

Stock Market Participation: New Empirical Evidence from Italian Households' Behavior

Attilio Gardini and Alessandro Magi

Department of Statistical Sciences - University of Bologna

E-mails: attilio.gardini@unibo.it;

magi@rimini.unibo.it (corresp. author)

October 15, 2006

Abstract

This paper provides new and updated empirical evidence about the stockholding behavior of Italian households. By exploiting SHIW data we find that in the last years participation rates have decreased. Previous similar studies has shown the importance of factors such as age, wealth and education in explaining stockholding choices. But these studies do not consider the stock market boom started from 1997-98 and the setbacks of the period 2000-2004. Instead, our investigation considers the recent 1998-2004 SHIW waves. Our analysis partly confirms previous outcomes but we find some new and challenging relations between age, wealth, education and stock market participation.

Keywords: stock market participation; probit regression; portfolio choice; italian households; micro data.

JEL codes: C01, C25, G11.

1 Introduction

In this paper we find that in the last years (in particular in the period 1998-2004) the stockholding behavior of Italian households has followed some distinctive patterns. First, in Italy participation rates are declining fastly (see Tables 1-4): this fact is in contrast with what happens in other European countries and USA (Calvet, Campbell and Sodini 2005; De Santis and Gérard, 2006; Ameriks and Zeldes, 2004; Gomes and Michaelides, 2005). Second, in the equity markets there is likely a high degree of "turnover"; the idea is that the so-called newcomers do not trust the stock market and stay in it only a few time, going out very quickly. This fact may help to explain the Italian investors' stockholding behavior of the last years, in particular the reduction of participation rates. May this "turnover" process be only explained by declining stock returns in the same period? Third, from the empirical investigations a clear fact emerges: the increasingly ageing population plays an important role in explaining stockholding choices. The numerical importance of the elderly in the population is growing over time and maybe it is not a case that they are relatively those who invest more in stocks.

The *stock market participation puzzle* (SMPP) is the fact that even though stocks have a high mean return, many households have historically been reluctant to allocate any money to them (Mankiw and Zeldes, 1991; Haliassos and Bertaut, 1995). The SMPP can also be re-stated: if one can expect to earn more by holding stocks rather than riskless financial assets (such as bank deposits), what is that keeps the majority of households out of the stock market? However, the crucial point is that participation is quite low even among wealthy households. For example, at the 80th percentile of the wealth distribution, a typical USA household has about \$200,000 in financial assets, but almost 20% of these households own no equity (Campbell, 2006). This finding has been

emphasized in various contributions (Mankiw and Zeldes, 1991; Haliassos and Bertaut, 1995; Heaton and Lucas, 2000b).

The literature which attempts to explain this puzzle heavily relies on transaction and information costs broadly interpreted as the main explanation for why some individuals choose zero holdings for stocks and other financial assets (Vissing-Jorgensen, 2002, 2003). But the exact nature of these costs is not well understood, and the challenge of current research is to assess the factors that prevent many households from holding stocks.

In the Italian case, the prevailing literature has reached the following most important empirical results:¹ a) Participation in risky assets is strongly increasing in wealth, exhibits a marked concave age profile and rises with education; b) Participation costs² act as a barrier to entry at low wealth and imply that participation increases with wealth; c) There is strong evidence that participation depends on background risk (labour income uncertainty, entrepreneurial risk, etc.).³

In this paper we do not focus on the last issue, while we attempt to provide new insights about the first two points. We investigate direct and indirect stockholding (equities held directly and through mutual funds) and try to identify the main variables which explain Italian households' stockholding behavior.

The paper is organized as follows. In section 2 we shortly discuss the prevailing literature and show some basic data about the stock market participation issue. In the third section we focus our attention on the Italian case. In section 4 we describe the data we use in our empirical analysis and present the econometric framework. The most important empirical outcomes and implications

¹See in particular Guiso, Haliassos and Jappelli (2002a); see also Guiso and Jappelli (2002) and Guiso, Haliassos and Jappelli (2002b).

²These costs take several forms, from minimum investment requirements, to transaction costs in purchasing stocks and mutual funds, to information costs.

³Several important studies have found associations between stockholding and background income risk (Guiso, Jappelli and Terlizzese, 1996; Heaton and Lucas, 2000).

are presented and discussed in section 5. Finally, section 6 concludes the paper.

2 Literature Review

Only 15 years ago, household stockownership in Europe was quite different than it is today. Few households invested in equities and most of their financial wealth was held in the form of risk-free low-return assets. Participation in the stock market was limited to a small part of the population, those in the very upper tail of the wealth distribution and relatively well educated. This picture changes markedly by the end of the 1990s: some differences between countries remain, but a much larger proportion of investors now hold stocks in their portfolio. About 50 percent of households in the US and Sweden, and over one third in the UK invest directly or indirectly (through mutual funds and other managed investment accounts) in the stock market. In the Netherlands, Italy, France and Germany the proportion is lower, between 15 and 25 percent, but in each of these countries it has increased quite significantly during the 1990s, sometimes doubling in the course of the decade (Guiso, Haliassos and Jappelli, 2002b).

These changes were encouraged by a variety of institutional and socioeconomic developments. Some of them were transitory, such as the high stock returns in the 1990s, but many are permanent: the privatization of public utilities, the demographic trends and the growth of the mutual funds industry. As emphasized by Guiso, Haliassos and Jappelli (2002b), "*.... such changes have brought into the stockholder pool many households with less financial sophistication [.....] and this has important effects on the activity of policymakers*". In fact, in addition to lowering excess returns on stocks, new entrants with the mentioned characteristics can induce greater volatility in stock markets by reacting excessively to market signals. Hence, as suggested by Guiso, Haliassos and Jappelli (2002b), "*if economic policy is to help avert stock market downturns*

and volatility in the new decade, it must address the needs of these newcomers and supervise the practices of mutual funds handling their accounts."

Haliassos (2002) remarks that, "*resolving the stock market participation puzzle [.....] can suggest important profit opportunities for financial institutions, practitioners, and even governments. If we understand what keeps people out of the stock market, we can expand the customer base by designing financial products that appeal to the average household.*" Limited financial market participation also has important implications for individual welfare: Cocco, Gomes and Maenhout (2005) show that the welfare loss from non-participation in stock markets is between 1.5 and 2 percent of consumption in calibrated representative agent life-cycle models.

One possible approach to the stock market participation puzzle considers participation costs of investing in the stock market; another examines whether non-stockholders have background risk which is correlated with the equity market (Heaton and Lucas, 2000a, b; Vissing-Jorgensen, 2002). While these approaches almost certainly explain some of the observed non-participation, they may not be able to account for all of it. Polkovnichenko (2004) finds that even among wealthy households, for whom participation costs are relatively low, there is still substantial non-participation; and Curcuro, Heaton, Lucas and Moore (2004) argue that, while the presence of correlated background risk can lower the recommended allocation to equity, it cannot easily generate an allocation as low as zero.

Apart the monetary (transaction) costs, how can we interpret the participation costs that deter participation in the stock market? One possible recent approach is to think of these costs as an economist's description of *psychological factors* that make equity ownership uncomfortable for some households. Hong, Kubik, and Stein (2004), for example, find that households that interact

more with other households in their community are more likely to own stocks, particularly if the participation rate is high in the community, suggesting that households are more comfortable following financial practices shared with others (Campbell, 2006). Guiso, Sapienza, and Zingales (2005) find that households that express willingness to trust others are more likely to own stocks. We observe that such explanations are related to and in line with some recent advances in behavioral finance models (see Barberis, Huang and Thaler, 2006; Christelis, Jappelli and Padula, 2006; Guiso and Jappelli, 2006; Magi, 2005): the basic idea is that the cognitive capabilities of individuals are bounded and this fact affects their ability to process information correctly. As a result, they make sub-optimal financial decisions/portfolio choices.⁴

3 The Italian Case

In the Italian case, several papers analysed the determinants of stock market participation and household portfolio choices using cross-sectional PROBIT regressions (Guiso and Jappelli, 2002; Guiso, Haliassos and Jappelli, 2002a, 2002b). These studies showed the importance of factors such as wealth, education and age in explaining stockholding choices. In particular, Guiso and Jappelli (2000, 2002) proposed an investigation based on 1989-1995 SHIW data. Their analysis takes into account a time period which does not include the stock market "boom" started from 1997-98.⁵ In contrast, our investigation considers the recent SHIW waves of 1998, 2000, 2002 and 2004.

The most important results obtained in the above literature are the following:

a) Participation in risky assets is strongly increasing in wealth, exhibits a marked concave age profile and rises with education;

⁴This approach also has some links with the recent literature on rational inattention (Sims, 2003; Reis, 2005).

⁵Guiso and Jappelli (2002) use the 1998 SHIW wave for a Probit regression analysis.

b) Participation costs act as a barrier to entry at low wealth and imply that participation increases with wealth;

c) There is strong evidence that participation depends on background risk (labour income uncertainty, entrepreneurial risk, etc.).

Here we do not focus on the last point, but we attempt to provide new insights about (a) and (b).

In Italy, in the 1980s direct stockholding accounted for about only 15% of households' financial assets, while indirect stockholding through mutual funds was almost absent. The thinness of the Italian stock market and its volatility discouraged stockholding, even after the introduction of mutual funds in 1984; the high level of government debt and the high interest rates necessary to finance it, made stocks relatively unattractive (Guiso and Jappelli, 2002). Then, in the 1990s different factors contributed to increase stockholdings. We refer to the drop in Italian Treasury bill returns, the changes in the social security system which lowered the expected future income of workers, the privatization process of public companies and the Italian stock market growth. But also the increase in competition among the financial firms offering investment services (reduction in entry costs and financial information costs) and the availability of new financial products increased the economic agents' interest in stocks.

Recently, for different reasons, some things have been changing. In 1998 the participation rate for stocks was 8.4% (see Table 1); the total participation rate was 15.5% (Table 3) and if we look at the category "risky financial assets" (Table 4) we see that participation is relatively high (18.5%). In 2000 the tendency was generally increasing (see again Tables 1-4), but in the next years participation rates are dramatically declined.

4 Data Description and Econometric Modelling

We use data from the Survey on Household Income and Wealth (SHIW), a biannual survey run by the Bank of Italy with the specific aim of providing information on household saving, income and wealth; we use 1998, 2000, 2002 and 2004 SHIW data. The survey collects detailed information on the composition of household (financial and real) wealth and on demographic variables. The fact that it is also repeated over time is very useful, because we are able to make interesting comparisons in trends of the dynamics of stockholding behavior.

Our empirical analysis is based on four cross-sections, for a total of 31,171 observations, including data from 1998, 2000, 2002 and 2004. We test the following PROBIT regression on cross-sectional data:

$$y_i^* = x_i' \beta + u_i$$

with $y_i = 1$ if $y_i^* > 0$ (stockholding) and 0 otherwise. We use several explanatory dummy variables (x_i), focusing on age, education, other household characteristics (married, male), and real and financial wealth quartiles.⁶ Our aim is to focus on the main household characteristics which affect stock market participation, avoiding to use other "macro" variables.⁷

An important note is to be said about age and time effects. Before one can understand the relative importance of these effects, one must confront a basic identification problem (Heckman and Robb, 1985; Ameriks and Zeldes, 2004). At any time t a person born in year b is a_t years old, where $a_t = t - b$. Hence, it is impossible to separately identify age effects, time effects, and cohort (birth-

⁶Our model specification is in line with Guiso, Haliassos and Jappelli (2002b) and is different with respect to Guiso and Jappelli (2002): we do not consider variables such as "number of banks", "index of financial development" and "unemployment rate".

⁷These "macro" variables may be a proxy for the overall riskiness of the economic environment in which households make their decisions, reflecting for example the discouraging effect of background, undiversifiable risk on risky investment (Guiso, Jappelli and Terlizzese, 1996; Heaton and Lucas, 2000).

year) effects on participation and portfolio choices. Even if we have complete panel data on portfolios of households over time, any pattern in the data can be fit equally well by age and time effects, age and cohort effects, or time and cohort effects (Campbell, 2006).

Theory suggests that there should be *time* effects on portfolio choice if households perceive changes over time in the risks or expected excess returns of risky assets. Theory also suggests that there should be *age* effects on portfolio choice if older investors have shorter horizons than younger investors and investment opportunities are time-varying, or if older investors have less human wealth relative to financial wealth than younger investors (Bodie, Merton and Samuelson, 1992; Campbell and Viceira, 2002). Hence, it seems hard to rule out either *time* or *age* effects in studying participation and portfolio choices.

Cohort effects are more problematic. They could be caused by different labor market experiences which affect the ratio of human to financial wealth held by a cohort at each age, but this effect is unlikely to be strong in modern economies (Campbell, 2006). *Cohort* effects could also arise from differences in preferences, perhaps driven by different asset market experiences. Such effects cannot be identified by the data without modelling them (or *age* or *time* effects) in some way. We will follow Heaton and Lucas (2000a) and most other studies by setting *cohort* effects to zero. Under this assumption *age* effects can be estimated in any cross-section.

5 Estimation Results and Comments

In Tables 1-4 we can see some interesting and relatively surprising data about Italian households' participation rates.⁸ As already said in the Introduction,

⁸For a more detailed statistical evidence (based on wealth, education, age, etc.) about Italian households, it is possible to see Guiso, Haliassos and Jappelli (2002a, b) and Guiso and Jappelli (2002).

they are totally at odds with the recent prevailing trends in Europe and USA. It is evident that in the last years the stock market participation has been decreasing. This fact holds for direct stockholding, indirect stockholding, total stockholding and also, more generally, for the broad category "risky financial assets".⁹ What is the reason of such a behavior? Basically, an important role has probably been played by the reduction of stock returns in the period 2000-2004. In fact, during that period, the returns of the Italian stock market have decreased. The Mibtel index was 28,404 on January 2000, 22,844 on January 2002 and 20,245 on January 2004.¹⁰ But this fact cannot be the only explanation of the entire story.

Observing Tables 5 and 6 we can see the impact of the different variables on (direct and indirect) stockholding: each of the coefficients indicate the effect of the dummy on the probability of investing in stocks and equity mutual funds. Although some of *age* dummies are not statistical different from zero, the Probit regressions indicate that participation is concave in age. The variables *high school* and *college* raise strongly the probability of investing in stocks and mutual funds, with a major impact on stocks.¹¹ We observe that more educated households are not only more likely to hold stocks, but also to learn easily about how to invest in stocks¹² and to estimate more precisely the costs and benefits

⁹Risky financial assets include stocks, corporate bonds, managed investment accounts and mutual funds.

¹⁰Data drawn from www.borsaitaliana.it.

¹¹About such issue, we think that the level of education plays a crucial role in explaining investor heterogeneity (and therefore stock market participation) especially in a *behavioral finance* framework (see Magi, 2005).

¹²This last sentence is largely accepted and is consistent with intuition, but a recent contribution by Guiso and Jappelli (2006) emphasizes a particular result: they find that the portfolio Sharpe ratio is negatively associated with investment in information. In other words, a well-known measure of portfolio performance, the Sharpe ratio, decreases as investment in financial information increases (in terms of time and money). This is in line with a recent developing strand of the behavioral finance literature ("overconfident" investor models), but it is at odds with standard "rational" models and with intuition. In fact, the basic idea is that those who invest much time and money in acquiring information, get high portfolio performances (Verrecchia, 1982; Barlevy and Veronesi, 1999; Peress, 2004). And there is consensus about the fact that well educated individuals are often those who invest more in information. In sum, recent contributions like Guiso and Jappelli (2006) point out several contradictions in individual financial decision-making processes.

of them. In Italy education also played an important role in the first part of 1990s, because several institutional changes (privatizations, the demographic transition and the growth of the mutual fund industry) were so complex that they were more likely to be understood by the more educated population.

Maybe, a possible partial explanation of declining participation rates is to be found in the high turnover process of new entrants. The idea is that those who enter the stock market in a given period, in the next period, for different reasons, go out;¹³ but since participation is decreasing over time, it should also be necessary that some "incumbents" go out of the stock market. Guiso, Haliassos and Jappelli (2002b) argue that the role of "new investors" (new entrants in the stock markets) may be important for understanding the volatility of equity markets, because of their low "financial sophistication" and hence their possible underreactions or overreactions to different stock markets signals:¹⁴ behind this consideration there is the idea that the newcomers are less educated than incumbents. But as recent participation rates show, the flow of new entrants is not so large: at the contrary, it is declining. Hence, there is no certainty about the low "financial sophistication" of newcomers. And this reasoning finds support in the fact that the effect of education variables on participation is decreasing over time (this holds in particular for the indirect stockholding case).

The role of education recalls the importance of *information costs* for participation decisions. Such costs, broadly interpreted, help explain the correlation between participation and education: poorly speaking, more educated households face lower information costs than others. But at the same time, information costs are not necessarily correlated with wealth, and might therefore explain why so many wealthy households (which "should" face low information costs) do not invest in risky financial assets. However, in general, education appears

¹³We point out that in this paper we do not investigate this issue empirically.

¹⁴And this issue would be important for economic policy.

to overcome the importance of participation costs. Table 5 and 6 show that education strongly affects equity ownership, even controlling for age and wealth; Campbell (2006) finds the same result. Moreover, the "trust effect" estimated by Guiso, Sapienza and Zingales (2005) is weaker for educated households. Therefore, education appears to improve the efficiency with which households make their financial decisions. This implies that education increases the welfare benefits of participation and may also reduce the psychological discomfort associated with activities for which households feel poorly prepared (Campbell, 2006).

Another important issue is represented by what emerges from the Probit regressions' outcomes about age coefficients and their connection with the strong *demographic changes* of the last years. We can see (Tables 5 and 6) that the major impact on the probability to invest in stocks is due to fifty-year-old individuals; and we know that in recent years the elderly have been growing. Therefore, this class of individuals probably is playing and will play in the future a prominent role in assessing stockholding choices. It could be of interest, for the purpose at hand, studying in deep the links between the ageing population and stockholding behavior, in particular investigating at the household level the characteristics of the elderly which invest the largest fraction of their financial assets in stocks.¹⁵

Demographic variables such as *married* and *male* have a limited (but significant) impact on direct stockholding; things are slightly different for indirect stockholding. In particular, the variable "male" has a strong and significant impact (on stocks) in the last two years of our analysis (2002 and 2004), while in the previous years the impact is negligible. We notice that if we want to

¹⁵Christelis, Jappelli and Padula (2006) study the importance of cognitive abilities for the decision to invest in stocks using data drawn by the recent Survey of Health, Ageing and Retirement in Europe (SHARE). The survey has detailed data on wealth and portfolio composition of individuals aged 50+ in 11 European countries and three indicators of cognitive abilities: mathematical, verbal fluency, and recall skills. They find that the propensity to invest in stocks is strongly associated with cognitive abilities, for both direct stock market participation and indirect participation through mutual funds and investment accounts.

have a picture of the "overall situation" about the effects of married and male, we can look at the pooled regressions of Table 7. By doing so, we can see that both variables have an overall positive and significant effect on the probability to invest in stocks.

Financial and real wealth quartiles are very important determinants of all the Probit regressions in Table 5 and 6. We notice that the effect of real wealth is not as strong as that of financial wealth, and is statistically different from zero in particular for stocks. Financial wealth quartiles have a large impact on the probability of direct and indirect stockholding, and such impact is increasing in quartiles but not over time. However, we can see that there is a distinctive behavior over time: the effect of financial wealth is increasing from 1998 to 2000, but from 2000 to 2004 is constantly decreasing; and this holds both for stocks and mutual funds. This dynamic behavior is consistent with the drop in participation rates which has occurred from 2000 to 2004: therefore we have a further proof of what theoretical portfolio/asset pricing models state, i.e. that individuals which participate to stock markets are in particular those in the upper tail of the wealth distribution.¹⁶

In Table 7 we can see the outcomes of two pooled data Probit regressions performed both on stocks and mutual funds. The basic results of cross-section regressions are strongly confirmed by the pooled data analysis: we have a "summary picture" of the four cross-sections previously analysed. We can notice that our previous basic results are confirmed: a) the concavity of participation in age; b) the importance of fifty-year-old individuals in explaining stockholding behavior; c) the higher effect of education variables on stocks than on mutual funds; d) the higher effect on stock market participation of the variable "college" than "high school"; e) the increasing effect of financial wealth as quartiles raises.

¹⁶This is consistent with what intuition suggests: risk aversion is decreasing in wealth, i.e. individual risk aversion decreases as wealth increases. And as predicted by theoretical models, if risk aversion is "low", equity portfolio holdings are "high".

6 Concluding Remarks

This paper provides new and updated empirical evidence about the stockholding behavior of Italian households. By exploiting the Italian Survey on Household Income and Wealth, we find that recently participation rates have declined and this fact is totally at odds with the recent prevailing trends in Europe and USA.

The drop in stock market participation rates may be related to the turnover process which is likely to be present within Italian stock market. The idea is that the so-called newcomers do not trust the stock market and stay in it only a few time, going out very quickly. The education variables (*high school* and *college*) raise strongly the probability of investing in stocks and mutual funds, with a major impact on stocks. Education appears to improve the efficiency with which households make their financial decisions and increases the welfare benefits of participation. Moreover, from our empirical investigations another clear fact emerges: the increasingly ageing population plays an important role in explaining stockholding choices.

Some questions remain unsolved and challenging and they can be interesting issues for future research: a) How long time the new entrants have been in the stock market? Do they go out fastly? b) It could be of interest studying in deep the links between the ageing population and stockholding behavior, in particular investigating, at the household level, the characteristics of the elderly which invest the largest fraction of their financial assets in stocks.

7 References

Ameriks, J. and S. Zeldes (2004), How do household portfolio shares vary with age?, *unpublished paper*, Columbia University.

Bank of Italy (1998-00-02-04), *Survey on Household Income and Wealth*,

Rome.

Barberis, N., M. Huang and R. Thaler (2006), Individual preferences, monetary gambles and stock market participation, *American Economic Review*, forthcoming.

Barlevy, G. and P. Veronesi (1999), Information acquisition in financial markets, *Review of Economic Studies*, 67, 79-90.

Bodie, Z., R. Merton and W. Samuelson (1992), Labor supply flexibility and portfolio choice in a life cycle model, *Journal of Economic Dynamics and Control*, 16, 427-449.

Calvet, L., J. Campbell and P. Sodini (2005), Down or out: Assessing the welfare costs of household investment mistakes, *unpublished paper*, HEC Paris, Harvard University, and Stockholm School of Economics.

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

Campbell, J. and L. Viceira (2002), *Strategic Asset Allocation: Portfolio Choice for Long-Term Investors*, Oxford University Press.

Christelis, D., T. Jappelli and M. Padula (2006), Cognitive abilities and portfolio choice, *CSEF working paper* n.157.

Cocco, J., F. Gomes and Maenhout (2005), Consumption and Portfolio Choice over the Life Cycle, *Review of Financial Studies*, 18, 491-533.

Curcuro, S., J. Heaton, D. Lucas and D. Moore (2005), Heterogeneity and Portfolio Choice: Theory and Evidence, in: *Handbook of Financial Econometrics*, Y. Ait-Sahalia and L.P. Hansen, (eds), Elsevier Science, Amsterdam.

De Santis, R. and B. Gérard (2006), Financial Integration, International Portfolio Choice and the European Monetary Union, *ECB working paper series* n.626, Frankfurt.

Gomes, F. and A. Michaelides (2005), Optimal Life-Cycle Asset Allocation:

Understanding the Empirical Evidence, *Journal of Finance*, 60, 869–904.

Guiso, L., M. Haliassos and T. Jappelli (2002a) (eds), *Household Portfolios*, Mit Press.

Guiso, L., M. Haliassos and T. Jappelli (2002b), Household Stockholding in Europe: Where Do We Stand and Where Do We Go?, *CSEF working paper* n. 88, University of Salerno.

Guiso, L. and T. Jappelli (2000), Household Portfolios in Italy, *CSEF working paper* n. 43, University of Salerno.

Guiso, L. and T. Jappelli (2002), Stockholding in Italy, *CSEF working paper* n. 82, University of Salerno.

Guiso, L. and T. Jappelli (2006), Information Acquisition and Portfolio Performance, *CSEF working paper* n. 167, University of Salerno.

Guiso, L., T. Jappelli and D. Terlizzese (1996), Income Risk, Borrowing Constraints and Portfolio Choice, *American Economic Review*, 86, 158-172.

Guiso, L., P. Sapienza and L. Zingales (2005), Trusting the stock market, *working paper*, University of Chicago and Northwestern University.

Haliassos, M. (2002), Stockholding: Recent Lessons from Theory and Computations, *working paper*, University of Cyprus.

Haliassos and Bertaut (1995), Why do so few hold stocks?, *Economic Journal*, 105, 1110-1129.

Heaton, J. and D. Lucas (2000a), Portfolio choice and asset prices: the importance of entrepreneurial risk, *Journal of Finance* 55, 1163-1198.

Heaton, J. and D. Lucas (2000b), Portfolio Choice in the Presence of Background Risk, *Economic Journal*, 110, 1-26.

Heckman, J. and R. Robb (1985), Using longitudinal data to estimate age, period, and cohort effects in earnings equations, in W. Mason and S. Fienberg (eds), *Cohort Analysis in Social Research: Beyond the Identification Problem*,

137-150, Springer-Verlag, New York.

Hong, H., J. Kubik and J. Stein (2004), Social Interaction and Stock Market Participation, *Journal of Finance*, 59, 137-163.

Magi, A. (2005), Financial Decision-Making and Portfolio Choice under Behavioral Preferences: Implications for the Equity Home Bias Puzzle”, *Note e Ricerche*, 3/2005, University of Bologna.

Mankiw, G. and S. Zeldes (1991), The consumption of stockholders and non-stockholders, *Journal of Financial Economics*, 29, 97-112.

Peress, J. (2004), Wealth, information acquisition and portfolio choice, *Review of Financial Studies*, 17, 879-914.

Reis, R. (2005), Monetary policy for inattentive economies, *Journal of Monetary Economics*, 52, 703-725.

Sims, C. (2003), Implications of rational inattention, *Journal of Monetary Economics*, 50, 665-690.

Verrecchia, R. (1982), Information acquisition in a noisy rational expectations economy, *Econometrica*, 50, 1415-1430.

Vissing-Jorgensen, A. (2002), Towards an explanation of household portfolio choice heterogeneity: nonfinancial income and participation cost structures, *NBER working paper* n.8884.

Vissing-Jorgensen, A. (2003), Perspectives on behavioral finance: does “irrationality” disappear with wealth? Evidence from expectations and actions, in M. Gertler and K. Rogoff (eds), *NBER Macroeconomics Annual 2003*, MIT Press.

TABLES

Table 1
Participation Rates for Stocks

The table reports the number of participants and participation rates for stocks. Our elaboration based on data drawn from the 1998, 2000, 2002 and 2004 SHIW.

Years	Households	Participants	Part Rate (%)
1998	7147	599	8,4
2000	8001	820	10,2
2002	8011	672	8,4
2004	8012	442	5,5

Table 2
Participation Rates for Mutual Funds

The table reports the number of participants and participation rates for equity mutual funds. Our elaboration based on data drawn from the 1998, 2000, 2002 and 2004 SHIW.

Years	Households	Participants	Part Rate (%)
1998	7147	776	10,8
2000	8001	970	12,1
2002	8011	588	7,3
2004	8012	384	4,8

Table 3
Participation Rates for Total Stockholding

The table reports the number of participants and participation rates for total stockholding (stocks + mutual funds).

Our elaboration based on data drawn from the 1998, 2000, 2002 and 2004 SHIW.

Years	Households	Participants	Part Rate (%)
1998	7147	1110	15.5
2000	8001	1451	18.1
2002	8011	1069	13.3
2004	8012	711	8.9

Table 4
Participation Rates for Risky Financial Assets

The table reports the number of participants and participation rates for the category “risky financial assets”. Risky financial assets include stocks, corporate bonds, managed investment accounts and mutual funds.

Our elaboration based on data drawn from the 1998, 2000, 2002 and 2004 SHIW.

Years	Households	Participants	Part Rate (%)
1998	7147	1323	18,5
2000	8001	1717	21,5
2002	8011	1500	18,7
2004	8012	1062	13,3

Table 5
Cross-sectional Probit Regressions for Participation in Stocks

The table reports PROBIT regressions for stocks. Data are drawn from the 1998, 2000, 2002 and 2004 SHIW. Each of the regressors is a dummy variable. z-statistics are reported in parenthesis.

Variable	Stocks			
	1998	2000	2002	2004
Age 30-39	0.007 (0.06)	0.10 (0.84)	0.25 (1.77)	0.56 (2.34)
Age 40-49	-0.07 (-0.62)	0.24 (2.02)	0.33 (2.29)	0.57 (2.43)
Age 50-59	0.06 (0.49)	0.29 (2.41)	0.40 (2.84)	0.60 (2.55)
Age 60-69	-0.007 (-0.06)	0.11 (0.93)	0.37 (2.51)	0.56 (2.35)
Age 70+	-0.12 (-0.97)	-0.21 (-1.59)	0.15 (1.01)	0.46 (1.91)
High School	0.55 (9.33)	0.45 (8.86)	0.54 (9.94)	0.48 (7.77)
College	0.77 (10.56)	0.57 (8.60)	0.60 (8.42)	0.64 (8.00)
Married	0.19 (2.87)	0.135 (2.32)	0.205 (3.23)	0.08 (1.26)
Male	0.13 (1.91)	0.095 (1.58)	0.255 (3.86)	0.335 (5.04)
II fin wealth quartile	0.96 (4.05)	1.28 (4.08)	1.20 (3.79)	1.08 (3.38)
III fin wealth quartile	1.57 (6.76)	2.08 (6.69)	1.78 (5.67)	1.60 (5.06)
IV fin wealth quartile	2.20 (9.43)	2.56 (8.25)	2.33 (7.43)	2.03 (6.46)
II real wealth quartile	0.50 (5.10)	0.41 (5.14)	0.18 (1.94)	0.34 (3.20)
III real wealth quartile	0.39 (4.28)	0.30 (4.04)	0.23 (2.64)	0.27 (2.75)
IV real wealth quartile	0.34 (3.78)	0.22 (2.98)	0.37 (4.38)	0.35 (3.62)
Observations	7,147	8,001	8,011	8,012

Table 6
Cross-sectional Probit Regressions for Participation in Mutual Funds

The table reports PROBIT regressions for mutual funds. Data are drawn from the 1998, 2000, 2002 and 2004 SHIW. Each of the regressors is a dummy variable. z-statistics are reported in parenthesis.

Variable	Mutual Funds			
	1998	2000	2002	2004
Age 30-39	0.078 (0.70)	0.12 (1.02)	0.21 (1.52)	0.50 (2.06)
Age 40-49	0.042 (0.38)	0.25 (2.14)	0.16 (1.21)	0.59 (2.50)
Age 50-59	0.12 (1.10)	0.36 (3.01)	0.30 (2.21)	0.61 (2.60)
Age 60-69	0.145 (1.26)	0.19 (1.55)	0.097 (0.68)	0.61 (2.60)
Age 70+	-0.17 (-1.43)	-0.04 (-0.32)	0.0027 (0.02)	0.21 (0.86)
High School	0.40 (7.70)	0.41 (8.44)	0.36 (6.44)	0.41 (6.51)
College	0.61 (8.95)	0.54 (8.37)	0.43 (5.95)	0.44 (5.23)
Married	0.17 (2.83)	0.09 (1.72)	0.15 (2.34)	-0.017 (-0.26)
Male	0.03 (0.52)	0.076 (1.31)	0.018 (0.29)	0.24 (3.60)
II fin wealth quartile	0.73 (4.80)	1.29 (4.23)	1.08 (5.15)	0.82 (2.66)
III fin wealth quartile	1.45 (9.95)	2.16 (7.16)	1.82 (6.91)	1.53 (5.10)
IV fin wealth quartile	2.05 (14.05)	2.84 (9.39)	2.36 (7.43)	2.04 (6.80)
II real wealth quartile	0.37 (4.52)	0.30 (4.14)	0.12 (1.29)	0.15 (1.41)
III real wealth quartile	0.24 (3.14)	0.09 (1.29)	0.14 (1.63)	0.16 (1.71)
IV real wealth quartile	0.115 (1.52)	-0.08 (-1.18)	0.16 (1.92)	0.08 (0.84)
Observations	7,147	8,001	8,011	8,012

Table 7
Pooled Regressions for Participation in Stocks and Mutual Funds

The table reports pooled PROBIT regressions for direct (stocks) and indirect (mutual funds) stock market participation. The sample uses the cross-sections of the 1998-2000-2002-2004 SHIW. We have a total of 31,171 observations. z-statistics are reported in parenthesis.

Variable	Stocks	Mutual Funds
Age 30-39	0.13 (2.01)	0.13 (2.08)
Age 40-49	0.18 (2.64)	0.16 (2.49)
Age 50-59	0.24 (3.53)	0.23 (3.61)
Age 60-69	0.15 (2.10)	0.13 (1.98)
Age 70+	-0.05 (-0.69)	-0.12 (-1.80)
High School	0.50 (17.97)	0.39 (14.65)
College	0.64 (17.91)	0.52 (14.74)
Married	0.15 (4.80)	0.10 (3.30)
Male	0.23 (7.18)	0.12 (4.20)
II fin wealth quartile	1.12 (7.81)	0.93 (8.15)
III fin wealth quartile	1.76 (12.41)	1.67 (15.08)
IV fin wealth quartile	2.27 (16.06)	2.26 (20.43)
II real wealth quartile	0.35 (7.69)	0.24 (5.80)
III real wealth quartile	0.29 (6.69)	0.14 (3.64)
IV real wealth quartile	0.30 (7.25)	0.05 (1.29)
Observations	31,171	31,171