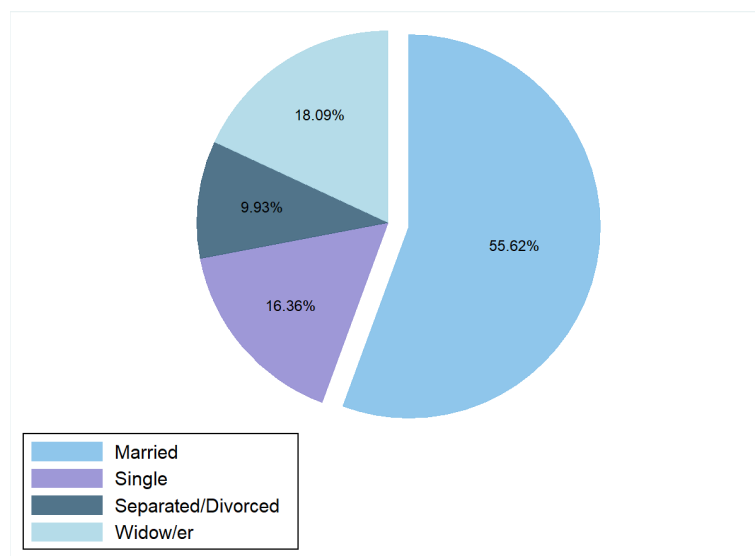


(b) Financial assets' composition

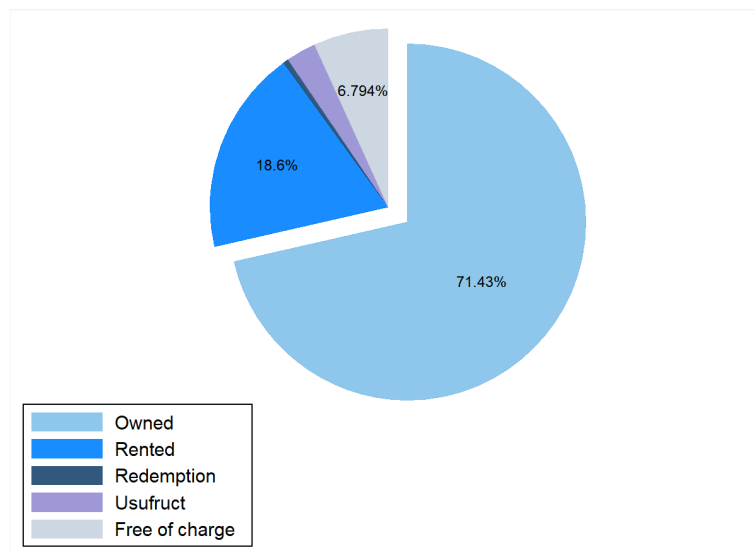
Source: My own elaboration.

Educational level is quite low (only 11,45 per cent has university degree) but, certainly, it may be due to the high share of retired households included in the sample. The low rate of educational qualification can be also associate to residential area: 45 per cent of households lives in the South of Italy. As this region is historically characterised by lower resources, also the rate of educated individuals will result to be lower there than in the rest of Italy, and this of course, impacts on the mean level of educated households.

Figure 2.5: Marital status and housing



(a) Marital status*



(b) Housing*

Individual characteristics refer to the head of household

Source: My own elaboration.

Table 2.2: Households classification by social and demographic characteristics (Percentages)

Characteristics	Households(*)	
Age		
34 and under	4, 07	
35-44	9, 49	
45-54	17, 70	
55-64	20, 59	
Over 64	48, 17	
Educational qualification		
None	3, 15	
Primary school certificate	23, 83	
Lower secondary school certificate	29, 76	
Uppery secondary school diploma	32, 28	
University degree	10, 98	
Work status		
Employee	blue-collar worker	16, 16
	office worker	12, 12
	manager, executive	3, 09
	all	31, 37
Self-employed	business-owner, member of profession	4, 35
	other self-employed	4, 54
	all	8, 89
Not employed	retired	50, 98
	other	8, 76
	all	59, 74
Number of household members		
1 member	34, 27	
2 members	32, 36	
3 members	16, 48	
4 members	12, 54	
5 or more members	4, 35	
Geographical area		
North	43, 10	
Centre	21, 60	
South and Islands	35, 30	
All	100	

(*) Individual characteristics refer to the head of household identified according to our definition.

Source: my own elaboration.

For an extensive description of demographic indicators that can affect investments choice, we compare housing status and marital status among households. From figure 2.5(a) we can see that the share of married households prevails on the others: if we further distinguish between “married” and “never married”, distribution is even more skewed towards married individuals.

This information can be relevant from many points of view: according to Das and Polachek (2017), in Italy single women’s mean labour income is quite similar to single men; for married individuals, instead, the gender pay gap is sizable. If married men earn much more than any other categories, and as we consider the head of household in a married couple, the man, we expect a high difference in term of income, and consequently in term of portfolios, between married and non married households.

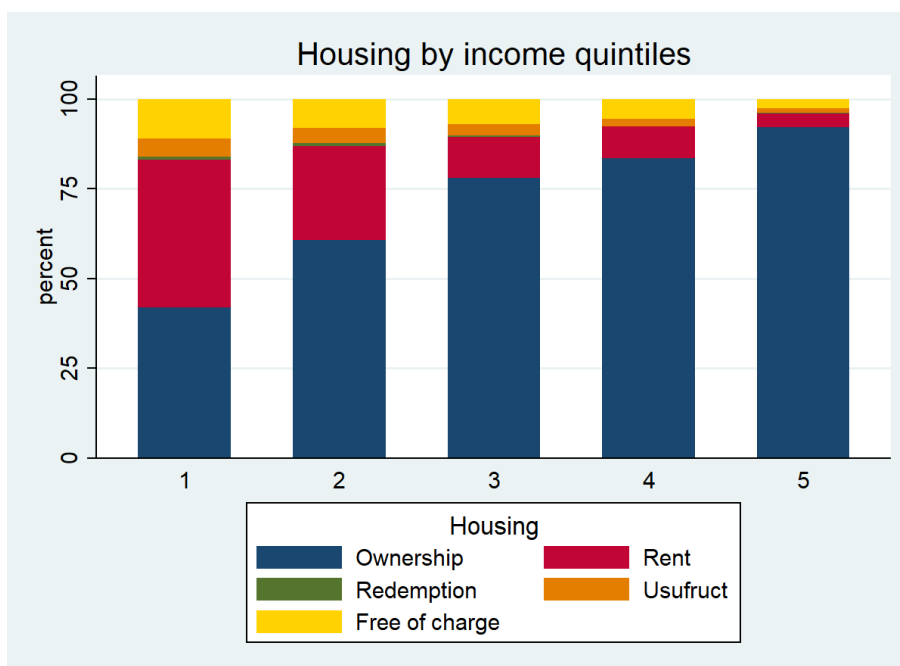
Before we have mentioned that real assets represent the main component of gross wealth for all households: here we can see that the 71,5 per cent of sample is homeowner. In addition to tangible financial benefits, homeownership generates also important social gains for families and communities: according to Yun and Evangelou (2016) homeownership improves educational achievement, reduce crime and has an impact on both physical and psychological health.

Income can be considered one of the primary drivers of homeownership: in figure 2.6 we can see how the share of households that decide to be homeowner increases with income level; so, we can suspect that those belonging to lower income quintiles may not be qualified for mortgages or are not able to find houses in lower price ranges near to the place where they work. Younger households, for example, are less stable because they are likely to change work more frequently than older individuals: less stability and low income together may contribute to reduce homeownership rates.

We will see later how this variable and the way it varies across ages, will affect the probability of participate in risky assets. Accordingly, renting share decreases with income and remaining housing categories are negligible.

Lastly, we want to evaluate the mean educational level in our sample and how can be correlated with age and income. As we have seen before, level of education decreases

Figure 2.6: Housing by income quintiles



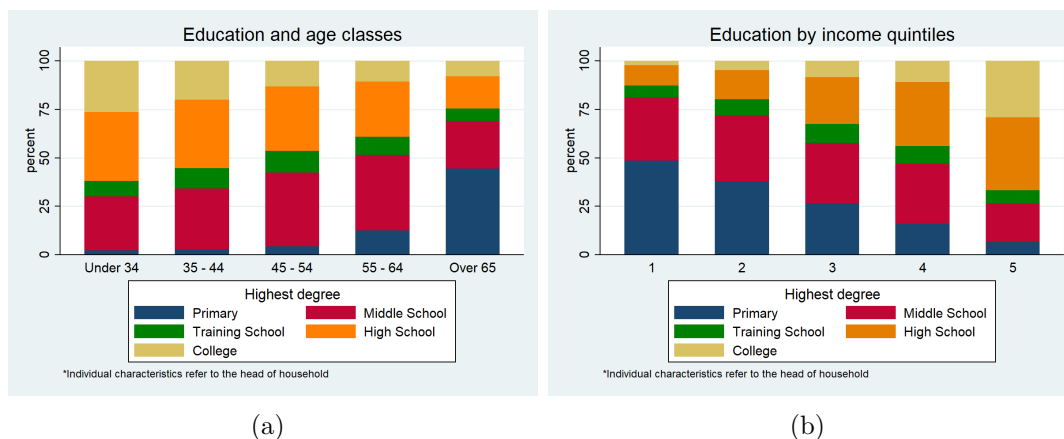
*Individual characteristics refer to the head of household
 Source: My own elaboration.

with age: the percentage of primary education as highest qualification is almost high (around 50 per cent) for pensioners, and similarly university degree reaches its highest rate for younger households. Lower education is usually associated with a lower probability of investing in risky assets or it can induce wrong financial choices.

As a large share of our sample is composed by pensioners, that are characterised by lower qualification, we can assume that this pattern will negatively affect participation choice. Observing figure 2.7(b) we infer a positive correlation also between education and income: the probability of achieving a university degree is quite zero for households belonging to lowest income level and the percentage of graduated households becomes substantial only from third quintile.

Trends discussed so far are the principal socio-economic features of households composing our sample. Now we want to investigate what induces participation looking at characteristics of those that do actually invest.

Figure 2.7: Education by age classes and income quintiles



(a)

(b)

Source: My own elaboration.

2.2 Households' portfolios conditional on participation in financial markets

In this section we aim at quantitatively analyse how share of households holding risky assets is quite low in Italy at 31-12-2016: we will study the characteristics of investing households to draw out some specific trends and try interpreting empirical data.

At first, we need to discuss what classes of financial instruments we include into definition of risky assets and how we compute participation share. We state that households participate in financial market if they hold at least one of the following financial instruments at 31-12-2016: investments in long-term bonds and stocks (directly or through mutual funds), life insurance policies and supplementary pension plans. A complete classification of risky assets is provided by following table 2.3:

We include defined-contribution pension plans because participation in these specific kinds of risky investments is increasing so much that they can be definitively combined with equity and risky securities; also, reforms of social security system have raised pension age and decreased relative expected gains, increasing the share of households that decide to hold supplementary pension plans.

Also, recent regulations made life insurance premiums and contributions to pension funds tax deductible: in particular in Italy there is a tax reduction of 19 per cent for

Table 2.3: Forms of savings

RISKY ASSETS
BONDS, ITALIAN INVESTMENT FUND UNITS, ETFs
Bonds issued by Italian firms
Bonds issues by Italian banks
Funds or ETFs in money market or in liquidity in euros
Funds or ETFs in bonds in euros
Balanced (or mixed) funds or ETFs in euros
Funds or ETFs in equities in euros
Funds or ETFs in foreign currencies
ITALIAN SHARES AND EQUITY
Shares in listed companies (at their market value on 31-12-2016)
Shares in unlisted companies (at their estimated realisable value on 31-12-2016)
Shares in companies limited by shares - srl (at their estimated realisable value on 31-12-2016)
Equity in partnerships (at estimated realisable value on 31-12-2016) (*)
MANAGED PORTFOLIOS
FOREIGN SECURITIES (ISSUED BY NON- RESIDENTS)
Government securities
Bonds
Shares and equities
Other
LOANS TO COOPERATIVES (SOCIAL LOANS, ETC.)
OTHER FINANCIAL ASSETS (options, futures, royalties, etc.)
SUPPLEMENTARY PENSION PLANS
LIFE INSURANCE POLICIES

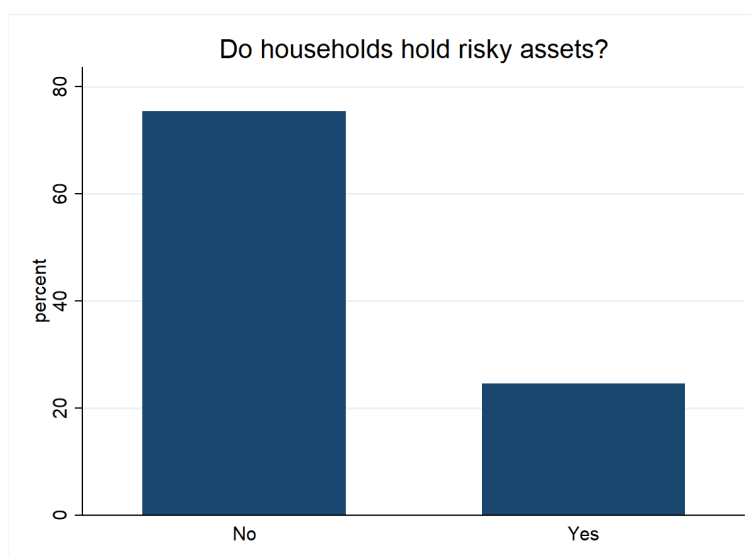
(*)Do not include shares in companies in which household members work.

Source: Survey on Households Income and Wealth 2016

Table 2.4: Share of participants by asset classes

life insurance policies, and a full tax deduction for contribution paid to supplementary pension plans (D. Lgs. N 252 (2005)). In this pattern, we finally compute participation rate: only around 23 per cent of sample holds at least one risky asset. In contrast with prediction of expected utility theory, share of investing households is quite low: a large share of households prefer investing wealth in safe assets or in currency. Table 2.5 highlights participation shares by financial assets classes including also safe deposits and governments securities. The 82,85% of households prefers to invest in postal and bank deposit and only the 0,97% in managed savings.

Figure 2.8: Share of participants in risky assets



Source: My own elaboration.

There are many reasons for the low participation in financial markets. First, entry and monitoring costs have been historically high, and the expected premium has been extremely volatile. The inclusion of mutual funds, leading to lower transaction costs and better risk diversification, still is not able to improve participation rate.

Transaction costs stay high, particularly at low wealth levels: less educated and poor households find it more convenient to hold only saving accounts and currency. To understand what induces participation, we need to exploit the main characteristics of investing households. From now on we will study only the portfolios of those that do

Table 2.5: Share of participants in all financial assets

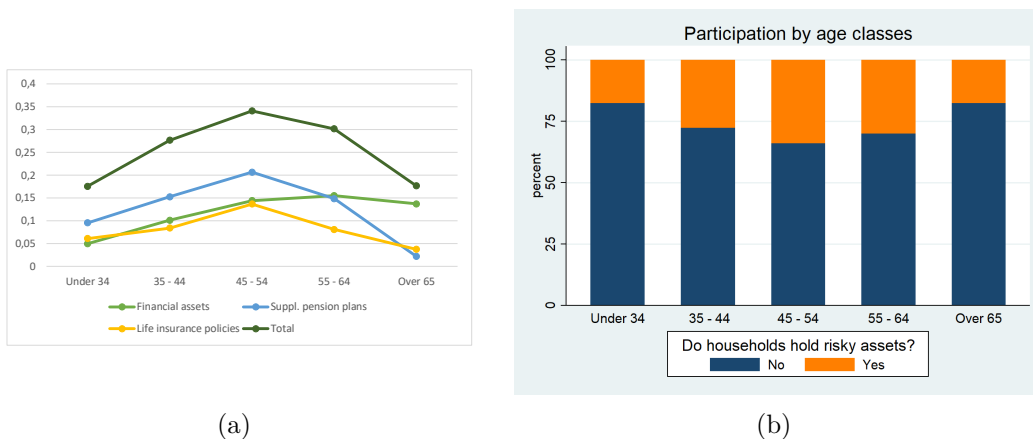
Deposits	82,85%
Government securities	6,53%
Bonds and ETFs	10,28%
Stocks	3,61%
Managed savings	0,97%
Government investments	0,74%
Loans to cooperatives	1,52%
Other financial assets	0,19

Source:my own elaboration.

invest in risky assets and we will try to identify hypothetical drivers of participation choice.

Following figures show how participation share varies across different age classes, highlighting also the pattern for main asset classes included in risky investments.

Figure 2.9: Participation by age classes



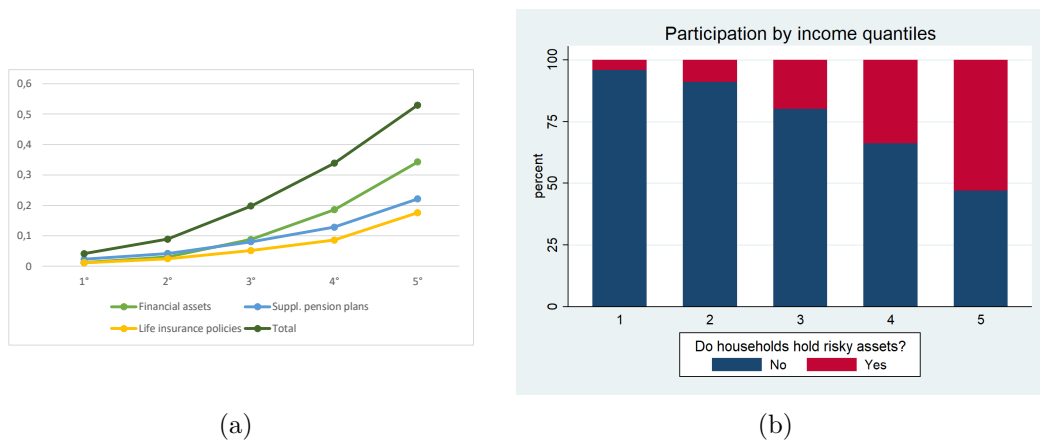
Source: My own elaboration.

We observe that risky assets participation, besides being limited at all ages, also follows a hump-shaped trend which peaks in the range 45 - 54 for life insurance policies and supplementary pension plans.

Instead, financial assets participation peaks in the range 55 - 64, just before retirement. A reason why households do not hold life insurance policies and supplementary pension plans in old age is probably due to the function these instruments perform: for many individuals insurance premium may have already been cleared or pension plans are nearly to their maturity.

Younger households, who have lower accumulated assets in financial wealth and high human wealth, hold a positive share of risky assets also to diversify their portfolio. In old age instead, households hold lower human capital and discount future more as life horizon reduces: these features make participation for them less convenient.

Figure 2.10: Participation by income quintiles



Source: My own elaboration.

Studying participation pattern by income quintiles we can easily assess that income can be considered one important driver of investments in financial markets: share of households that holds at least one risky assets is quite low in first income quintile, and becomes more than 50 percent in the top quintile.

The increasing trend is more pronounced for financial assets: a crash in financial markets can have a huge impact on lower income quintiles and if level of trust among households is not so high, individuals under a certain income threshold will prefer to not invest. Presence of participation costs can also be useful to explain the income pattern; life insurance policies and supplementary pension plans usually are expensive instruments too, so it is reasonable that only richest will hold these kinds of assets.

The most important source of income for households is labour income, which depends

on working status. We distinguish between employed, self-employed and not employed households and study how participation share changes across distinct kinds of occupations. Analysing following figures, we can observe how more than 60 per cent of managers holds at least one risky asset.

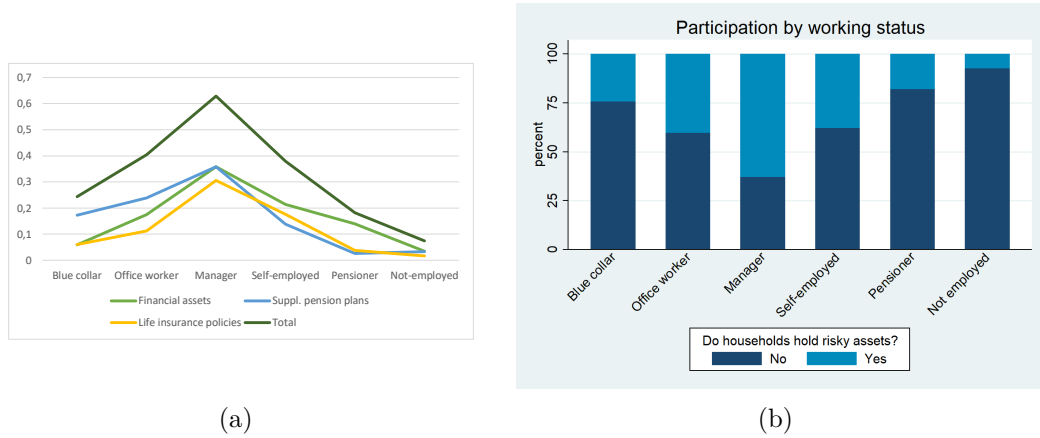
One explanation can be related to the practice of some firms that decide to remunerate managers also through shares or stock options: the underlying assumption is that if workers become shareholders, they will be more motivated to better perform. The trend is quite similar among the three asset classes, but it seems that supplementary pension plans reach the highest share for all employed categories: blue collars, office workers and managers.

As seen before for age pattern, participation in life insurance policies and supplementary pension plans is quite zero for pensioners. Also, coherent with income distribution, not employed do not hold any kind of risky assets; managers and self-employed can be classified as highest income workers, so we would expect similar share of participation. However, even if we observe a more than 60 per cent of managers holding risky assets, only less than 40 per cent of self-employed decide to invest. Moreover, entrepreneurship usually is considered a high-risk bearing occupation, so it is reasonable to suppose a similar degree of risk tolerance from entrepreneurs also in financial markets. Nevertheless, data shows different patterns.

Working status alone is not enough to explain participation choice and it may be correlated with other variables able to affect investments in risky assets.

Educational level can be considered one of them. As figures 2.12 show, education has an important effect on participation in financial markets: only less than 10 per cent of households with a primary degree holds risky assets and in many cases pensioners represent the largest component of this category. Combining data from age distribution, income, working status and education conditional on participation, we are able to interpret low rate of pensioners that hold risky assets, and considering that retiree constitute the highest fraction of our sample, we can better understand total rate of participation too.

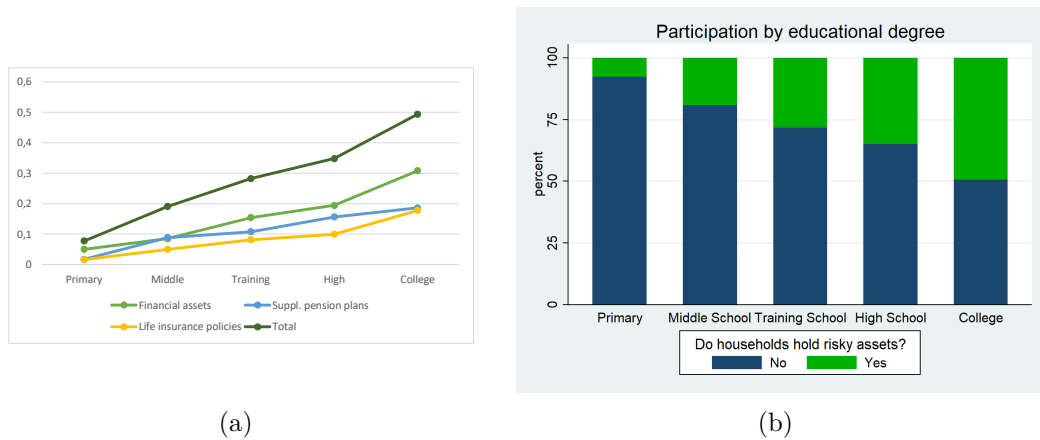
Figure 2.11: Participation by working status



Source: My own elaboration.

Participation by educational degree has an increasing trend: almost 50 per cent of households with a college qualification invests in risky assets. Also, trends are quite similar between all asset classes, even if financial assets participation reaches highest value with respect to life insurance policies and supplementary pension plans.

Figure 2.12: Participation by educational degree



Source: My own elaboration.

For a complete analysis of participation share, we need to compare the level of financial literacy between households that decide to invest and those that stay out of financial markets.

We measure financial literacy by the numbers of right answers at three questions about respectively interests capitalization, inflation, and portfolio diversification principle (table 2.7, table 2.8 and table 2.9): if households answer in the wrong way to all

Table 2.6: Scores of financial literacy in SHIW 2016

Financial Literacy score	Frequencies	Percentage
None	1.485	21, 56
Low	1.338	19, 43
Medium	2.157	31, 32
High	1.908	27, 70
Tot.	6.888	100, 00

Source: my own elaboration.

questions than we state that they have no financial literacy; accordingly, if they rightly answer to all questions, they have high level of financial literacy.

Observing table 2.6 we can deduce that almost 50 per cent of households has a good knowledge of basic financial mechanisms and a quite negligible share has no financial literacy. This is an important goal due to the increasing spread of financial knowledge sponsored by government and institutions.

Financial literacy as a strong effect on participation choice: if households are able to make informed financial choices and gain higher returns from their investments, it is more likely for them to invest in portfolios of risky assets too.

Finally, Figure 2.13 highlight how share of participants in risky assets increases with level of financial literacy: among those with no financial literacy, only around 10 per cent decides to hold risky assets with respect to a 40 per cent of participation among households with a high level of financial literacy.

Clearly, in this section we are presenting the direct effect of each single variable on decision to invest in risky assets, without assuming that these indicators alone are enough to explain documented low level of participation. Also among households with good financial skills, more then half decide to stay out of financial markets, so it is

Table 2.7: Suppose you put 100 euros into a (no fee, tax free) savings account with a guaranteed interest rate of 2 per cent per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of 5 years, once the interest payment is made?

Less than 102 euros	8,39%
Exactly 102 euros	20,66%
More than 102 euros	49,59%
Don't know	19,79%
No answer	1,57%
Tot.	100%

Source: my own elaborations.

Table 2.8: Suppose you put 1,000 euros into a (no fee, tax free) savings account with a guaranteed interest rate of 1% year. Suppose furthermore inflation stays at 2 per cent. In one year's time will you be able to buy the same amount of goods that you could buy by spending today 1,000 euros?

Yes	4,76%
No, less than I could buy today	62,48%
No, more than I could buy today	7,17%
Don't know	23,58%
No answer	2,00%
Tot	100,00%

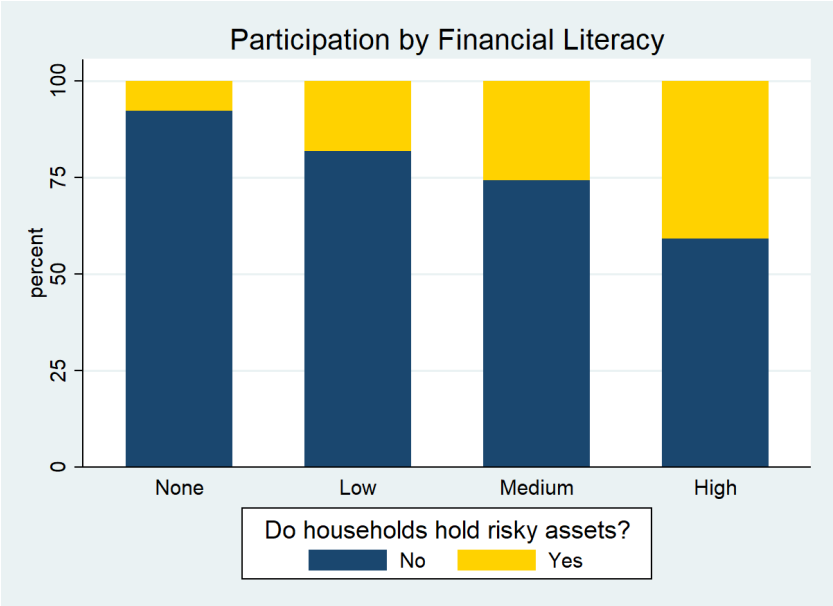
Source: my own elaboration.

Table 2.9: In your opinion, the purchase of shares of one company usually provides a safer return than buying shares of a wide range of companies through a mutual fund?

True	9,79%
False	53,11%
Don't know	33,91%
No answer	3,19%
Tot	100,00%

Source: my own elaboration.

Figure 2.13: Scores of financial literacy conditional on participation



Source: My own elaboration.

Table 2.10: In managing your financial investments, would you say you have a preference for investments that offer:

very high returns, but with a high risk of losing part of the capital	9, 90%
a good return, but also a fair degree of protection for the invested capital	10, 15%
a fair return, with a good degree of protection for the invested capital	27, 50%
low returns, with no risk of losing the invested capital	61, 45%
Tot	100, 00%

Source: my own elaboration

evident that the effect of financial literacy is mitigated by other variables.

To conclude the analysis of households' characteristics conditional on participation, we need to mention risk aversion. Risk aversion has always been considered the most important driver of participation choice according to standard theory.

Certainly, attitudes towards risk cannot be excluded from a research on decision to invest in risky assets, but, as already mentioned, risk aversion is quite difficult to measure and estimations based on qualitative questions can be biased. That being said, here we refer to risk aversion through a specific question in 2016 SHIW where households are asked to report their preferences for investments (table 2.10):

More than 50 per cent has no tolerance for risk and the share of households willing to bear substantial risk is quite zero: as in our analysis we focus only on very risky assets, a high percentage of households declaring no tolerance for risk is coherent with the 77 per cent of sample that decide to not participate at all.

Comparing risk aversion's level among participant and non-participant households, most relevant feature is that low risk aversion is quite similar between two groups but a larger share of households staying out of financial markets have no tolerance for risk.

2.3 “Money needed” as a piece of puzzle

Now we finally present the principal instruments that we aim to introduce in our analysis of households’ portfolios: the definitions of “money needed” and financial hardship. The idea of “money needed” comes from a specific question asked to households into 2016 SHIW: “In your opinion, how much does a household like yours need per month in order to live reasonably comfortably but not in luxury?”.

Each head of households gives a quantitative answer that should reflect their current financial well-being. We expect that if “money needed” is too high with respect the actual level of income and wealth, then it’s reasonable for these households to not participate in financial markets and to not hold investments involving high probability of losing invested capital.

Hence, we can consider “money needed” as a self-reported signal of financial hardship: if reported values are higher than current income, it means that households are not able to live comfortably with their actual resources, and consequently, they cannot afford any “luxury”, least of all risky investments. Median recorded value for “money needed” is 2000 euro compared to a median monthly income of 1667 euro; we can observe same pattern if we analyse the mean reported value: 2244 euro for money needed compared to 2059 euro for income.

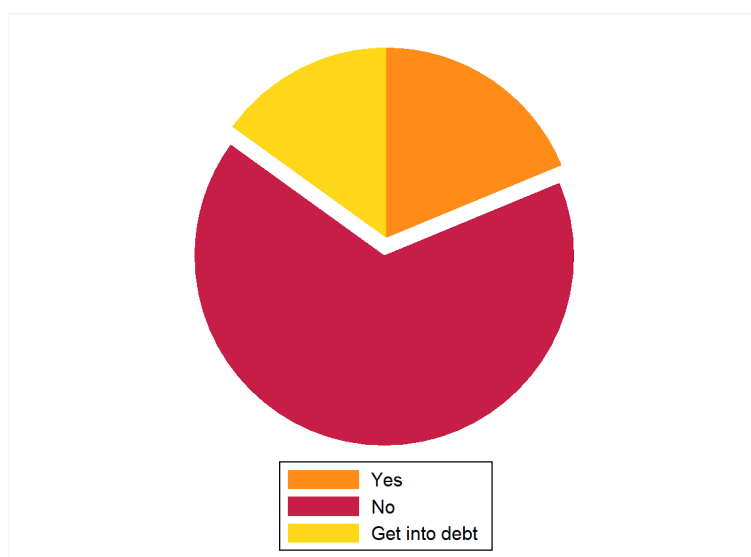
In both cases, households show a form of financial difficulty: if their income is not enough to live comfortably, then they need to reduce their consumption in order to make ends meet.

We need to mention that this kind of questions are subjected to under-reporting problem: if poorer households may be willing to truly report their financial condition, the wealthy, instead, may be reluctant. Also, because of the way “money needed” question is asked, richer households may consider part of their consumption not essential in order to live comfortably: if this is so, their reported values for money needed will be lower than those on actual income, and will potentially bias our computations.

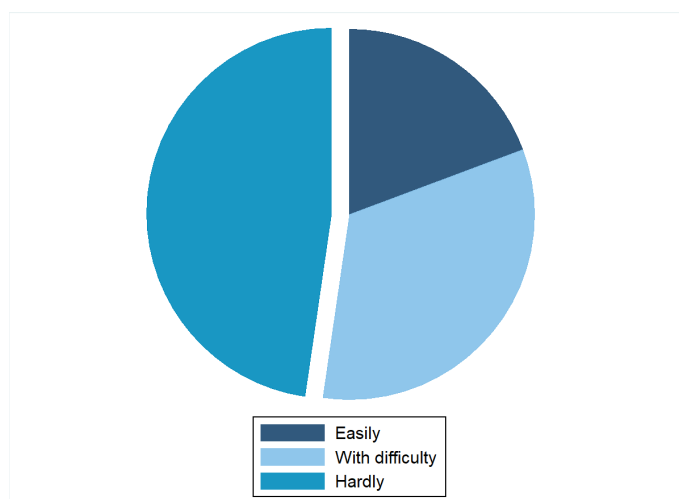
For this reason, as we will explain in next chapter, we do not introduce money needed in absolute values but related to consumption’s level of each family.

The aim is to prove that in the presence of financial difficulties and other associated characteristics, like low education, low financial literacy, and high risk aversion, households' portfolios are characterized by no investments in risky assets and lower return. In order to have a better understanding of financial condition among households in our sample, we introduce also a financial hardship estimator. We create this indicator combining two different variables: saving capability and being able to make ends meet.

Figure 2.14: Variables



(a) Savings

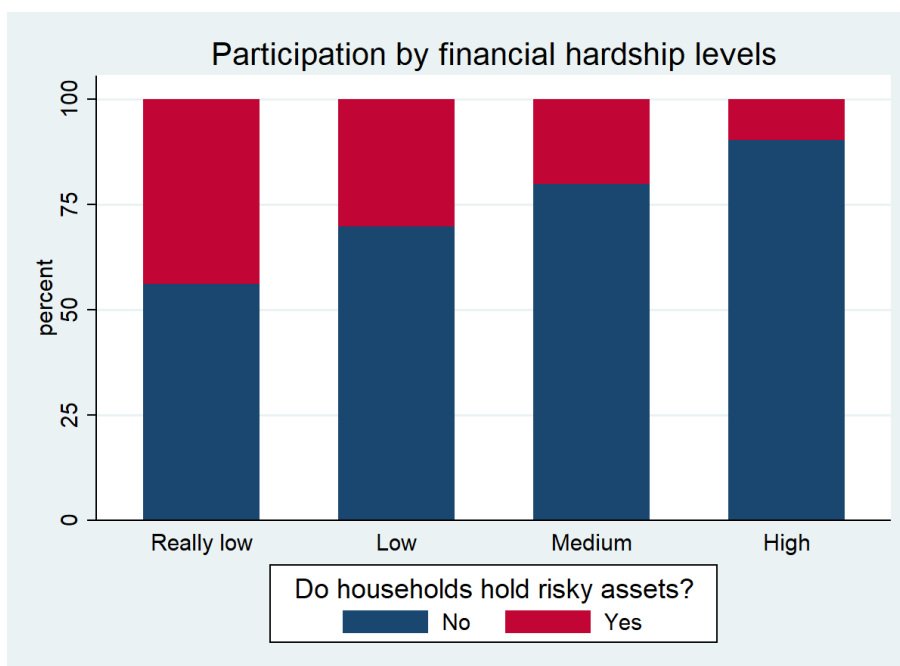


(b) To make ends meet

Source: My own elaboration.

More than 50 per cent of households declare that they spent entire yearly income and did not manage to save anything; only a small fraction succeeded in savings and the

Figure 2.15: Financial hardship conditional on participation



Source: my own elaboration

same share of households even report that they spent more than entire yearly income, drawing on savings or borrowing.

Same features characterized the second indicator: more than 60 per cent of households consider their income insufficient to see them through to the end of the month, and 30 per cent of them has great difficulty to make ends meet. It is clear that large fraction of households in the sample has financial difficulties and we can reasonably expect that this condition will negatively affect participation choice.

So combining values of these two variables, we create a single one indicator of financial hardship that can take four different values, where, at the extremes, “really low” means that at the households are both able to save and to make ends meet, and “really high” imply that households needs to borrow and are not able to make ends meet.

Observing distribution of values, we can how more than 30 per cent of households has a high financial hardship: this information can be crucial for an investigation about investments drivers. If households suffer of financial hardship, they will not be able to sustain even low participation cost associated with investments in risky assets.

As Table 2.11 shows, share of households with high financial hardship holding risky

Table 2.11: Financial hardship level in SHIW 2016

Really low	9, 90%
Low	10, 15%
Medium	27, 50%
High	61, 45%
Tot.	100, 00%

Source: my own elaboration.

assets is less the 10 per cent; quite the opposite, around 40 per cent of those with low financial hardship decides to invest in risky assets. In order to better understand the negative effect that financial hardship has on households' portfolios, it can be useful comparing it with the set of variables that positively affect investment choice. We observe that individuals with low financial hardship are characterized by high level of financial literacy; this is not surprisingly for at least two reasons: financial literacy entails expensive investments in education that only richer households can sustain; also, financial literacy is the ability to take informed financial decisions and better investments lead to higher return.

So, dependence between wealth and education creates a loop: only richer individual achieve higher education, and only higher education leads to better return. Similarly, share of households with low financial literacy increases with level of financial hardship.

Chapter 3

Empirical analysis

Finally, in this last chapter we are going to empirically investigate if the participation in risky assets by Italian households is positively correlated with the key variables “Money needed” and “Financial Hardship”, also controlling for a set of independent demographic and economic variables.

As already mentioned, our hypothesis is that households showing a significative level of financial hardship and the need of an income level higher than their actual one will be more reluctant to participate in financial markets at all, but especially in risky investments.

First section presents the econometric model for binary discrete choice variable; second section covers the analysis of independent variables introduced into specification and, finally, section three discusses results of estimation model.

3.1 Econometric model for discrete choice variables

Discrete outcome or qualitative response models are models for a dependent variable that indicates in which one of “m” mutually exclusive categories the outcome of interest falls. As the aim of our research is to investigate the participation in risky assets, from an econometric point view, this implies using a discrete binary choice model.

We suppose that a set of factors such as, for example, age, education, marital status

and family size, gathered in a vector X explain the decision to invest or not, so that formally we get:

$$Prob(Y = 1|x) = F(x|\beta) \quad (3.1)$$

$$Prob(Y = 0|x) = 1 - F(x|\beta). \quad (3.2)$$

Parameters β reflect the impact of changes in x on the probability of investing in risky assets. Binary dependent variable Y_i represents the participation choice and it takes value 1 if household i invests in risky assets and value 0 otherwise. The problem is to find a suitable form for function $F(\cdot)$. We can retain the linear regression:

$$F(x, \beta) = x'\beta \quad (3.3)$$

and since $E[y|x] = F(x, \beta)$, we are able to construct the regression model:

$$y = E[y|x] + (1 - E[y|x]) = x'\beta + \epsilon, \quad (3.4)$$

defined as Linear Probability Model. Since $x'\beta + \epsilon$ must be equal to 0 or 1, the residual ϵ equals either $-x'\beta$ or $1 - x'\beta$, with probabilities $(1 - F)$ and F respectively. Thus

$$Var[\epsilon|x] = x'\beta(1 - x'\beta). \quad (3.5)$$

In this way we show why in the Linear Probability Model errors ϵ are heteroskedastic by construction, in a way that they depend on β . In order to overcome such complication, we include into specification robust standard errors to correct for the heteroskedasticity of the error term. Final OLS regression, then, can be defined as follow:

$$P(Participation_i = 1|X_i) = \alpha + \beta_h X_{ih} + \epsilon \quad (3.6)$$

where a change in probability that household i participates in risky assets given the set of controls X_i is measured by the marginal effect β_h . Also, X_{ih} covers all the h independent variables included into regression that we discuss in next section.

3.2 Construction and explanation of independent variables

The descriptive analysis of previous chapter shows that in Italy the propensity to invest in risky assets varies significantly with income, education, working status and age. Participation increases strongly with mentioned variables, with the exception of the age profile that instead follows a hump - shaped trend.

A descriptive analysis only examines the effect of each variable alone on the probability of investing in risky assets, omitting any form of correlation between variables. In this section we go one step further running a regression of investment choice over a set of demographic controls and economic variables, both referred to the head of household. Table 3.1 reports summary statistics – mean, standard deviation, minimum, maximum and median value – for all the indicators used in the estimation.

We define as dependent variable the dummy “Risky investments”, and it takes value 1 if the head of households holds at least one risky asset between financial investments, life insurance policies and supplementary pension plans, and 0 otherwise. Then we introduce a set of controls, in order to avoid omitted-variables bias.

Dataset covers 6888 observations instead of 7420, because we drop from sample all head of households with an age lower than 25 and higher than 85. Besides controlling for age and age square, we include into regression also logarithm of family size, where the variable “Family size” can assume five values in the range “1” and “5 or more”.

In order to improve descriptive analysis of previous chapter, we control for wealth quintiles net of financial liabilities to banks and financial companies, and for the inverse hyperbolic sine¹ of disposable income net of property income: according to Bank of

¹One problem with taking the logarithm of a variable is that it does not allow retaining zero-valued observations because $\ln(0)$ is undefined. The inverse hyperbolic sine (or arcsinh) transformation, except for very small values, can be interpreted in exactly the same way as a standard logarithmic, but it allows retaining zero-valued (and even negative-valued) observations. For a random variable x , taking the inverse hyperbolic sine transformation yields a new variable \tilde{x} , such that

$$\tilde{x} = \text{arcsinh}(x) = \ln(x + \sqrt{x^2 + 1}) \quad (3.7)$$

Bellemare, M. F., and C. J. Wichman. “Elasticities and the inverse hyperbolic sine transformation.”

Table 3.1: Summary statistics of variables included into specification

Control	Mean	Std. dev.	Min	Median	Max
Age	4.109175	1.412732	0.5	4.2	6.5
Age square	18.88084	11.23084	0.25	17.64	42.25
Log family size	0.6793178	0.5323655	0	0.6931472	1.609438
Education	9.8509	4.099387	5	8	18
Wealth quintiles	3.013937	1.42356	1	3	5
Income ihs	3.618668	0.8906785	0	3.689504	6.952251
Area	1.924652	0.8815333	1	2	3
Marital status	0.5561847	0.4968693	0	1	1
Working status	3.850319	1.705085	1	5	6
Money Needed	0.1975159	0.4832645	-2.780371	0.1823216	2.665491
Housing	1.385453	0.6606207	1	1	3
Financial hardship	2.635598	1.145528	1	3	4
Financial literacy	1.651568	1.101088	0	2	3
Risk aversion	3.495064	0.7120519	1	4	4

Source: my own elaboration.

Italy's definition, income at yearly basis is defined as the sum of payroll income, income from pensions and net transfers, and net self-employment income.

We include a dummy variable for whether the head of households is married or not and a homeownership variable to control for correlation of housing with probability of holding risky assets. Homeownership dummy is defined as 1 if the household's house is owned, or under redemption agreement, or occupied in usufruct or, lastly, occupied free of charge ², and 0 if house is rented.

We include into specification also a geographical control in order to take into account the differences that may arise from living in North, Central and South/Insular of Italy. To test the trend observed in the previous chapter, we control for correlation between participation in risky assets and education: "Education" is defined as the sum of school years for different levels of educational qualification:

- 1 = primary school (5 years of education)
- 2 = middle school (8 years of education)
- 3 = training school (10 years of education)
- 4 = high school (13 years of education)
- 5 = college (18 years of education).

Head of households with no educational qualification are included into "Primary" category and "College" incorporates 3-years university degree, 5-years university degree and postgraduate qualification.

Finally, we control also for head of households' employment status; categorical variable that we include into the model follows the definition used by bank of Italy and identify six different categories: blue collar, office worker, manager, self-employed, pensioner and not employed.

As already mentioned, financial literacy has a strong predictive effect on the decision to hold risky assets, so we construct a plausible measure of financial literacy's endowment

Oxford Bulletin of Economics and Statistics 82.1 (2020): 50-61.

²For example a house loaned by friends or relatives or given in exchange for services, such as caretaking.

based on answers to three financial and numerical questions.

The first question is about interest rate compounding in a savings account and is commonly regarded as a very good proxy for financial literacy (Lusardi and Mitchell (2008)).

The second question is about purchasing power and inflation; finally, third question is about diversification of risk. The answers to these questions are combined into a summary indicator that takes value zero if the head of household gives the wrong answer to all questions; otherwise, the variable takes value one, two or three, based on the number of right answers.

In order to control for correlation between participation choice and participation costs, we construct “Money needed” indicator. As mentioned in previous chapter, we refer to a specific question introduced in 2016 SHIW able to measure a perceived form of financial hardship: “In your opinion, how much does a household like yours need per month in order to live reasonably comfortably but not in luxury?”.

We divide reported values for the number of family components and compute the consumption’s level at monthly basis for each household, still divided by the family size. Finally, we compute for each household the logarithm of the ratio between the per capita “money needed” and consumption:

$$MoneyNeeded = \log\left(\frac{moneynEEDED}{consumption}\right)_3 \quad (3.8)$$

Resulting values are collected into a new final variable named “Money Needed”. In order to take a comparison between a perceived subjective form of financial difficulties and an objective one, we construct an indicator of financial hardship.

As previously mentioned, we identify two different variables able to create an effective indicator of financial hardship. First variable refers to a question asking households if their income is sufficient to see them through to the end of the month:

- 1 = with great difficulty,

³Both money needed and consumption are per capita and defined at monthly basis.

- 2 = with difficulty,
- 3 = with some difficulty,
- 4 = fairly easily,
- 5 = easily,
- 6 = very easily.

Later, we sum up these categories in order to obtain only three different values, easier to handle with: “Hardly” for answer one and two, “With difficulty” for answer three and “Easily” for answers four, five and six. The second variable that we identify as predictive of financial hardship, refers to the ability to save. Following the survey, “Savings” indicator is defined for three categories, respectively “No”, “Yes” and “Get in debt”.

We say that households do not manage to save anything if they spend their entire yearly income, otherwise they succeed in savings if they spend less than their entire yearly income. Households that consume more than their actual income, they drawing on saving account or even borrowing, are placed into the category “Get in debt”.

Finally we combine values of this two variables in order to obtain an indicator of financial hardship, defined over four categories:

- 1= really low
- 2= low
- 3= medium
- 4= high.

If households are not able to save and to make ends meet, they have a high level of financial hardship. In the same way, if they are able both to save and make ends meet they have a low level of financial hardship.

3.3 Estimation results

In this section we present and discuss the results of econometric model applied to the sample of 2016 SHIW. Table 3.1 shows the outcomes of Linear Probability Model, with standard error robust for heteroskedasticity in parentheses. The regression results confirm patterns predicted in previous chapter. We run six different regressions on the same set of controls and independent variables:

- first regression running the discrete dependent variable "Risky assets", covers all categories of risky financial assets that we consider investigating participation choice. It takes value 1 if households hold at least one risky investments between bonds, ETFs, stocks, life insurance policies, supplementary pension plans and other financial investments ⁴ and 0 otherwise;
- in remaining regressions, the discrete dependent variable measures the probability that households hold respectively Bonds, Stocks, Life insurance policies, Supplementary pension plans and Other financial assets respectively if equals 1, and 0 otherwise.

In almost all regression Age is significant at 1 per cent and positively affects investment in risky assets: this means that as age increases probability that households will hold risky financial assets increases. This seems to be coherent with the trend resulted from descriptive analysis.

However, in regression we are not able to highlight the final tail of age hump shaped distribution, because we do not distinguish between age classes. Nonetheless, this problem can be easily overcome looking at category Pensioner of Working status variables: the parameter is significant for main regression and negatively correlated with invest-

⁴

- Managed savings
- Foreign government securities
- Foreign bonds
- Foreign Shares and equities
- Other foreign securities
- Loans to cooperatives
- Other financial assets (options, futures, royalties, etc.)

ment choice: being a pensioner, then, reduces probability of holding risky assets.

Logarithm of family size is not significant in all regression, regardless of dependent variable used.

Education coefficients for middle and training school's degree are not significant in all regressions; they become positively correlated and significant at 1 percent only for category "High school diploma" and "University degree": having a college degree is associated with an increase of almost 10 percentage points in the probability of holding risky assets, with respect to a 5 per cent for households with only an high school diploma.

The highest category of Education variable, having a college degree, is significantly different from zero at 1 per cent in first three regressions; when the dependent variable is holding a Life insurance policies it becomes significant at 5 per cent, and later, in last two regression is not significant at all.

If we compare the effect of highest educational qualification with the highest level of Financial literacy, we are able to show how the effect of the latter is much stronger than the former one. Financial literacy coefficients are significant at 1 per cent only for the highest category in all six regressions: having a high level of financial literacy increases probability of holding risky assets of 11,2 per cent compared with an increase of 9,7 per cent for those having a university degree.

But the main result is that highest level of financial literacy are associated also with an increase in the probability of investing in Supplementary pension plans, Life insurance policies and derivatives, financial assets usually considered difficult to understand.

Wealth coefficients are significant at 1 percent when the dependent variable is Risky assets and Bonds for all quintiles: belonging to the fifth quintile of wealth increases the probability of holding risky assets of almost 20 per cent. Income as well, is significant at 1 per cent and positive correlated in all regression, with the exception of the last one where the dependent variable is investing in Other financial assets.

We can suppose that this is due to the fact that investing in very complex financial assets such as derivatives is associated with highest level of wealth rather than income.

However also in this case results are coherent with graphical analysis of previous chapter.

Control for geographical area also results significant for category “living in middle of Italy” and “living in south or insular”. The trend is pretty the same among all six regressions: living in any geographical area but North of Italy, reduces the probability of holding every class of financial investments. In the specific, living in South or Insular reduces probability of holding risky assets of almost 11 percent.

Coefficient of “Married” dummy is not significantly different from zero. This means that marital status do not have any explicative power on probability to participate in risky assets.

Working status coefficients are not significant except for “manager” and ”pensioner” categories in almost all regression: being a manager is positive correlated with participation and increases probability of investing in risky assets of 10,5 per cent.

Being a pensioner, instead, is negative correlated with participation when the dependent variable is Risky assets or Supplementary pension plans: at this regard, we can suppose that supplementary pension plans usually are financial products bought by mid-age households in order to improve their future retirement income rather than pensioners.

Also, this asset class usually is considered “complex” to understand and being a pensioner, with a lower level of education decreases probability of investing in it.

Housing parameters are not significant in main regression when the dependent variable cover every class of risky assets: this means that being homeowner or a renter has no effect on probability of holding at least one risky investment. In last regression, with the dependent variable “Other financial assets” including very risky financial investments, being a renter increases probability of holding derivatives.

Risk aversion’s coefficient is not significantly different from 0 in all six regression and for all categories: this means that a change in level of risk aversion will not produce any effect on the probability of holding any class of risky assets. It becomes significant only in third regression where dependent variable is Stocks, and only for category

“No tolerance for risky”: in this case high risk aversion reduces probability of holding stocks.

Finally, Money Needed coefficients are significant at 1 percent in almost all regressions, except when the dependent variable is Supplementary pension plans. The effect of Money Needed, as predicted, reduces the probability of holding any class here considered of risky assets. We consider Money Needed as a self-reported form of financial difficulties, that in the presence of participation costs, reduces participation in risky assets: then if reported values increase, e.g. households need more than their actual monthly income in order to live reasonably comfortably but not in luxury, the probability of holding risky assets will be reduced of 4 per cent.

Combining these results with the estimates for Financial Hardship variable we are able to identify two key indicators explaining low level of participation between Italian households.

Financial Hardship coefficients are significant at 1 per cent for all categories in the regressions with dependent variables “Risky assets” and “Bonds”: an households with a high level of financial hardship is not able both to save and to make end mee: indeed belonging to the highest category of financial hardship reduces probability of holding risky assets of 10 per cent.

When the dependent variable is Stock, Financial Hardship is significant only for the lowest categories: the effect however remains negative. Lastly, for Supplementary pension plans and Life insurance policies coefficient are significant at 5 per cent only for highest category, and not significant at all when the dependent variable is Other financial assets. However, participation share in these last categories are quite low, so it’s reasonable that there is any strong effect.

Table 3.2: LPM regressions on participation by asset classes

Variable	Risky as- sets	Bonds and ETFs	Stocks	Life insur.	Suppl. pensions	Other fin. assets
Age	0.0759*** [0.0168]	0.0441*** [0.0105]	0.00834 [0.00697]	0.0231** [0.0104]	0.0455*** [0.0126]	0.0130** [0.00605]
Age square	-0.0109*** [0.00210]	-0.00501*** [0.00146]	-0.00050 [0.000942]	-0.00395*** [0.00128]	-0.00705*** [0.00141]	-0.00120 [0.000880]
Log. family size	0.0198 [0.0132]	-8.64e - 05 [0.00883]	-0.00540 [0.00583]	0.0217** [0.00878]	0.0336*** [0.0104]	-0.00254 [0.00550]
Education						
Middle school	0.00624 [0.0116]	0.0133 [0.00832]	0.00411 [0.00438]	-0.00578 [0.00651]	-0.0166** [0.00697]	-0.00316 [0.00509]
Training school	0.0289 [0.0200]	0.0109 [0.0139]	0.0124 [0.00872]	0.0101 [0.0124]	-0.0214 [0.0131]	0.00732 [0.00947]
High school	0.0430*** [0.0154]	0.0292** [0.0114]	0.0243*** [0.00689]	0.00176 [0.00936]	-0.0119 [0.00973]	0.00621 [0.00696]
College	0.0974*** [0.0221]	0.0515*** [0.0177]	0.0448*** [0.0127]	0.0356** [0.0149]	-0.0213 [0.0151]	0.0183 [0.0115]
Wealth						
2°	0.0566*** [0.0170]	0.0335*** [0.0104]	0.00177 [0.00612]	0.00226 [0.0109]	0.0149 [0.0131]	0.0248*** [0.00853]
3°	0.0615*** [0.0213]	0.0537*** [0.0136]	0.00542 [0.00831]	-0.0145 [0.0147]	0.0195 [0.0171]	0.0349*** [0.00893]
4°	0.118*** [0.0227]	0.0920*** [0.0150]	0.00341 [0.00897]	-0.0150 [0.0154]	0.0313* [0.0180]	0.0349*** [0.00893]
5°	0.197*** [0.0250]	0.162*** [0.0171]	0.0755*** [0.0116]	0.0133 [0.0172]	0.0393** [0.0195]	0.0818*** [0.0107]
Income ihs	0.0501*** [0.00681]	0.0117*** [0.00446]	0.00948*** [0.00354]	0.0144*** [0.00439]	0.0306*** [0.00506]	0.00484 [0.00327]
Area						
Central	-0.0667*** [0.0128]	-0.0642*** [0.0100]	-0.0408*** [0.00608]	-0.00386 [0.00853]	0.00489 [0.00952]	-0.0247*** [0.00622]
South/ Insular	-0.114*** [0.0112]	-0.109*** [0.00741]	-0.0359*** [0.00493]	-0.0161** [0.00723]	-0.00391 [0.00848]	-0.0364*** [0.00439]
Married	-0.00878 [0.0127]	-0.0101 [0.00885]	0.00220 [0.00551]	0.000698 [0.00804]	-0.0241*** [0.00919]	-0.00359 [0.00582]
Working status						
Office worker	0.0160 [0.0208]	-0.00290 [0.0130]	-0.00388 [0.00798]	0.0188 [0.0133]	0.0293 [0.0186]	-0.00741 [0.00849]
Manager	0.105*** [0.0363]	0.0747** [0.0311]	0.0384* [0.0230]	0.169*** [0.0318]	0.114*** [0.0347]	-0.0187 [0.0168]
Self- employed	-0.0320 [0.0219]	-0.00130 [0.0146]	0.00682 [0.0100]	0.0793*** [0.0163]	-0.0751*** [0.0179]	-0.0134 [0.00917]
Pensioner	-0.0912*** [0.0183]	0.0217* [0.0119]	0.00185 [0.00679]	-0.0135 [0.0110]	-0.138*** [0.0146]	-0.0102 [0.00743]
Not employed	-0.0317 [0.0200]	0.0284*** [0.0109]	0.0165*** [0.00635]	-0.000188 [0.0113]	-0.0776*** [0.0162]	0.0103 [0.00788]
Money Needed	-0.0380*** [0.0109]	-0.0228*** [0.00747]	0.0121** [0.00539]	-0.0150** [0.00713]	-0.0133 [0.00854]	-0.0167*** [0.00521]

Variable	Risky assets	Bonds and ETFs	Stocks	Life insur.	Suppl. pensions	Other fin. assets
Housing						
Rent	-0.00812 [0.0184]	0.0199** [0.00944]	0.00419 [0.00772]	-0.0340*** [0.0122]	-0.0167 [0.0143]	0.0242*** [0.00725]
Rent free	0.0325* [0.0191]	0.0373*** [0.0109]	0.00724 [0.00816]	-0.00436 [0.0138]	0.00126 [0.0148]	0.0282*** [0.00842]
Financial hardship						
Low	-0.0611*** [0.0160]	-0.0862*** [0.0129]	-0.0250*** [0.00838]	-0.00711 [0.0110]	0.00332 [0.0119]	0.00282 [0.00810]
Medium	-0.0891*** [0.0159]	-0.0851*** [0.0121]	-0.0248*** [0.00711]	-0.0218** [0.0105]	-0.0231** [0.0114]	-0.00218 [0.00723]
High	-0.0961*** [0.0165]	-0.0690*** [0.0122]	-0.0113 [0.00733]	-0.0334*** [0.0107]	-0.0266** [0.0120]	-0.000176 [0.00732]
Financial literacy						
Low	0.0213* [0.0121]	0.00241 [0.00718]	-0.00616 [0.00406]	0.00495 [0.00716]	0.00444 [0.00862]	-0.00568 [0.00448]
Medium	0.0368*** [0.0118]	0.0104 [0.00738]	-0.00176 [0.00425]	0.00380 [0.00688]	0.00878 [0.00858]	-0.000139 [0.00472]
High	0.112*** [0.0139]	0.0814*** [0.00988]	0.0240*** [0.00602]	0.0233*** [0.00853]	0.0306*** [0.00982]	0.0185*** [0.00622]
Risk aversion						
Above average risk	-0.00971 [0.0437]	-0.0149 [0.0407]	-0.0670 [0.0417]	0.0264 [0.0309]	-0.0338 [0.0383]	-0.0206 [0.0312]
Average risk	0.0572 [0.0426]	0.0205 [0.0401]	-0.0904** [0.0411]	0.0322 [0.0301]	0.00433 [0.0376]	-0.0238 [0.0309]
No tolerance for risk	-0.0352 [0.0420]	-0.0690* [0.0396]	-0.113*** [0.0408]	0.0256 [0.0296]	-0.0189 [0.0371]	-0.0380 [0.0306]
Constant	-0.0347 [0.0597]	-0.00323 [0.0488]	0.0782* [0.0455]	-0.0286 [0.0411]	0.0123 [0.0489]	0.00194 [0.0347]
Observations	6887	6887	6887	6887	6887	6887
R-squared	0.238	0.186	0.103	0.091	0.130	0.056

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: my own computation.

Conclusion

In conclusion, lack of participation in financial markets is a robust feature of households portfolios. Unwillingness to invest also increases for those investment classes characterized by substantial risk, e.g. stocks, derivatives, supplementary pension plans and life insurance policies. We have shown analytically why, according to expected utility theory, a positive investment in risky assets is crucial to optimize investor's expected utility given a positive equity premium.

We have also explained this economic outcome, known as stockholding puzzle, and how we can conceptualize it adding to classical model participation costs, financial literacy and trust. Our focus is to explain low level of participation among households through an indicator measuring level of financial distress: Money needed. Money needed is a specific question introduced into the 2016 SHIW and, together with other variables, is supposed to explain low share of participants in our sample. The Dataset used to perform empirical analysis is the Survey of Households Income and Wealth run by Bank of Italy. We qualitatively describe the selected sample and highlight demographic and economic patterns. Then we perform a descriptive analysis of households portfolios conditional on participation.

Finally, we introduce the concept of Money Needed and financial hardship. We explain how they can be both considered as different indicators of the same issue: financial difficulties. In chapter three we present the econometric model and discuss results from estimations: as predicted, financial hardship and Money Needed both have a significant and negative effect on the probability of holding risky assets.

If households are not able to make ends meet and report the need of a monthly income

higher than their actual one in order to live comfortably but not in luxury, it is reasonable that they will not invest in risky assets.

This does not mean that both Money Needed and financial hardship variables are enough to explain lack of participation, but combined with financial literacy, working status and other demographic and economic indicators, they give us an idea of principal investments drivers.

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