No. 2005/29

Awareness and Stock Market Participation

Luigi Guiso andTullio Jappelli

Center for Financial Studies
an der J. W. Goethe-Universität ▪ Taunusanlage 6 ▪ D-60329 Frankfurt am Main

Telefon: (+49)069/242941-0
Fax: (+49)069/242941-77 ▪ http://www.ifk-cfs.de ▪ E-Mail: info@ifk-cfs.de

Center for Financial Studies

The *Center for Financial Studies* is a nonprofit research organization, supported by an association of more than 120 banks, insurance companies, industrial corporations and public institutions. Established in 1968 and closely affiliated with the University of Frankfurt, it provides a strong link between the financial community and academia.

The CFS Working Paper Series presents the result of scientific research on selected topics in the field of money, banking and finance. The authors were either participants in the Center´s Research Fellow Program or members of one of the Center´s Research Projects.

If you would like to know more about the *Center for Financial Studies*, please let us know of your interest.

Prof. Dr. Jan Pieter Krahnen

Prof. Volker Wieland, Ph.D.

Center for Financial Studies
an der J. W. Goethe-Universität ■ Taunusanlage 6 ■ D-60329 Frankfurt am Main
Telefon: (+49) 069/242941-0
Fax: (+49) 069/242941-77 ■ http://www.ifk-cfs.de ■ E-Mail: info@ifk-cfs.de

CFS Working Paper No. 2005/29

Awareness and Stock Market Participation*

Luigi Guiso[1] and Tullio Jappelli[2]

August 24, 2004
This Version: September 6, 2005

Abstract:
The paper documents lack of awareness of financial assets in the 1995 and 1998 Bank of Italy Surveys of Household Income and Wealth. It then explores the determinants of awareness, and finds that the probability that survey respondents are aware of stocks, mutual funds and investment accounts is positively correlated with education, household resources, long-term bank relations and proxies for social interaction. Lack of financial awareness has important implications for understanding the stockholding puzzle and for estimating stock market participation costs.

JEL Classification: E2, D8, G1

Keywords: Financial Information, Portfolio Choice

* We thank Raman Uppal, the referee, Raffaele Miniaci and seminar participants at the Bank of Italy, the U.K. Financial Service Authority (FSA), the Universities of Padua, Salerno, Tilburg, Turin, and Venice for helpful comments. This work has been supported by the European Community's Human Potential Programme under contract HPRN-CT-2002-00235 (AGE) and by the Italian Ministry of Education, Universities and Research (MIUR).

[1] University of Sassari, Ente Luigi Einaudi for Monetary, Banking and Financial Studies, and CEPR

[2] University of Salerno, CSEF, and CEPR

1. Introduction

Many studies document substantial heterogeneity in individual financial portfolios, including the fact that many consumers hold no stocks, a feature that is known as the non-participation puzzle (Mankiw and Zeldes, 1991; Haliassos and Bertaut, 1995). Limited financial market participation has important implications for individual welfare and the explanation of the equity premium puzzle.[1] On the welfare issue, Cocco, Gomes and Maenhout (2005) calculate that the welfare loss from non-participation in stock markets can be substantial, between 1.5 and 2 percent of consumption in calibrated life-cycle models. On the equity premium front, Mankiw and Zeldes (1991) treat share ownership as an exogenous individual characteristic and show that differences in the consumption patterns of stockholders and non-stockholders tend to lower the level of risk aversion necessary to justify the equity premium. Attanasio, Banks and Tanner (2002) estimate ownership probabilities to separate "likely" stockholders from non-stockholders, and don't reject the prediction of the consumption capital asset pricing model for the group of stockholders.[2]

The literature has focused primarily on transaction and information costs broadly interpreted to explain why some individuals choose zero holdings for stocks and other financial assets (Vissing-Jorgensen, 2004). However, the exact origin and nature of these costs is not well understood, and the challenge of current research is to single out the factors that prevent large sectors of the population from holding stocks. In this paper we analyze the reasons for limited financial market participation, calling attention to information barriers. As in Merton (1987), the barrier we consider is lack of awareness of the menu of available assets, such as stocks and mutual funds.

In Section 2, we use a survey of Italian households with detailed data on financial assets and socioeconomic variables. The survey uncovers dramatic lack of basic financial

---

[1] Basak and Cuoco (1998) investigate the equilibrium implications of restricted stock market participation. Their findings are consistent with the empirical regularities uncovered by Mankiw and Zeldes in consumption and financial data.

[2] Limited financial market participation and changes in participation over time are relevant for many other important issues, such as the distribution of wealth (Guvenen, 2005), household choices regarding individual retirement accounts (Bernheim and Garrett, 2003), and wealth effects on consumption (Dynan, 2001). Quite obviously, managers of mutual funds and retirement accounts are interested in broadening the stockholder base, and thus, in understanding what triggers the decision to invest in particular assets.

information: 35 percent of potential investors are not aware of stocks, and 50 percent of mutual funds. On average, survey participants know about less than two thirds of the assets, with considerable sample heterogeneity. Having established the potential importance of financial awareness for financial market participation, we focus on two related issues.

The first issue we address is what determines awareness. In Section 3 we present a simple model where investors can learn about assets from distributors or through social interaction. The probability of becoming aware depends on distributors' incentives to inform investors; that is, on the cost of information production and the probability that people buy the asset, once they are aware of it. More intense social interaction increases the probability of awareness, but might discourage direct information production. Section 4 relates the probability of being aware of stocks, mutual funds, investment accounts, and an overall indicator of financial awareness to household characteristics and proxies for social interaction. We find that awareness is positively associated to socioeconomic variables that increase the probability of financial market participation (education, wealth, income and year of birth), long-term bank relations, intensity of social interaction and national newspaper readership in the area where investors live (as a proxy for the cost of information production). Thus, differently from Hong, Kubik and Stein (2004), who infer the role of social learning from the stock market participation decision, we offer a direct test of the effect of social learning on awareness, providing insights into the mechanism by which social learning affects stockholding.

The second issue we analyze is the implication of awareness for the analysis of the non-participation puzzle and for the estimation of participation costs. Section 5, calculates how much stockownership would increase if all investors were aware of stocks, assuming no effects on returns, and how one should estimate transaction costs when not all investors are aware of stocks. Our results suggest that if all investors were aware, stockownership could even double from its current level. Though this shows that awareness is an important explanation for stockholding, we also find that many potential investors are not stockowners even if aware, suggesting that there are impediments for participation even when awareness is accounted for. Our results also imply that estimates of participation costs that do not take awareness into account may be seriously biased. Section 6 summarizes the results.

2. How important is financial awareness?

We document the importance of financial awareness and then explore its determinants using the 1995 and 1998 Bank of Italy Surveys of Household Income and Wealth (SHIW).[3] The surveys collect detailed information on wealth and socioeconomic variables. Before asking if household members own any particular asset, and how much, the survey elicits data on financial awareness. Each household head reports whether he or she is aware of the existence of financial assets by answering, for each asset category, the following question:

> *I will show you a list of possible forms of saving. I would like you to tell me which forms of saving you (or another member of your household) know, even if only by hearsay*.

The financial asset categories refer to *types* of assets available to potential investors. Some of the categories correspond to a single asset (for instance, checking accounts and specific types of government bonds, quite popular in Italy), but others refer to broad groups of assets (for instance, stocks, mutual funds, and corporate bonds). Unfortunately, the survey does not distinguish between mutual funds and investment accounts that are predominantly bonds or stocks.

Two points about the wording of the questions are worth stressing. First, those who are not aware of stocks (or mutual funds) should not be aware of *any* stock. But even those who report that they know stocks are likely to know only a small set. Therefore their portfolio should be more diversified than that of completely uninformed individuals, but they might still invest in only a few stocks and therefore be poorly diversified. Second, the question distinguishes between aware and unaware respondents, but not between respondents who, apart from existence, know very little about the asset - such as past returns, volatility and

[3] The SHIW collects detailed data on demographic variables, households' consumption, income and balance sheets. The survey covers 8,135 households in 1995 and 7,147 in 1998. In each year, the surveys are representative samples of the Italian resident population. Sampling is in two stages, first municipalities and then households. Municipalities are divided into 51 strata defined by 17 regions and 3 classes of population size (more than 40,000, 20,000 to 40,000, less than 20,000). Households are randomly selected from registry office records. Households are defined as groups of individuals related by blood, marriage or adoption and sharing the same dwelling. The net response rate (ratio of responses to contacted households net of ineligible units) is 57 percent in 1995 and 44 percent in 1998. The SHIW archive can be downloaded from the web site *www.bancaditalia.it* or obtained by writing to: Bank of Italy, Research Department, Via Nazionale 91, 00186 Roma, Italy.

liquidity - and more sophisticated investors. Finer data would of course shed further light on the determinants of financial information and on the effects of financial information on household portfolios.[4]

After answering questions on financial awareness, the same individuals are asked two sets of questions to identify assets selected in the past and assets held at the end of the year:

> *Have you or any other member of your household ever invested in …[this particular asset] at any time in your life*?
>
> *Did you or any of your household members have… [this particular asset] at the end of the previous year*?

Table 1 reports data on awareness of 14 types of financial assets, lifetime ownership, and ownership at the end of the year. The answers must be mutually consistent. If an asset is owned or was previously owned, the respondent should report that the asset is known. If an asset is currently owned, the respondent should report that he has previously purchased the asset. These consistency requirements apply to each respondent and to each asset. Inconsistencies are rare, causing less than 1 percent of the sample to be discarded.

Not surprisingly, the most popular assets are transaction accounts (checking, savings and postal accounts), short-term government bonds (BOT and CCT), and bonds issued by the national postal service. About 5 percent of the sample is not aware of checking accounts and 25 percent never had one. Part of the reason is that some people, especially the elderly and the poor, use post-office accounts, a close substitute.

The most interesting statistics refer to riskier assets. Over one third of the sample is not aware of stocks, 50 percent is not aware of mutual funds and corporate bonds, and almost 70 of investment accounts. Combining, less than 30 percent is simultaneously aware of stocks, mutual funds and investment accounts. Except for stocks, awareness increases by 6 or 7

[4] The sentence in parenthesis - "or another member of your household" - suggests that the respondent should report being aware of the asset also if another household member is aware. This raises an issue of interpretation. If person A knows that person B knows about an asset, then person A must know about the asset as well, and there is no reason to make a reference to person B. We suspect that the reason for such wording of the question is an attempt to reconcile awareness, which is an individual characteristic, with wealth and asset ownership, which refer to the household, not the individual. Ideally, one would like to have information on all household members. In practice only the head, defined as the person in charge of the financial decisions of the household, responds to the question and it is unclear whether and how he or she refers to other members. Since we cannot rule out that the wording of the question affects the results, in the empirical specification for financial awareness we add dummies for family size and other adults present in the household, and restrict the sample to singles or couples. The results are qualitatively unaffected.

points between 1995 and 1998 for mutual funds, investment accounts and corporate bonds.[5]

Since the wealth distribution is skewed, even if a large fraction of people is not aware of some assets, their weight in the wealth distribution might be small. This would be the case if, as implied by the model outlined in Section 3, intermediaries and firms target wealthy investors. The third and fourth columns of Table 1 report the share of wealth owned by people that are aware of each asset in 1995 and 1998, respectively. As expected, we find that the fraction of unaware people is always larger than the share of wealth owned by the same people: for instance, 35 percent of the sample is not aware of stocks, and the share of wealth of this group is only 12 percent of total wealth. Yet, for investment accounts, mutual funds, and corporate bonds the share of wealth owned by those who are not aware is substantial, ranging from 20 to 40 percent.

The other columns in Table 1 document the Italian non-participation puzzle and lack of diversification. In 1995 only 5 percent were direct stockholders, and 7.8 percent in 1998.[6] In 1998 total market participation through stocks, mutual funds and investment accounts was just 15 percent. The standard explanation of this puzzle cites entry costs. As we shall see in Section 5, asset awareness is a complementary explanation.

The data can be used to construct summary indicators of financial awareness. One indicator is simply the number of assets that each individual knows about divided by the number of potential assets known (14 in all). A second measure is an index that weights less popular assets (such as checking accounts) than assets that are less widely known (such as corporate bonds and mutual funds). In practice, we weight the index by the inverse of the proportion of people aware of the asset, and scale it by the sum of the weights.[7]

The two indicators are very strongly correlated and provide useful summary statistics of

---

[5] Awareness of risky assets (stocks, mutual funds, investment accounts, corporate bonds) either increased between 1995 and 1998 (mutual funds, investment accounts, corporate bonds) or did not change significantly (stocks). But for six financial assets there is a small, but statistically significant decline in awareness. This decline is puzzling, given that the wording of the questions in 1995 and 1998 is identical, and so is the coding of missing values and the definitions of the asset categories. One possibility is that the change in the interviewing agency that occurred between 1995 and 1998 introduced unobserved differences in responses. To address at least in part these concerns, in the regression analysis we always introduce a time dummy. We also run separate regressions for 1995 and 1998, obtaining similar results.

[6] This is an overestimate of indirect stockholding because some households have mutual funds that invest predominantly or exclusively in bonds or in the money market. Since the survey does not distinguish between different categories of mutual funds and investment accounts, we assume that if a household has a mutual fund or an investment account he invests at least part of his wealth in stocks.

[7] For instance, checking accounts have a weight of 1.05, and stocks 1.64.

financial awareness. They can also be conveniently related to household characteristics in the descriptive and regression analysis of Section 4. Table 2 shows that, on average, in 1998 respondents were aware of 63.9 percent of the assets (57 percent using the weighted index). The cross-sectional distribution of the index reveals considerable heterogeneity. Households in the first quartile of the distribution are aware of less than 40 percent of the assets (less than 5 out of 14). Those above the fourth quartile are aware of all assets except one at most; 15 percent of the sample reports being aware of all asset categories. There is a slight increase in the overall index of awareness between 1995 and 1998 at each quartile of the distribution.

3. Theoretical framework

Our goal in this section is to present a simple analytical framework to single out the key determinants of awareness and to obtain predictions that can be tested empirically. We analyze the problem of a distributor (a bank or a broker) of an asset that we denote "stocks", but could well be a mutual fund or another financial instrument. Distributors would like to broaden financial market participation because each sale of a unit of stocks entails a commission *b*. Merton (1987) points out that firms also have an incentive to broaden the investors' base, because this lowers their cost of raising external capital.[8]

3.1. Awareness

There are N potential investors, where $N = \{1, \overline{N}\}$. The expected benefit of the distributor is the product between *b* and the expected amount invested in stocks:

$$bp(I)p(A \mid I)\overline{a}N ,$$

where $p(I)$ denotes the probability that an investor is aware of stocks, $p(A|I)$ the probability

[8] Merton shows that by expanding its stockholder basis the firm can lower its cost of capital and increase its value. Using simple calculations, he argues that a small business with a limited stockholder base could pay a cost of capital up to 300 basis points higher than if its stocks were widely held. This provides enough incentives for firms to distribute information to widen the number of investors that are aware of the stock.

that the investors buys stocks, conditional on knowing them, and $\overline{a}$ the average amount invested by those buying stocks. We assume that entry costs affect the participation decision, so that not all investors buy stocks and $p(A|I)<1$.[9] As we shall see, one implication of this assumption is that entry costs affect distributors' incentive to inform potential investors.[10]

Distributors can broaden the investor's base by informing them about stocks, by such means as mailings, advertising or direct contacts with potential investors. Let S denote the number of information signals, contacts or ads, where $S \in \{0,\infty\}$. The probability that an individual receives the signal and becomes aware increases with the number of signals. However, some investors may never receive a signal even if the number of signals is very large (for instance, they don't read newspapers and have no contacts with distributors). The following function of the probability of receiving a signal captures which possibility:

$$p(I) = \frac{S/N}{\beta + S/N}. \tag{1}$$

Equation (1) posits that the probability of receiving a signal increases with the number of signals per potential investor, S/N. The parameter $\beta \in \{0,\infty\}$ measures the inefficiency of the information technology. A lower value of β means that a given number of signals leads to a larger $P(I)$. As the number of signals approaches infinity, $P(I)$ converges to 1, and with lower β convergence is faster. But for finite number of signals, $P(I) < 1$.

Producing a signal costs c euros. The distributor chooses the number of signals in order to maximize profits, the difference between total expected commissions and costs of signals:[11]

---

[9] In the standard portfolio model with no entry costs, $p(A|I)=1$, and only those who are not aware of stocks do not buy them.

[10] If distributors are able to sort potential investors in groups with similar characteristics, the analysis can be thought of as applying to one of these groups. For simplicity we do not keep track of the group index, but note that if potential investors are sorted in groups, $p(A \mid I)\overline{a}$ depends on group characteristics.

[11] If potential investors are sorted in K groups, distributors choose the number of signals for each group maximizing total profits:

$$\max_{\{S_k\}} \sum_k \pi(S_k) = b p_k(A \mid I)\overline{a}_k N_k \left[\frac{S_k/N_k}{\beta + S_k/N_k}\right] - cS_k,$$

where k=1,…K denotes a particular group of potential investors. From the first order conditions one obtains an expression similar to equation (3) in the text for each group. It is easy to show that wealthier individuals are more likely to be targeted and to receive signals because they are more likely to invest in stocks and, conditional on investing, the amount invested $\overline{a}_k$ is larger.

$$\max_{\{S\}} \pi(S) = bp(A \mid I)\bar{a}N\left[\frac{S/N}{\beta + S/N}\right] - cS \,. \qquad (2)$$
$$s.t. \quad S \geq 0$$

From the first order condition of the problem, one obtains:

$$\frac{S}{N} = \sqrt{\frac{\beta b P(A \mid I)\bar{a}}{c}} - \beta \,. \qquad (3)$$

The optimal number of signals falls with the cost of a signal and increases with the probability of buying, conditional on receiving the signal and being aware, and with the average amount invested by buyers. If the latter is too small, distributors may not send any signal, because too few investors would buy even if they received the signal. This occurs if $P(A \mid I)\bar{a} \leq \frac{\beta c}{b}$.

Entry costs and awareness interact. Lower entry costs affect participation directly, encouraging aware investors to buy stocks. But they can also increase participation indirectly, because distributors find it more profitable to send signals when they have a strong impact on the stockholder base. If instead entry costs are so high as to discourage most investors from buying, distributors are less willing to spend on advertising.

Substituting equation (3) into (1), we obtain an expression for the probability of receiving a signal and being aware:

$$p(I) = \begin{cases} 1 - \sqrt{\dfrac{\beta c}{bP(A \mid I)\bar{a}}} & if \quad P(A \mid I)\bar{a} \geq \beta c / b \\ 0 & if \quad P(A \mid I)\bar{a} < \beta c / b \end{cases} \,. \qquad (4)$$

The probability of being aware is an increasing function of the probability of buying stocks (if aware) and a decreasing function of the cost of the signal. These empirical predictions will be confronted with the data in Section 4.

3.2. Social learning

Besides learning from signals, individuals often learn about investment opportunities

from peers who are already informed. Social learning changes distributors' incentives, and hence, the optimal signaling policy. How this occurs depends on the specific process of social learning and on how people interact. The simplest case is one in which each potential investor interacts sequentially with another investor.

Suppose that individual i has a probability $0<\delta<1$ of meeting i+1. The probability δ increases with the strength of social networks. If i+1 is aware, then i also becomes aware. Thus, i can become aware if he receives a signal – with the probability given in equation (1) that we denote s here – or because he does not receive a signal, which occurs with probability $1-s$, but meets i+1, provided i+1 is aware. In turn, i+1 is aware with probability s given again by (1) or because he does not receive a signal but meets and learns from i+2 with probability δ, provided again i+2 is aware. The probability that i is aware is:

$$p_i(I) = s + (1-s)\delta p_{i+1}(I) = \frac{S/N}{\beta + S/N} + \left(\frac{\beta}{\beta + S/N}\right)\delta p_{i+1}(I)\,. \tag{5}$$

Repeated substitution gives:

$$p_i(I) = \frac{s}{1-\delta(1-s)} = \frac{S/N}{\beta(1-\delta) + S/N}\,. \tag{6}$$

which is bounded between zero and 1. Note that, *for given s*, the probability of being aware is larger with social learning than without social learning. In fact $1/\left[1-\delta(1-s)\right] = \mu > 1$ is the social learning multiplier. Social learning amplifies the effectiveness of a given signal, which thus has a better chance of reaching a potential investor. Second, the social multiplier increases with the extent of social interactions as parameterized by δ. Third, an increase in the intensity of social interactions has a stronger impact on the social multiplier the lower is the value of s, the frequency of signals. Using equation (6) to solve problem (2) gives the optimal number of signals with social learning:

$$\frac{S}{N} = \sqrt{\frac{(1-\delta)\beta b P(A \mid I)\overline{a}}{c}} - \beta(1-\delta)\,. \tag{7}$$

It is now less likely that distributors choose to send no signals. This happens only if

$P(A \mid I)\overline{a} \le \dfrac{\beta c(1-\delta)}{b}$ which is smaller than $\dfrac{\beta c}{b}$, the threshold for no signals if there is no social learning.

In our setting, social learning is equivalent to a more efficient information technology that raises the incentives to send signals (a lower β). However, assuming a positive number of signals is optimally sent, equation (7) implies that an increase in the intensity of social learning has an ambiguous effect on the number of signals. One can check that a higher value of δ lowers the number of signals if $P(A \mid I)\overline{a} > 4\dfrac{\beta c(1-\delta)}{b}$. Thus, for some parameters' values, distributors choose to rely on social interactions, saving the cost of signals.

Substituting equation (7) into equation (6) the probability of being aware with social learning is:

$$p(I) = \begin{cases} 1 - \sqrt{\dfrac{\beta c(1-\delta)}{bP(A \mid I)\overline{a}}} & \text{if} \quad P(A \mid I)\overline{a} \le \beta c(1-\delta)/b \\ 0 & \text{if} \quad P(A \mid I)\overline{a} > \beta c(1-\delta)/b \end{cases} . \tag{8}$$

The probability of being aware increases with the intensity of social learning, a proposition that can be tested empirically.[12]

4. The determinants of financial awareness

The model outlined in Section 3 has three relevant testable implications. First, distributors target individuals (or groups) with higher probability of investing in stocks.

[12] Needless to say, the effect of social learning depends on the structure of the network. The structure assumed in our example is one where learning is directional (individual *j* learns from individual *j*+1 but not vice versa) and sequential (*j* can learn from individual *j*+1 but not from *j*+*k*, with *k*>1). This structure is clearly arbitrary as any other one, and a priori it is not obvious what a "realistic" network structure looks like. For instance, if the structure is sequential but not directional, so that learning can occur in both directions, one can check that the probability of being aware depends on the signal according to the relation: $p(I) = \dfrac{2(1-s)\delta - 1 + \sqrt{1 - 4\delta(1-\delta)(1-s)}}{2(1-s)\delta^2}$. For given values of *s* and δ, this probability is larger than if learning is directional, as in equation (6). However, the qualitative results are the same: the effect of the intensity of interactions on the number of signals is ambiguous, but the probability of being aware is larger with social interactions than without.

Second, people are more likely to be aware in areas where the cost of contacting investors is lower. Third, awareness should be higher in areas where the chance of learning from others is higher.

In the model we have implicitly assumed that distributors send signals evenly to all potential investors, and have related the incentive to send signals to the average probability of buying stocks among the aware, multiplied by the average amount invested, or $p(A|I)\,\overline{a}$. This is a reasonable assumption if information is communicated through, say, television or other general media, so that in principle all potential investors are contacted. However, advertisements is costly, and it is unwise to send signals to people who are unlikely to buy stocks even if informed about them.

A more realistic case is one in which issuers or distributors observe some characteristics of potential investors that are correlated with the probability of buying stocks and the amount invested. Then, issuers are able to group potential investors according to these characteristics and target likely buyers. The implication is that the probability of receiving a signal also depends on a set of observable characteristics associated with stockholding.

In the empirical analysis we focus on household resources (income, financial wealth, real wealth), age, and education as proxies for the probability of adoption and the average amount invested, $p(A|I)\,\overline{a}$. Because with fixed costs of adoption the affluent are more likely to buy stocks and invest larger amounts, they will receive more signals and are therefore more likely to be aware. A similar argument applies to individuals with higher education. On the other hand, groups with very low probability of buying stocks are not targeted and remain unaware, unless there are information spillovers from other individuals.

As a proxy for the cost of sending signals we rely on geographical differences in newspapers readership. We focus on sales of national newspapers (defined as newspapers sold in at least half of the Italian provinces) as they host the greatest portion of financial product advertisement. Most importantly for our purposes, the cost of advertising financial products in national newspapers is borne out at the national level and reflects overall (not local) readership.[13]

[13] Although national newspapers have local editions, i.e. some pages are dedicated to local news, financial advertisement is concentrated in the "national part" of the newspaper. The largest business paper, Sole 24 Ore, has only a national edition.

Therefore, the effective cost of contacting investors and spreading information is lower in areas where newspapers sales are highest. For example, suppose that the cost of sending a signal using a national newspaper is x, that there are two regions, and that readership is twice as large in the first region. Then the effective cost of contacting an unaware investor will be twice as large in the second region. Thus, one driving variable of awareness should be newspaper readership, as measured by the number of copies sold in the local market scaled by local population. This ratio, computed by pooling the 14 newspapers that sell in at least half of the provinces, varies considerably across provinces, ranging from less than 1 newspaper per 100 inhabitants in the Sicilian provinces of Agrigento, Caltanissetta and Enna to over 15 newspapers in the Northern provinces of Genoa, Piacenza and Ravenna.[14] The cost of contacting investors through the general press is accordingly lower in, say, Genoa than Agrigento.

As a proxy for social interactions – our third determinant of awareness – we use the number of voluntary organizations per 1,000 inhabitants in each province, excluding sport clubs.[15] The indicator varies considerably across provinces, from a minimum of 0.07 in the Southern province of Foggia to a maximum of 0.18 in Genoa. Social interactions are more intense in the North, suggesting that our regressions must control for North-South differences to avoid simply picking up a North-South divide.[16]

4.1. Descriptive evidence

We start with a graphical analysis of the correlation between financial awareness and education, age, wealth, newspaper readership and social learning. In each case, we graph

---

[14] These are: Avvenire, Corriere della Sera, Giornale, Il Giorno, Italia Oggi, Manifesto, Il Mattino, Il Messaggero, Repubblica, Il Resto del Carlino, Il Secolo XIX, Il Sole 24 Ore, La Stampa, Il Tempo. We exclude sport newspapers as they are not used as a vehicle for financial information. Restricting the list to the 5 largest national newspapers (Corriere della Sera, Repubblica, La Stampa, and the two business papers Sole 24 Ore and Italia Oggi) does not change the econometric results.

[15] Source: First Census of private non profit institutions for the year 2000 (ISTAT - Italian National Institute of Statistics, 2002).

[16] Although it is not obvious a priori how to measure the intensity of social interactions in a community, alternative available measures tend to be highly correlated. In fact, as shown by Putnam (1993) with reference to Italian regions, communities that are more social in one dimension (e.g. participation in voluntary organizations concerned with health, such as blood donation) tend also to be more social in other dimensions (e.g. participation in political movements, recreational and charity groups, engagement in the civic community, etc.).

awareness of stocks, mutual funds, investment accounts, corporate bonds and the overall index of financial information separately. We choose to focus on the weighted index for all financial assets and for the four risky assets combined. Results for the unweighted index are similar. In each graph we merge 1995 and 1998 data. In the regression analysis, however, we introduce a time dummy to distinguish between the two surveys.

The relation between education and information (Figure 1) is positive and quite strong. The proportion of individuals aware of stocks increases from 25 percent for those with no more than elementary education to 80 percent for those with a university degree. Over the same range of education, the proportion aware of mutual funds raises from 5 to 60 percent, and the overall index of financial awareness from 20 to 75 percent.

In Figure 2 awareness clearly increases with year-of-birth, particularly for cohorts born between 1910 and 1945. Subsequent cohorts (born 1946-70) display only a moderate increase in awareness, for each of the assets considered. With only two years of data, we cannot identify separately cohort and age effects. One possible interpretation of the data is that distributors target younger generations, which are therefore more likely to be aware.

The relation between wealth and awareness is plotted in Figure 3. At low levels of wealth (less than 2,500 euros), the relation is strongly positive. At higher levels, the correlation is still positive but attenuated. This suggests considering non-linear terms in wealth in the regression analysis below. In Figure 4 awareness is positively associated with newspaper readership, particularly at low levels of readership. Figure 5 displays a positive relation between awareness and the index of social learning. Overall, the descriptive evidence is broadly consistent with some of the model's predictions relating the probability of being aware to the economic incentives of distributors and social interaction.

4.2. Econometric analysis

Education and financial resources tend to be positively correlated, while wealth and income vary in predictable ways with age. Education and wealth are also likely to be correlated with social learning, because the wealthy and better educated are more likely to interact and learn from others. To account for these correlations and to isolate the contribution of each factor while holding others constant, we run probit regressions for the probability of being aware of stocks, mutual funds, investment accounts and corporate bonds, and Tobit regressions for the index of financial information.

Table 3 reports summary statistics – mean, standard deviation, minimum and maximum value – for all the variables used in the estimation. Data are pooled over 1995 and 1998. Household head is defined as the person primarily responsible for economic decisions. They are males in about 70 percent of the cases; on average, financial wealth is 18,000 euros, and real wealth about 120,000 euros; over 20 percent of the sample have a high school diploma, 7 percent a university degree and 1 percent an economic degree. Comparison between the two surveys indicates that the sample is quite stable in demographic structure, education, and regional location.

Besides controlling simultaneously for economic resources (financial wealth, real wealth, household disposable income), education, year-of-birth, social learning and density of financial intermediaries, we include in each regression a dummy variable for whether the household head is married or male and a time dummy to control for differences between survey years. We also include the Herfindhal index in each province and year, as a proxy for the competitive structure of local financial markets. The literature suggests that market competitiveness affects producers' incentives to advertise (Tirole, 1989). If the gains from spreading information can be appropriated by competitors – as in industries with relatively high product substitution and low market power – distributors have fewer incentive to disseminate basic information. However, the coefficient of this variable never turns out to be statistically different from zero.

As another determinant of awareness, we define a dummy variable taking the value of one if the respondent has a long-term relation (more than 10 years, or more than 5 years) with a bank. Other things equal, banks are more likely to target individuals on which they have

more information (for instance, because they have more precise assessment of financial wealth and portfolio choice). These individuals are therefore more likely to have received signals in the past and, therefore, be more informed.

To make sure that our geographical indicators do not pick up differences between the North and the South that just happen to be correlated with measures of social interactions and the cost of distributing information, we add to the regression a dummy variable for the North. Since social interactions and newspaper readership might pick up geographical differences in economic development, we also expanded the set of regressors to include provincial per capita GDP and the provincial unemployment rate. Since these variables were never statistically different from zero, they are dropped in the reported specification.

The observations might be correlated across provinces, thereby increasing the probability of rejecting the null hypothesis. We therefore adjust the standard errors using a robust variance-covariance matrix assuming that observations are independent across provinces, but not necessarily within provinces.

The probit results in Table 4 confirm the descriptive evidence in Section 4.1. The coefficients of the cohort dummies are positive for each of the assets considered, indicating that older people are less likely to be aware than the young. Education is strongly associated with awareness. Having a university degree is associated with an increase of 17 percentage points in the probability of being aware of stocks, and of 25 points for mutual funds, investment accounts and corporate bonds. Having an economic degree further increases the probability of awareness of mutual funds, investment accounts and corporate bonds by 13 to 21 points. In case of stocks the coefficient of the dummy for an economic degree is positive but imprecisely estimated.

The coefficients of financial wealth, real wealth and income indicate that awareness is positively correlated with household resources. Increasing simultaneously the three variables from the 25^{th} to the 75^{th} percentile of their distributions, raises the probability of being aware of stocks by 13 percentage points, and of mutual funds, investment accounts and corporate bonds by 18, 11 and 19 points, respectively. Experimenting with quadratic terms of these variables does not change these conclusions. Our interpretation is that these correlations reflect the incentives of intermediaries to target financial information primarily towards individuals with a higher probability of buying the financial asset they advertise and,

conditional on buying, invest larger amounts.[17]

The dummy for long-term bank relation (more than 10 years) has a strong impact on awareness, between 5 and 8 percentage points, depending on the asset considered. Since we are holding constant age, education and economic resources, the most plausible interpretation of this effect is that it is "supply-driven": banks have a greater incentive to inform individuals on which they have superior information. Results are unchanged if long-term relations are defined over 5-years.

Newspaper readership has a positive impact on awareness, and its coefficient is always highly significant. Increasing readership from the lowest (the Sicilian province of Agrigento) to the highest value (the Northern province of Ravenna) raises the probability of stock awareness by 5.4 percentage points and that of being aware of mutual funds, investment accounts and corporate bonds by 25, 23, and 21 points, respectively.[18] The coefficient of the proxy for social learning is positive in all regressions, and statistically different from zero at conventional levels for stocks, investment accounts and corporate bonds. Raising the index of social learning from the lowest to the highest value (Foggia and Genoa, respectively) increases the probability of being aware of stocks by 12 percentage points; for mutual funds, investment accounts and corporate bonds the respective figures are 14, 12 and 8 percentage points.[19] To make sure that the results are not driven by the particular measure chosen we check their robustness with an alternative measure: the number of non-profit organizations, scaled by population in the province (Mortara, 1985).[20] The coefficient of this proxy of social interactions is also positive and statistically different from zero.[21]

---

[17] Another possibility is that education and wealth proxy for characteristics that are related to individual exposure to financial information. For instance, the better educated and the affluent may have access to circles where financial information is more easily available, and therefore have more frequent contacts with financial intermediaries. Given the reduced form of our regressions, we cannot distinguish this particular channel from the explicit targeting of some population groups by financial intermediaries.

[18] Similar results are obtained if we use the provincial readership of the top five national newspapers or of the two leading national economic newspapers (*Il Sole 24 Ore* and *Italia Oggi*).

[19] Section 2 shows that more intense social interaction has an ambiguous effect on the optimal number of signals. Since we don't observe the signals, we cannot estimate the relation between intensity of information production and strength of social interaction.

[20] A non-profit institution is any organization whose status does not allow its members, founders or those in control, to obtain any income or other yield through it.

[21] As pointed out by the editor, since one way investors become aware of stocks is through social learning, one may wonder why after a century of stock markets we still find that 35 percent of investors is not aware of stocks. The following is a possible reason. Social learning is likely to take place within limited groups that are somewhat segregated. Traditionally, stockholders were much fewer than today and concentrated in the wealthier segment of the population. Even in the US, where the stock market has been around for more than a century, the

Table 5 presents a Tobit regression for the weighted index of financial awareness using the same specification as in Table 4. A two-limit Tobit estimator is warranted because the index ranges from 0 for 248 individuals reporting being aware of no asset at all, to 1 for 2,585 individuals aware of all 14 assets. Also in this case standard errors are adjusted for provincial cluster effects. We report results for the index based on all financial assets and for that referring to risky assets only. In both cases the results confirm the evidence on individual assets. Awareness is strongly correlated with education, year-of-birth, wealth, long-term banks relations, newspaper readership and the index of social learning.

Raising economic resources (financial wealth, real wealth, and disposable income) from the 25th to the 75th percentile, is associated with an increase in the overall index of financial awareness by 9 percentage points (15 percent if we consider the index relative to risky assets only). Long-term relations increase the index by 6.5 percentage points. Increasing the density of newspaper readership and the index of social learning from the lowest to the highest value increases the overall index by 8 and 11 percentage points, respectively.

5. Implications

In this section we use our results to study how far awareness can go empirically to explain limited financial market participation and participation costs. To clarify the role of awareness for these issues, let's consider a situation in which investors can choose between a safe and a risky asset (bonds and stocks). Stocks yield an equity premium equal to $\tilde{r}$, distributed according to the p.d.f. $g(\tilde{r})$, with expected value $E\tilde{r} = r > 0$ and variance σ^2. We normalize the return on bonds to zero and assume that in some states of the world $\tilde{r}$ <0 so that stocks do not dominate bonds.

Each investor i is endowed with wealth w_i and invests a fraction of wealth α_i in stocks. The investor must pay a fixed entry cost f_i (say, a brokerage fee) to enter the stock market. If he chooses to purchase stocks, he pays f_i and invests $\alpha_i w_i$ in stocks; otherwise he keeps all of his wealth in bonds.

---

stockholders base started to broaden only in the past two decades. Thus, the propagation of information through social learning may be slow and limited to certain groups.

There are two types of investors, aware and unaware. Aware investors know the existence and characteristics of both assets and have the same information on the probability distribution of the stock return $g(\tilde{r})$. The others are not aware of stocks. Hence, they can only invest in bonds, regardless of entry costs. The shadow cost of ignorance is *r*, the expected excess return.[22]

Let $I(x_i)$ be an indicator function equal to 1 if the investor is aware and zero if unaware. As was shown in Section 4, the indicator depends on a vector of characteristics x_i which include the costs of disseminating financial information in the local market, the strength of social interactions, and personal characteristics, such as education, cohort, and wealth. If $I(x_i) = 0$ all wealth is invested in bonds and $\alpha_i = 0$. If $I(x_i) = 1$, the problem of the aware investor is:

$$\max_{\alpha} Eu\left[(\alpha_i \tilde{r} + 1)(w_i - f_i)\right]$$

and the optimal share invested in stocks, α_i^*, satisfies the first order condition:

$$Eu'\left[(\alpha_i^* \tilde{r} + 1)\tilde{r}(w_i - f_i)\right] \equiv 0 .$$

The investor chooses to invest in stocks if:

$$Eu\left[(\alpha_i^* \tilde{r} + 1)(w_i - f_i)\right] > u(w_i) . \qquad (9)$$

If the expected benefit from stockholding exceeds the fixed cost, the investor chooses to purchase stocks, pays the fixed cost f_i and invests α_i^* (w_i -f_i) in stocks. Given our assumptions, α_i^* is strictly positive. Condition (9) indicates that, for given w_i and f_i, participation is more likely if the excess return is high. Since one additional euro of wealth increases the right-hand side more than the left-hand-side, there exists a sufficiently high level of wealth that triggers stock market participation. As entry costs approach zero, all aware investors purchase stocks.

Condition (9) delivers three insights. First, if all investors are aware of stocks, everyone above the wealth threshold invests in stocks. Second, if there are no entry costs, those who

[22] One could consider a third type of investors, aware of stocks but not well informed about $g(\tilde{r})$. For instance, the investor might perceive a p.d.f. $g_u(\tilde{r})$ with the same mean but larger variance than $g(\tilde{r})$. Other things equal, these investors are less likely than fully informed investors to enter the stock market.

don't invest in stocks are simply those who are not aware that stocks exist. Third, with both unaware investors and entry costs, an individual who does not invest in stocks may be uninformed or may have low wealth.

Let now $\hat{r}_i$ be the certainty equivalent equity premium defined implicitly by:[23]

$$Eu\left[(\alpha_i^*\tilde{r}+1)(w_i-f_i)\right]=u\left[(\alpha_i^*\hat{r}_i+1)(w_i-f_i)\right].$$

Then, the stock market participation condition can be written as:

$$w_i > \frac{f_i(\alpha_i^*\hat{r}+1)}{\alpha_i^*\hat{r}_i}=\overline{w}_i. \tag{10}$$

All aware investors with wealth above $\overline{w}_i$ purchase stocks; all unaware investors and all those with $w_i < \overline{w}_i$ do not. Equation (10) states that the wealth threshold increases with the fixed cost, risk aversion (because the optimal share α_i^* and the certainty equivalent premium $\hat{r}$ fall with risk aversion) and the variance of returns to stocks. Other things being equal, people who are willing to invest a large share of their wealth in stocks are more likely to enter the stock market because they have more to lose from not taking advantage of the equity premium.

Using (10), one can compute the proportion of stockholders in the population as the product of the proportion of stockholders among aware investors and the probability of being aware:

$$h = prob(w_i \geq \overline{w}_i \mid I=1)\,prob(I=1). \tag{11}$$

If $prob(I=1)<1$, equation (11) implies that lack of awareness can account for at least part of the stockholding puzzle. Clearly, even if all consumers are informed, stock market participation would still be limited by entry costs.

5.1. The stockholding puzzle

[23] The certainty equivalent premium is approximately equal to $\hat{r}=r\left(1-\frac{1}{2}a\frac{\alpha^*\sigma^2}{1+\alpha^* r}\right)$, where a is the investor's

A simple way to assess the importance of awareness in explaining the stockholding puzzle is to compare the proportion of investors with stocks in the total sample and in the restricted sample of aware investors. Table 6 indicates that if all investors were aware of stocks - and the adoption probability was the same for aware and unaware - the proportion of stockholders would increase by over 50 percent (that is, from 5.6 to 8.7 percent).

Table 6 also shows that awareness may have an even more important role in explaining lack of participation in mutual funds, investment accounts and corporate bonds. In each case the proportion investing in these assets would more then double if all investors were aware of these assets. The last row of Table 6 indicates that if all investors were aware of all risky assets, total stockholding (stocks, mutual funds and investment accounts) would increase from 12.6 to 27.6 percent.

These simple estimates are subject to criticism, however, because the characteristics of aware investors are different from those of the unaware. Since the former tend to be richer and more educated, and since education, income and wealth are positively associated with stockholding, the simple calculation tends to overestimate the effect of awareness on participation. Therefore we refine our calculation, estimating the probability that aware investors are stockholders (or invest in any of the four assets considered) and then imputing the probability in the sample of unaware individuals.

The imputed figures are obtained from a probit regression with Heckman sample selection in which the decision to invest in a particular asset is a function of age, education dummies, dummies for quartiles of financial wealth, real wealth and income, a dummy for residence in the north and a year dummy. Since each probit is performed on a sample of people who know the asset, and since the error term of the participation decision is potentially correlated with unobserved determinants of asset awareness, each probit is corrected for sample selection using the same specification for the probability of being aware as in Table 4. The coefficients of the equation for the participation decision, not reported for brevity, show that direct and indirect stock market participation increases with household resources and education, is higher in the North, and increases over time.[24]

As expected, considering the differing characteristics of aware and unaware investors,

---

degree of relative risk aversion evaluated at final wealth.

[24] The participation equations confirm the standard results in the literature that wealth, income and education are important determinants of stockholding (Guiso, Haliassos and Jappelli, 2003).

attenuates the effect of awareness on participation. Still, participation in the stock market would increase from 5.6 to 7.5 percent, in mutual funds from 7.6 to 12.0, and in investment accounts from 1.8 to 3.1 percent. Overall, direct and indirect participation would almost double (from 12.6 to 23 percent).

Clearly, we still find that the proportion of aware investors is much larger than the proportion of households investing in the asset. For instance, while about 50 percent of respondents are aware of mutual funds (Table 1), less than 15 percent of this group actually invests in mutual funds (Table 6). Thus, while lack of awareness helps explaining limited financial markets participation, other factors – such as entry costs, indivisibilities, and lack of financial sophistication beyond asset awareness – are also important.

5.2. Participation costs

To address the relation between awareness and empirical estimates of participation costs, consider again equation (10) and assume that the asset share invested in stocks and the certainty equivalent equity premium are the same for all investors. The condition for participating can then be expressed as:

$$f_i < \frac{\hat{r}\alpha w}{(1+\alpha\hat{r})}$$

As in Mulligan and Sala-i-Martin (2000) and Vissing-Jorgensen (2004), we use the joint distribution of wealth and stock ownership to infer information on the distribution of entry costs. As an example, suppose that $\hat{r}$ = 0.03, α = 0.3, and 10% of the households with w = €25,000 invest in the stock market. Then, using the above formula, 10% of this group must have participation costs below $\frac{0.03\times0.3\times25{,}000}{1+(0.03\times0.3)}$ = 223 euro. If the entry cost f is not correlated with w, this also implies that 10% of these households has participation costs lower than €296.[25]

To estimate the empirical distribution of entry costs, we split the sample into wealth

[25] Vissing-Jorgensen (2004) considers three types of transaction costs: a pure entry cost, a per-period participation cost and a trading cost. Using data from the Panel Study of Income Dynamics, she finds median per period participation costs of $800 in 1984, $500 in 1989, and $350 in 1994. Luttmer (1999) focuses on the lower bound of fixed costs that make consumption data consistent with data on asset returns, suggesting transaction costs of at least 3 percent of monthly consumption for an investor with log utility function. Paiella (2004) follows a similar approach, and using the same dataset as Vissing-Jorgensen estimates that annual

percentiles and repeat the procedure for each different percentile. The lower line in Figure 6 plots the fraction of total stockholders (defined as direct stockholders plus indirect stockholders through mutual funds and investment accounts) against participation costs for the total sample, i.e. without distinguishing between aware and unaware investors. Assuming, as in the example, $\hat{r}$=0.03 and α=0.3, median participation costs so estimated are €850.

The point here is that some people do not invest in stocks because they are not aware of stocks, not because entry costs are too high. So entry costs should be estimated on the sample of aware investors, the only group that has the option of paying or not the fixed cost. In the previous example, suppose that only 50 percent of households with w = €25,000 are aware of stocks. Then one should conclude that only 5 percent – not 10 – have participation costs lower than €223. Clearly, the overestimation of participation costs increases with the fraction of unaware individuals.

The upper line in Figure 6 reports an estimate of the distribution of participation costs in the restricted sample of aware investors. These are defined as those who are aware of stocks, mutual funds and managed investment accounts. The downward revision in participation costs is substantial. In fact, median costs in the restricted sample is about €380, less than half the value in the total sample.[26] The corresponding wealth threshold is €31,700.

It is worth noting that the calculation of participation costs could be refined by allowing for heterogeneity in the asset share invested in stocks, estimating a selection model for the asset share. Vissing-Jorgensen (2004) reports that this refinement does not appreciably change the estimated distribution of participation costs, given that models of the share invested in stocks typically have low explanatory power, something we also observe in our data. One should also bear in mind that aware investors are richer and more educated than unaware individuals, and the opportunity cost of their time is also likely to be higher. This implies that participation costs (should they be observed) for unaware investors (should they become aware, e.g., due to an exogenous change) would likely to be lower than for aware investors.

---

participation costs range from $95 to $175.

[26] This does not imply that considering awareness would reduce participation costs in the US by a comparable amount. It may well be that in the US the fraction of unaware individuals is much smaller, and so is the bias. Indeed, it is likely that US households are better informed than Italians. However, where the stock market is less developed and the mutual fund industry still lags behind, as in many European countries, awareness is likely to

6. Conclusions

Starting from the observation that in two large, representative surveys of Italian households a significant fraction of consumers are not aware of the existence of basic financial assets such as stocks and mutual funds, this paper makes two contributions to the literature on household portfolios. First, we propose an explanation for the mechanism whereby asset awareness may be acquired. Distributors of financial assets have an incentive to disseminate information that is stronger when aware individuals are more likely to buy the asset and when the cost of spreading information is lower. In addition, social learning represents a further channel through which potential investors can become aware of financial assets, though it may induce distributors to disseminate less information. In the empirical analysis, we show that awareness is positively affected by demographic variables – education, wealth, income and birth cohort – that increase the probability of stockholding, long-term bank relations, intensity of social interactions and national newspaper readership in the area where investors live.

Second, we show that lack of awareness can help explain limited participation in financial markets. Ignorance of investment opportunities is a specific impediment to stockholding that goes beyond the generic reference to fixed adoption costs as a cause of non-participation typically found in the literature. Our calculations show that if all investors were aware of risky assets, stock market participation could increase substantially (and even double) from its current level. Yet we also find that a large fraction of potential investors do not own stocks even if aware, suggesting that other barriers exist even when awareness is accounted for. Our results also imply that estimates of participation costs that do not take awareness into account may be seriously biased upwards.

---

be of first order importance.

References

Attanasio, Orazio P., James Banks, and Sarah Tanner (2002), "Asset holding and consumption volatility," *Journal of Political Economy* 102, 771-92.

Basak and Cuoco (1998), "An equilibrium model with restricted stock market participation," *Review of Financial Studies* 11, 309-341.

Bernheim, Douglas, and Daniel M. Garrett (2003), "The effects of financial education in the workplace: Evidence from a survey of households," *Journal of Public Economics* 87, 1487-1519.

Cocco, João F., Francisco J. Gomes, and Pascal J. Maenhout (2005), "Consumption and portfolio choice over the life-cycle," *Review of Financial Studies* 18, 490-533.

Dynan, Karen E., and Dean M. Maki (2001), "Does stock market wealth matter for consumption?," Discussion Series 2001-23. Washington: Board of Governors of the Federal Reserve System.

Guiso, Luigi, Michalis Haliassos, and Tullio Jappelli (2003), "Stockholding in Europe: where do we stand, and where do we go?" *Economic Policy* n. 36, April, 123-70.

Guvenen, Fatih (2005), "Reconciling conflicting evidence on the elasticity of intertemporal substitution: A macroeconomic perspective," *Journal of Monetary Economics* (forthcoming).

Hong, Harrison, Jeffrey D. Kubik, and Jeremy C. Stein (2004), "Social interaction and stock market participation," *Journal of Finance* 59, 137-63.

Luttmer, Erzo G. J. (1999), "What level of fixed costs can reconcile consumption and stock returns?," *Journal of Political Economy* 107, 969-98.

Merton, Robert C. (1987), "A simple model of capital market equilibrium with incomplete information," *Journal of Finance* 42, 483-510.

Mortara, Andrea (1985), *Le associazioni in Italia*. Milano: Franco Angeli.

Mulligan, Casey B., and Xavier Sala-i-Martin (2000), "Extensive margins and the demand for money at low interest rates," *Journal of Political Economy* 108, 961-91.

Paiella, Monica (2004), "Heterogeneity in financial market participation: appraising its implications for the C-CAPM," *Review of Finance* 8, 445-480.

Putnam, Robert D. (1993), *Making democracy work. Civic traditions in modern Italy*. Princeton: Princeton University Press.

Tirole, Jean (1989), *The Theory of Industrial Organization*. Cambridge: MIT Press.

Vissing-Jorgensen, Annette (2004), "Perspectives on behavioral finance: does irrationality disappear with wealth? Evidence from expectations and actions," in *NBER Macroeconomics Annual 2003*. Cambridge: MIT Press.

Table 1
Financial awareness: descriptive statistics

The table is based on questions asked in the 1995 and 1998 SHIW about awareness of financial assets, participation over the life cycle and current participation. BOT are Treasury Bills up to one-year maturity. CCT are floating-rates Treasury credit certificates, 2-4 years in maturity indexed to BOT. BTP are long-term, fixed interest rates government bonds. CTZ are zero-coupon Treasury credit certificates. Statistics are computed using population weights. All values are expressed in percentages.

Financial asset	*Proportion of individuals aware of the asset*		*Share of wealth owned by people aware of the asset*		*Has invested in the asset at least once*		*Currently investing in the asset*	
	1995	*1998*	*1995*	*1998*	*1995*	*1998*	*1995*	*1998*
Checking accounts	94.6	93.3	99.2	98.5	74.7	76.9	68.9	73.2
Saving accounts	92.1	88.6	96.7	93.4	49.2	47.2	26.7	28.0
Postal accounts	87.6	82.7	94.5	90.0	17.6	18.2	9.6	11.5
Certificates of deposit	57.9	61.8	83.2	82.2	10.5	11.5	5.3	3.7
Government bonds: BOT	89.6	86.3	97.9	95.7	38.2	30.1	22.4	8.7
Government bonds: CCT	77.5	73.7	93.7	91.1	13.9	14.2	7.8	4.4
Government bonds: BTP	52.9	54.5	81.9	81.1	6.9	6.9	4.4	2.5
Government bonds: CTZ	24.9	30.3	53.1	57.6	1.5	2.3	0.9	0.6
Postal bonds	82.9	76.8	92.7	86.2	15.5	13.4	7.4	5.9
Corporate bonds	49.4	55.8	80.0	82.2	4.7	8.9	2.6	5.1
Mutual funds	48.4	55.5	79.2	83.1	7.0	13.7	4.2	9.6
Investment accounts	31.5	37.1	60.4	67.4	1.5	3.4	1.0	2.7
Stocks	64.9	63.7	87.9	85.9	7.3	11.1	5.0	7.8
Saving in cooperative societies	34.9	35.1	54.5	52.2	1.8	1.9	1.4	1.3

Table 2
The index of financial awareness

The unweighted index of financial awareness is the sum of the financial assets known divided by the number of potential assets known. The weighted index uses as weights the inverse of the aggregate fraction of households aware of the asset. Statistics are computed using population weights. Values are expressed in percentages.

		1995	*1998*
Unweighted index	First quartile	42.8	42.9
	Median	64.3	71.4
	Third quartile	85.7	92.9
	Average	63.5	63.9
	Standard deviation	27.4	29.4
Weighted index	First quartile	27.7	30.9
	Median	51.3	57.7
	Third quartile	77.6	87.0
	Average	53.7	57.1
	Standard deviation	29.9	31.2

Table 3
Selected statistics for variables used in the estimation

Indicators of financial awareness, demographic variables, financial assets and real assets are drawn from the 1995-98 Survey of Household Income and Wealth (15,281 observations in total). Newspaper readership is measured by the number of copies sold in each province scaled by the population in the province. The ratio is computed considering the 14 newspapers that sell in at least half of the Italian provinces. The index of social learning is the number of voluntary organizations per 1000 residents in the province. The Herfindhal index is the provincial sum of squared market shares of loans of all banks in each province. Data refer to 1995. Source: The Italian Central Credit Register (managed by the Bank of Italy). Income, financial wealth, and real wealth are converted in 1998 prices using the CPI deflator, and expressed in thousand euro. Sample means and standard deviations are computed using population weights.

Variable	*Mean*	*Standard deviation*
Aware of stocks	0.64	0.48
Aware of mutual funds	0.51	0.50
Aware of investment accounts	0.34	0.47
Aware of corporate bonds	0.52	0.50
Index of financial information	0.55	0.30
Index of financial information – risky assets only	0.48	0.41
Born before 1930	0.27	0.44
Born in 1931-45	0.28	0.45
Born in 1946-60	0.30	0.46
Born after 1960	0.14	0.34
High school	0.21	0.40
College	0.07	0.25
College degree in economics	0.01	0.11
Married	0.70	0.45
Male	0.72	0.45
Financial wealth	18.5	54.9
Real wealth	119.8	244.0
Disposable income	22.46	18.59
Long-term bank relation	0.50	0.50
Newspapers sales, per capita (%)	5.92	4.10
Index of social learning	0.27	0.13
Herfindhal index	0.15	0.08
Resident in the North	0.47	0.50

Table 4
The determinants of awareness: Probit regressions

The regressions pool 1995 and 1998 data. We report marginal effects and robust *z* statistics in parentheses. Standard errors are adjusted for clustering at the provincial level. One star denotes significant at 5%; two stars significant at 1%.

	Stocks	*Mutual funds*	*Investment accounts*	*Corporate bonds*
Born in 1931-45	0.124	0.163	0.124	0.154
	(10.42)**	(11.76)**	(8.27)**	(10.47)**
Born in 1946-60	0.180	0.232	0.180	0.212
	(14.80)**	(15.91)**	(11.47)**	(13.19)**
Born after 1960	0.205	0.275	0.209	0.256
	(15.21)**	(13.36)**	(8.48)**	(12.09)**
High school	0.165	0.237	0.211	0.246
	(12.79)**	(16.97)**	(14.00)**	(19.83)**
College	0.169	0.253	0.272	0.251
	(8.79)**	(11.72)**	(11.35)**	(10.45)**
College (economics)	0.056	0.129	0.208	0.174
	(0.82)	(2.05)*	(3.83)**	(2.75)**
Married	0.005	0.001	0.009	-0.001
	(0.38)	(0.05)	(0.66)	(0.05)
Male	0.070	0.114	0.094	0.093
	(3.96)**	(6.41)**	(6.72)**	(6.36)**
Financial wealth (x1000)	0.518	0.989	0.529	0.735
	(1.69)	(2.50)*	(2.57)*	(2.10)*
Real wealth (x1000)	0.147	0.224	0.119	0.222
	(3.55)**	(4.19)**	(2.78)**	(4.08)**
Disposable income (x100)	0.557	0.752	0.451	0.751
	(6.48)**	(9.02)**	(7.73)**	(9.15)**
Long-term bank relation	0.063	0.084	0.048	0.077
	(5.24)**	(6.10)**	(4.26)**	(5.41)**
Newspapers sales	0.102	0.060	0.061	0.094
	(2.55)*	(1.65)	(1.86)	(2.54)*
Index of social learning	0.205	0.216	0.194	0.110
	(2.17)*	(2.28)*	(2.39)*	(1.35)
Herfindhal index	-0.026	-0.082	-0.160	-0.073
	(0.16)	(0.56)	(1.04)	(0.51)
North	0.157	0.196	0.122	0.175
	(6.07)**	(7.16)**	(4.40)**	(6.79)**
Dummy for 1998	-0.045	0.057	0.045	0.041
	(1.80)	(2.51)*	(2.10)*	(1.79)
Proportion aware	0.64	0.51	0.34	0.52
R square	0.16	0.20	0.15	0.19
Observations	15281	15281	15281	15281

Table 5
The determinants of awareness: Tobit regressions for the index of financial awareness

The index of financial awareness is the sum of the financial assets known divided by the number of potential assets known, weighted by the inverse of the aggregate fraction of people aware of the asset. The index based on risky assets is computed using only stocks, mutual funds, investment accounts, and corporate bonds. We report robust *z* statistics in parentheses. Standard errors are adjusted for clustering at the provincial level. One star denotes significant at 5%; two stars significant at 1%.

	All assets	*Only risky assets*
Born in 1931-45	0.107	0.202
	(13.29)**	(11.73)**
Born in 1946-60	0.155	0.280
	(17.36)**	(15.27)**
Born after 1960	0.179	0.333
	(13.04)**	(12.45)**
High school	0.169	0.293
	(19.19)**	(15.22)**
College	0.174	0.313
	(10.88)**	(10.99)**
College (economics)	0.155	0.185
	(4.97)**	(3.95)**
Married	0.012	0.019
	(1.42)	(1.42)
Male	0.073	0.127
	(8.50)**	(7.69)**
Financial wealth (x1,000)	0.124	0.187
	(1.15)	(1.13)
Real wealth (x1,000)	0.077	0.127
	(3.50)**	(3.32)**
Disposable income (x100)	0.398	0.642
	(9.33)**	(8.47)**
Long-term bank relation	0.065	0.107
	(7.88)**	(7.22)**
Newspapers sales	0.053	0.099
	(2.52)*	(2.86)**
Index of social learning	0.177	0.294
	(2.93)**	(2.92)**
Herfindhal index	-0.077	-0.103
	(0.78)	(0.59)
North	0.100	0.205
	(5.76)**	(7.08)**
Dummy for 1998	0.017	0.052
	(1.13)	(1.99)*
Constant	0.111	-0.446
	(4.22)**	(7.09)**
Average index of financial awareness	0.55	0.48
Observations	15281	15281

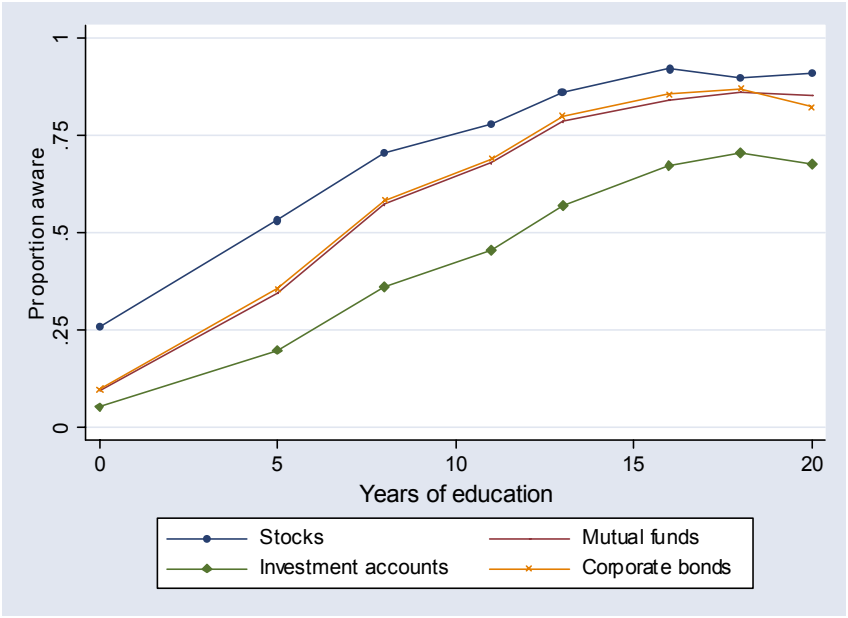
Table 6
Awareness and the stockholding puzzle

The first column of numbers reports the proportion of households with stocks, mutual funds, investment accounts, and corporate bonds. The second column reports the same proportions in the sample of informed investors. The third column uses selectivity-adjusted estimates for the probability of having stocks, mutual funds, investment accounts and corporate bonds in the sample of aware investors to predict the probability of participation in the total sample (including aware and unaware investors). The selectivity adjustment takes into account that the probit is estimated on the sample of aware investors. All statistics are computed using population weights.

	Proportion in the total sample	*Proportion in the sample of aware investors*	*Proportion if all investors were aware (estimated from probit with sample selection)*
Stocks	5.6	8.7	7.5
Mutual funds	7.6	14.4	12.0
Investment accounts	1.8	5.2	3.1
Corporate bonds	3.8	7.3	5.5
Total	12.6	27.6	23.1

Figure 1
Awareness and education

The upper graph plots the proportion of people aware of stocks, mutual funds, investment accounts and corporate bonds against years of education. The lower graph plots two indicators of financial awareness against years of education. The first indicator is the sum of the financial assets known weighted by the inverse of the aggregate fraction of people aware of each of the assets. The second indicator is the sum of risky assets known (stocks, mutual funds, investment accounts and corporate bonds) weighted by the inverse of the aggregate fraction of people aware of each of the assets. Data refer to the pooled 1995-98 sample.



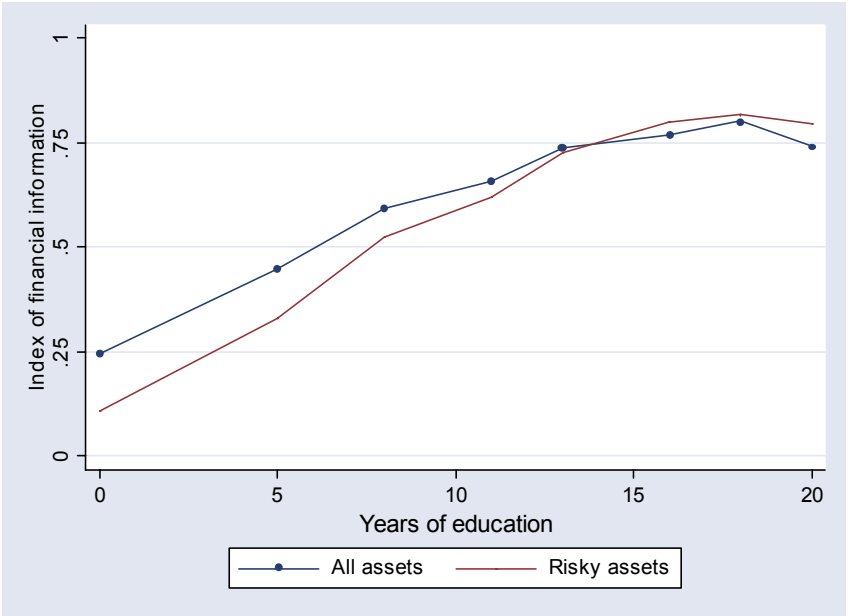
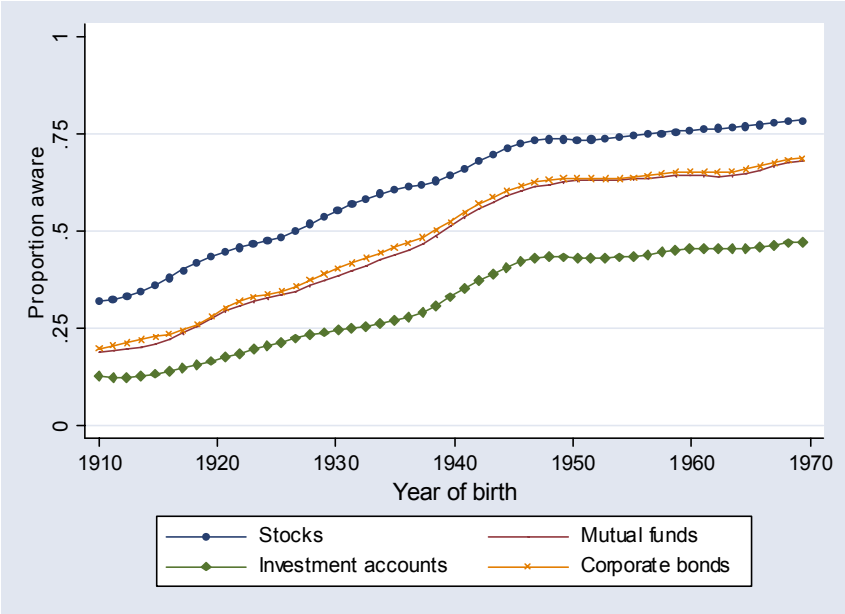


Figure 2
Awareness and cohort

The upper graph plots the proportion of people aware of stocks, mutual funds, investment accounts and corporate bonds against year of birth. The lower graph plots two indicators of financial awareness against year of birth. The first indicator is the sum of the financial assets known weighted by the inverse of the aggregate fraction of people aware of each of the assets. The second indicator is the sum of risky assets known (stocks, mutual funds, investment accounts and corporate bonds) weighted by the inverse of the aggregate fraction of people aware of each of the assets. The cohort profiles are estimated by a kernel regression using a Gaussian weight function. Data refer to the pooled 1995-98 sample.



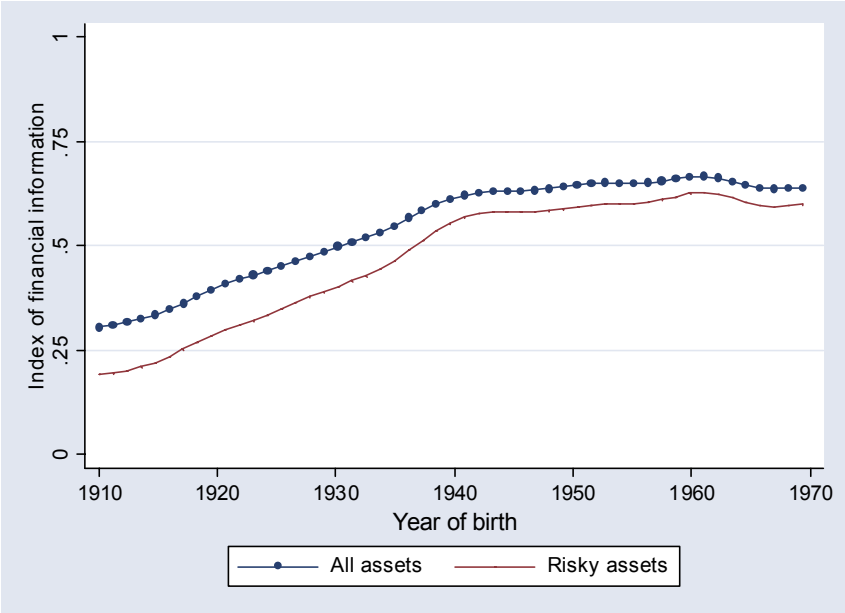
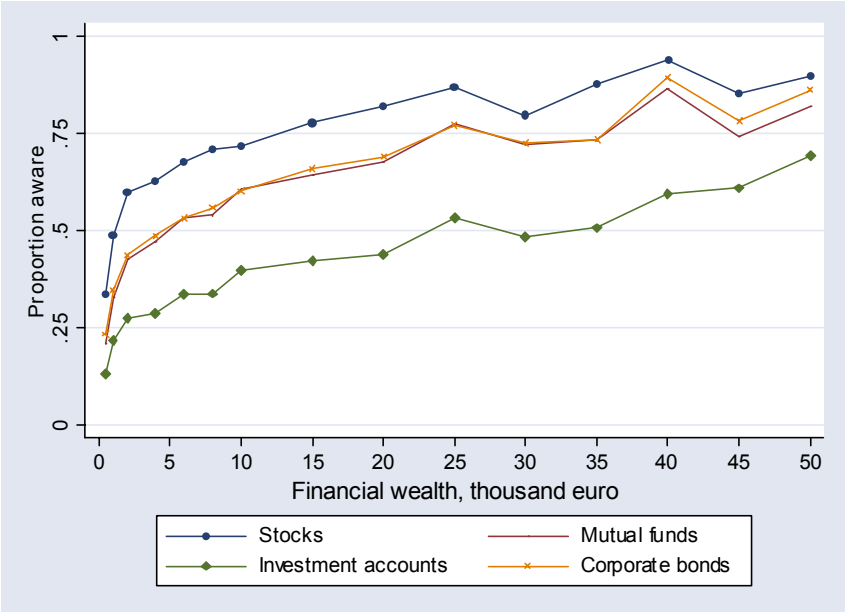


Figure 3
Awareness and financial wealth

The upper graph plots the proportion of people aware of stocks, mutual funds, investment accounts and corporate bonds against household financial wealth. The lower graph plots two indicators of financial awareness against household financial wealth. The first indicator is the sum of the financial assets known weighted by the inverse of the aggregate fraction of people aware of each of the assets. The second indicator is the sum of risky assets known (stocks, mutual funds, investment accounts and corporate bonds) weighted by the inverse of the aggregate fraction of people aware of each of the assets. Data refer to the pooled 1995-98 sample.



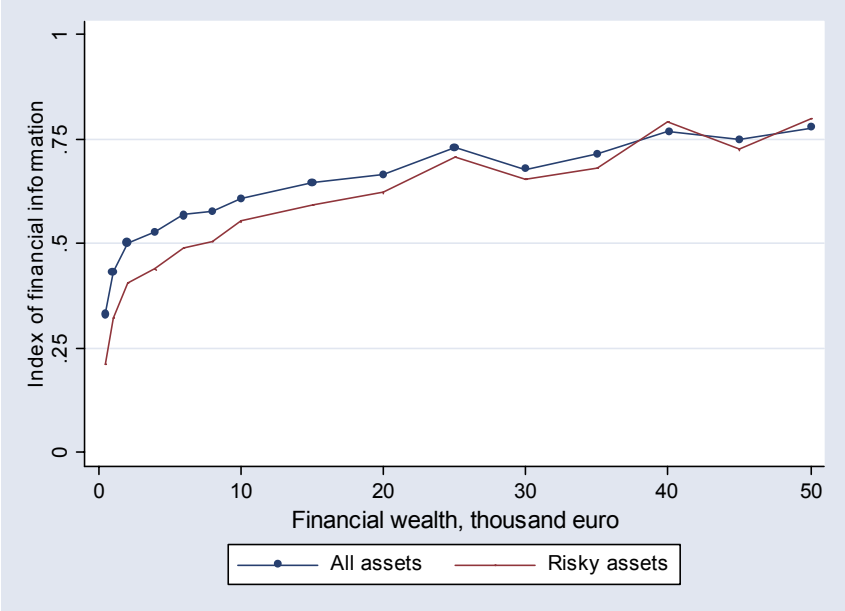
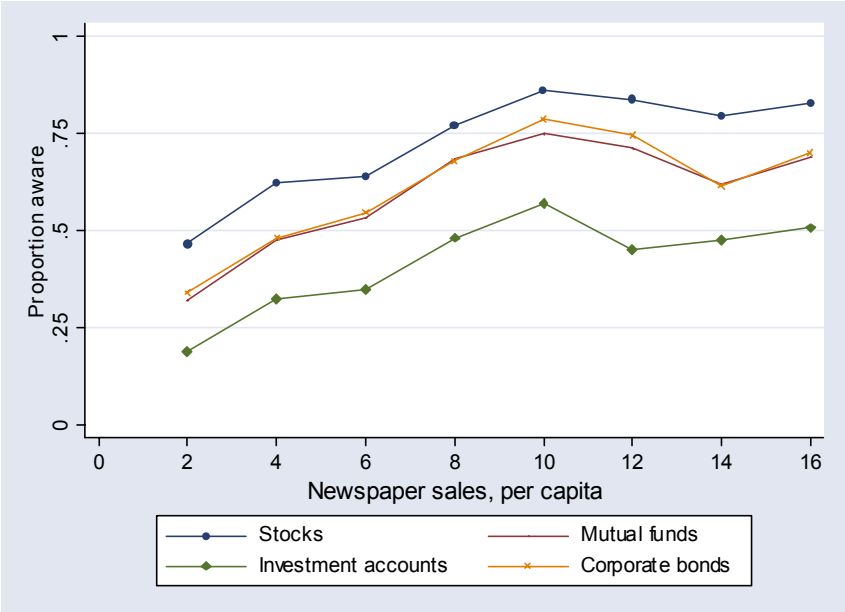


Figure 4
Awareness and newspapers readership

The upper graph plots the proportion of people aware of stocks, mutual funds, investment accounts and corporate bonds against per capita newspapers sales. The lower graph plots two indicators of financial awareness against per capita newspapers sales. The first indicator is the sum of the financial assets known weighted by the inverse of the aggregate fraction of people aware of each of the assets. The second indicator is the sum of risky assets known (stocks, mutual funds, investment accounts and corporate bonds) weighted by the inverse of the aggregate fraction of people aware of each of the assets. Newspaper sales is measured by the number of copies sold in each province scaled by the population in the province. The ratio is computed considering the 14 newspapers that sell in at least half of the Italian provinces. Data refer to the pooled 1995-98 observations.



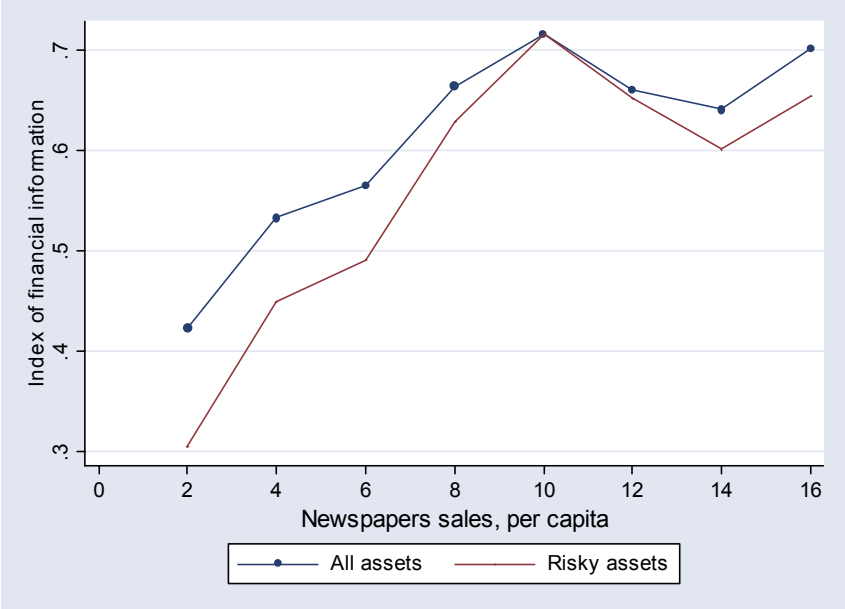
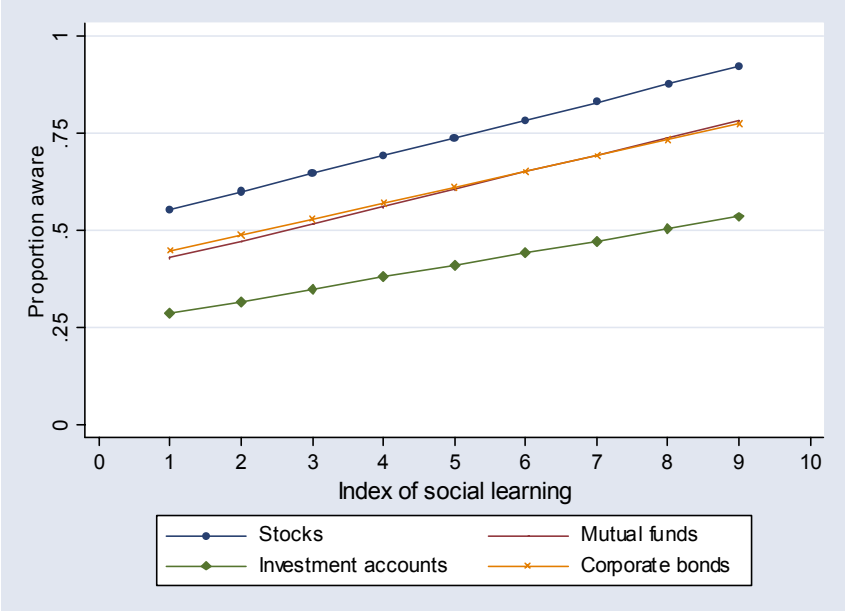


Figure 5
Awareness and social learning

The upper graph plots the proportion of people aware of stocks, mutual funds, investment accounts and corporate bonds against an index of social learning. The lower graph plots two indicators of financial awareness against an index of social learning. The first indicator is the sum of the financial assets known weighted by the inverse of the aggregate fraction of people aware of each of the assets. The second indicator is the sum of risky assets known (stocks, mutual funds, investment accounts and corporate bonds) weighted by the inverse of the aggregate fraction of people aware of each of the assets. The index of social learning is the number of number of non-profit institutions per 100 inhabitants in the province. Data refer to the pooled 1995-98 observations.



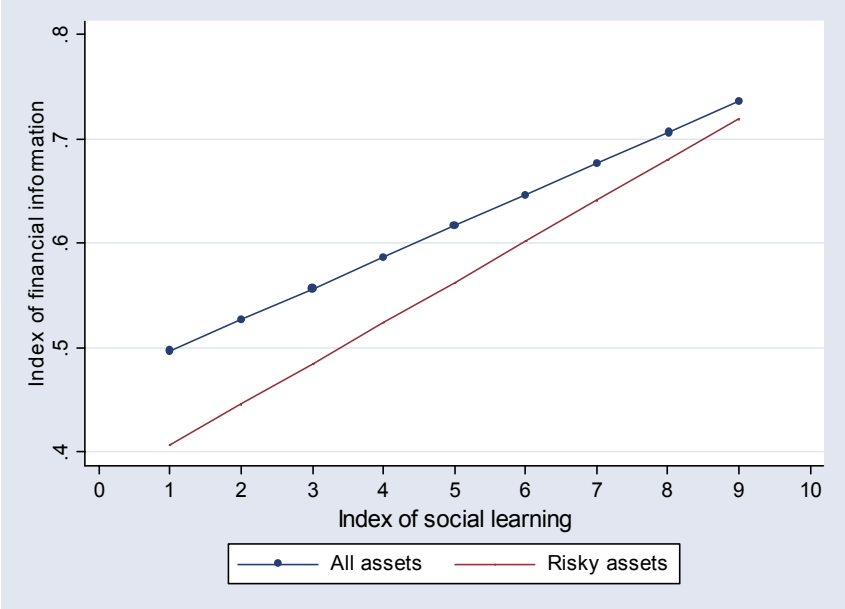
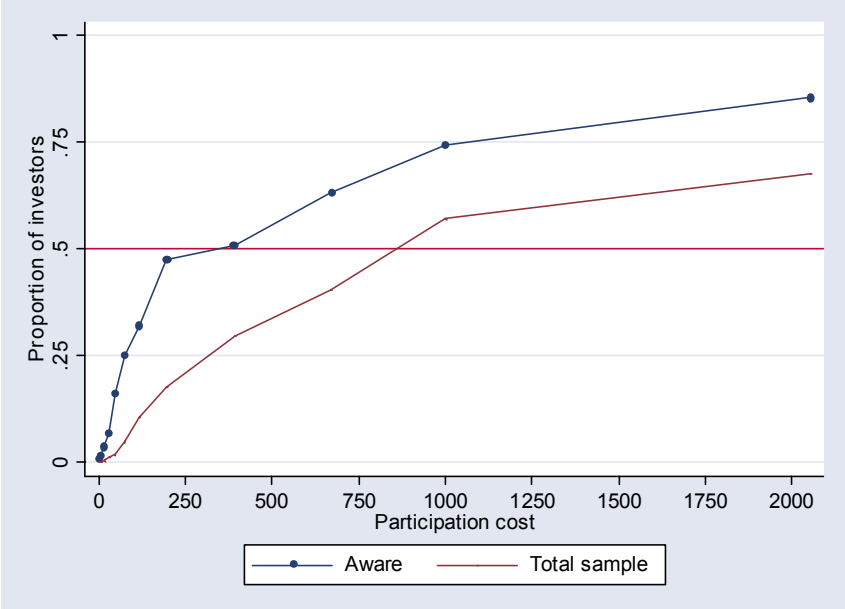


Figure 6
Stockholding and participation costs

The figure plots the proportion of stockholders and the associated participation costs (in euro) for the total sample and the sample of informed investors, defined as those who are aware of stocks, mutual funds and investment accounts.



CFS Working Paper Series:

No.	Author(s)	Title
2005/20	**Yannis Bilias** **Dimitris Georgarakos** **Michael Haliassos**	Equity Culture and the Distribution of Wealth
2005/21	**Silke Brandts** **Christian Laux**	ART Versus Reinsurance: The Disciplining Effect of Information Insensitivity
2005/22	**Sean D. Campbell** **Francis X. Diebold**	Stock Returns and Expected Business Conditions: Half a Century of Direct Evidence
2005/23	**Franklin Allen** **Elena Carletti** **Robert Marquez**	Credit Market Competition and Capital Regulation
2005/24	**Neil A. Doherty** **Alexander Muermann**	Insuring the Uninsurable: Brokers and Incomplete Insurance Contracts
2005/25	**Franklin Allen** **Elena Carletti**	Credit Risk Transfer and Contagion
2005/26	**Michael Haliassos** **Michael Reiter**	Credit Card Debt Puzzles
2005/27	**Luigi Guiso** **Paola Sapienza** **Luigi Zingales**	Trusting the Stock Market
2005/28	**Tullio Jappelli** **Luigi Pistaferri**	Intertemporal Choice and Consumption Mobility
2005/29	**Luigi Guiso** **Tullio Jappelli**	Awareness and Stock Market Participation

Copies of working papers can be downloaded at http://www.ifk-cfs.de