THE RELATIONSHIP BETWEEN EVERYDAY PRACTICES AND FINANCIAL LITERACY. AN EMPIRICAL ANALYSIS

Caratelli, Massimo*
Roma Tre University
**Corresponding author*

Ricci, Ornella
Roma Tre University

ABSTRACT
The global financial crisis has drawn the attention of both scholars and supervisors to the issue of financial education as an instrument for the development of efficient markets. The aim of this paper is to test the hypothesis that financial experience, gained with the daily use of different products and services, has a relevant effect on the acquisition of financial capabilities. Data are drawn by the 2008 Bank of Italy Survey on Household Income and Wealth, collecting a wide set of information on respondents and including 9 multiple-choice quizzes to measure financial literacy. A regression model was performed to assess the impact on financial literacy of four different groups of variables: socio-demographic features; income, consumption and household wealth; formal education and the experience resulting from the active participation in the capital market through the holding of financial assets and the use of specific products. The contribution of each group of regressors was measured with the Bonferroni index. Our results are consistent with previous literature, confirming a higher level of financial literacy for middle-aged adults, men, white collars, teachers, officials and managers, increasing with the years of schooling, household income and wealth. As for the financial experience, the Bonferroni index provided a strong evidence of its crucial role in explaining financial literacy, also with respect to a model already accounting for general education. This finding suggests to policymakers the adoption of incentives on the use of financial instruments or wealth accumulation, other than on educational programs.

INTRODUCTION

The recent global financial crisis has drawn the attention of both scholars and supervisory authorities to the issue of financial education in the hope that it might contribute to the development of more efficient markets.

By the most basic definition, financial education is the series of measures designed to improve financial literacy. The latter relates to a person's competence for managing money and addresses the area of individual knowledge, capability and motivation (Noctor *et al.*, 1992). Financial literacy requires confidence in more than just one topic of personal finance such as credit, budgeting, investment processes, and planning (Remund, 2010).

A few countries, firstly among them the United States, the United Kingdom and Australia, have already implemented a number of financial education initiatives starting from the early 2000. The addressees are usually high school or university students. At the same time, those countries have conducted surveys with a view to evaluating the effectiveness of the programs that had been carried out. Despite the considerable efforts and the number of analyses, their outcome is still uncertain. The widespread lack of financial literacy casts serious doubts on the ability of individuals to make responsible decisions (Lusardi, 2008),

whilst there is no strong evidence that substantiates a contribution of school and university education to personal financial growth (Martin, 2007).

In spite of the poor findings, the financial education initiatives arouse considerable enthusiasm and entail the allocation of massive investments, not infrequently taken away from the development of alternative consumer protection tools.

Recent research provides interesting insights into the determinants of financial literacy. Some demographic characteristics, such as being male and white, are commonly associated with greater knowledge (Bernehim, 1998). There is evidence of an inverse *U*-shaped age profile of financial skills, meaning middle-aged adults report higher scores than both their younger and older counterparts (Worthington, 2004). Some investigations also suggest that the acquisition of capabilities could be affected by individual financial experience, defined as the holding of financial assets and the use of payment instruments or debts (Hilgert *et al.*, 2003). Specifically, financial experience could be a source of learning. Although previous studies have supposed a theoretical relationship between everyday practices and literacy, none of the articles empirically has addressed this issue.

This paper reviews the determinants of responsible behaviors in order to test – with an empirical analysis – the hypothesis that financial experience has a relevant effect on the acquisition of financial capabilities.

A multivariate analysis is performed with a view to identifying the determinants of the responsible behaviors following the prevalent methodology, applied in Lyons, Rachlis, Scherpf (2007), Guiso, Jappelli (2008), and Monticone (2010). The data set is composed by the responses collected by the Bank of Italy through the Survey on Household Income and Wealth in 2008.

This research is important because offers policymakers guidance in the adoption of effective tools to protect the consumers implementing literacy. A significant impact of financial experience on responsible decisions would promote incentives on the use of financial instruments or wealth accumulation, rather than on educational programs.

The rest of the paper is organized as follows: section 2 presents a review of the literature; section 3 describes the empirical analysis and section 4 comments on its results. At the end, section 5 shows the implications of the study, as well as the limits and the likely developments of the research conducted.

LITERATURE REVIEW

The overall picture of the studies on financial literacy has been broken down in such a way as to deal with the following topics: the two research currents into which the applications can be divided; the methods and the explanatory variables that have been adopted; the limits of the analyses that have been carried out.

As regards the two research currents, the first one comprises the applications that ascertain the level of financial literacy of specific populations. The major analyses concern the United States, the United Kingdom and Australia. Quite often, the studies consist in large-scale sample surveys promoted by government departments, supervisory authorities and leading private banks.

Since 1946, the University of Michigan has organized a monthly survey to track attitudes and expectations of American households. Each month, a minimum of 500 adult men and women are interviewed by telephone. Every interview includes approximately 50 core questions. In 2001, the Federal Reserve Board (FRB) commissioned, for the surveys of November and December, 28 additional questions (in the form of “true or false” quizzes) regarding household financial knowledge. The FRB surveys also ascertained the diffusion of 18 financial behaviors (ranging from tracking expenses to investment diversification) and the use of 13 financial instruments (from current accounts to pension plans). The resulting picture was not encouraging: the 1,004 respondents answered correctly to little more than 60% of the quizzes; only 39% of the households were saving for long-term goals, while barely 6% invested in bonds (Hilgert *et al.*, 2003). These findings are in line with those reported in more recent studies conducted in the United States (Lusardi and Mitchell, 2007).

In 2005, the Financial Services Authority (FSA) conducted a national investigation to measure levels of financial capability in the UK. The study involved 5,328 individuals (aged 18 years or over), who were interviewed face-to-face giving answers to more than 250 questions (open and closed-ended). Each interview dealt with patterns of behavior and covered four domains: managing money, planning ahead, choosing products and staying informed. A factor analysis allowed the FSA to estimate the incidence of every behavior on financial capability. The approach involved assigning a score to each answer based on a scale ranging from 0 to 100: 0 pointed to the lack of any concept correlated to the financial world, while 100 pointed to a full ability in managing personal finances. The scores highlighted two critical areas in planning ahead and in comparing products. With reference to both areas, over 50% of the respondents failed to exceed 50 points (FSA, 2006).

Since 2002, ANZ – a major international banking group – has organized a triennial survey to evaluate the development of financial literacy across the Australian adult population. The last report dates back to 2008 and is based on 3,500 telephone interviews. Each interview included 134 core questions (open and closed-ended). A financial literacy score was calculated using the responses to a subset of 26 questions drawn from the areas of numeracy, knowledge and consumers' responsibilities. Points (ranging from +2 and -2) were allocated to each response depending on the compliance with the principles of good money management. The average points achieved in the 26 answers were multiplied by 100 to calculate the respondent's score. The maximum outcome obtained by the sample was 131, while the mean grade amounted to 83.1 (63% of the best result). The findings showed several gaps in the area of awareness of consumer rights (ANZ, 2008).

Since 1965, the Bank of Italy has organized a biennial survey with the aim of gathering data on the incomes and savings of Italian households. Over the years, the scope of the survey has grown and now includes wealth and other aspects of households' economic and financial behavior. The last report dates back to 2008. The interviews were conducted between January and September 2009. Each interview was administered face-to-face and included more than 200 questions (open and closed-ended). Questions dealt with the structure of households, their income, wealth, financial assets, the use of payment instruments, and housing. The sample involved 19,551 individuals, including 13,268 income-earners, who were distributed over about 300 municipalities. In addition to the standard questionnaire, about half of the sample (7,977 household heads) was given an extra module of 9 multiple choices on financial literacy. The quizzes was designed to determine the ability to read an account statement, calculate changes in purchasing power, evaluate the difference in the riskiness between different types of mortgage loan, and to assess knowledge of the main characteristics of supplementary pension schemes. Heads of household responded correctly to an average of 43% of the questions on financial literacy. Interviewees were significantly less informed about supplementary pension schemes: the percentage of households who knew their characteristics ranges between 20 and 33%, depending on the question.

A comparison of the results from the surveys reveals a set of common key findings. Financial literacy is strongly associated with socioeconomic characteristics: people aged 18-24 years, women, unemployed persons, singles, the less well-off and the ethnic minorities usually achieve scores significantly below the sample mean. Furthermore, there seems to be a positive correlation between the level of aptitudes and the everyday practices in the financial markets.

Several analyses specifically involve students. The most representative case is a survey administered in the United States. The Jump$tart is a non-profit organization created in 1997 in conjunction with the FRB. Since its foundation, Jump$tart has been conducting national surveys of high school seniors to measure their financial literacy biennially. Students take a standard 31 multiple choice test in classes. The topics concern: money management, saving and credit. The last survey dates back to 2008; a sample of 6,856 students was investigated. They answered 48% of the questions correctly (Mandell, 2008).

Various scholars uphold that the poor scores ascertained are not representative of the actual diffusion of financial capability. Specifically, they adduce the financial literacy level is higher. Scholars point to the limits of the survey techniques (Lusardi, 2008): the latter

investigate for the most part the basic knowledge, neglecting attitudes and motivations, which succeed in exalting individual competence.

A further explanation of the poor performances relates to the difficulties in building data sets which describe the behavior of households (Martin, 2007). Unlike corporate-related data, such information is not directly available and needs to be surveyed. The collection is costly and may only be occasional, to the detriment of the data surveying experiences. Furthermore, the data collection is hindered by the consumers' reluctance to provide personal information.

The second field of study concerns the assessment of educational programs. The number of the applications is limited and the analyses involve for the most part younger population groups. The following paragraph shall refer in chronological order to several representative investigations providing details on the research methods applied. Such information proves expedient to interpret the solutions adopted in the empirical analysis of section 3.

In 1998, Chen and Volpe investigated the determinants of financial capability among college students. They administered by mail 924 questionnaires, including 44 multiple choices on financial knowledge and behaviors. The survey involved 13 campuses, located in the Eastern part of the United States. Students with a percentage of correct answers higher than the sample median were classified as those with relatively more capability. This dichotomous characteristic was used in a logistic regression as the dependent variable. The predictors adopted in the study were the academic discipline and the class rank. Chen and Volpe concluded that the less able group was more likely not to be studying business have less work experience and was usually younger and female.

In 2001, Hirard and Zorn tested the attitude of the program 'Affordable Gold' to reduce borrower delinquency rates. The program was conceived by Freddie Mac in 1993: in order to purchase an Affordable Gold mortgage, Freddie Mac required the borrower had to receive homeownership counseling. Lenders were free to determine the type of the recommendation; they only had to record how the advice was administered. A total of 39,233 loans were considered in the analysis. Of this number, 1,221 mortgages were exempt from advice. A comparison of the mean delinquency rate of borrowers with similar risk characteristics was performed. Hirard and Zorn deduced classroom and individual sessions significantly mitigated the risk.

In 2003, Hilgert, Hogarth and Beverly explored the connection between knowledge and behavior. They analyzed the responses collected through the University of Michigan surveys in November and December 2001. Households in the surveys replied to 28 "true or false" quizzes regarding financial knowledge. They also reported on 31 practices: 18 financial behaviors and the use of 13 financial instruments. These practices were categorized by Hilgert, Hogarth and Beverly into four financial activities: cash flow management, credit management, saving and investments. An index was constructed measuring the diffusion of the activities between the sample. The study revealed a positive connection between the index level and the number of correct responses on knowledge. Unfortunately, the authors neglected to deepen the statistical significance of the correlation. Hilgert, Hogarth and Beverly also did not ascertain the direction of causality; however, they suggested households who reported learning a lot from personal experience were more likely to achieve higher scores. Coherently, they advocated that financial education campaigns and learning tools might be coupled with practical experiences to elicit the desired behavioral changes in financial-management practices.

In 2004, Worthington used an ordered logit model to predict financial literacy on the basis of socio-demographic characteristics. The author examined the data collected in 2002 by the banking group ANZ. Respondents were divided into quintiles based on their financial literacy scores. The quintile ranking was modeled as the dependent variable of the study. Worthington specified four groups of predictors. The first group comprised several proxies for characteristics exposing respondents to financial literacy, including gender, age, household structure, geographical location, ethnicity and access to labor. The second group related to school education, while the third reflected the active participation in the financial

markets through the use of debts. The fourth group of predictors regarded income, consumption and investments; the underlying assumption was individuals with more resources have a greater incentive to learn about finances in view of the higher costs of an unskilled administration. The evidence suggested a higher financial literacy in the 50-60 age group, among professionals, managers and those who have a university degree with a higher level of income, savings and debt.

Elliehausen, Lundquist and Staten have examined the impact of credit counseling sessions on borrowing (2007). The counseling was administered (face-to-face or by telephone) in 1997 by five certified agencies located in distinct cities. The analysis considered the credit profile of 73,880 consumers, of which 7,979 participated in debt sessions. The profiles were provided by a credit bureau and were kept under observation from June 1997 to June 2000. The data collected were evaluated having recourse to a logistic regression model. In order to measure the change in each profile, several dependent variables were adopted, treating them separately, including an overall index of creditworthiness, the number of accounts with positive balances and the debt load. The analysis showed improvements were associated with the participation in the debt sessions, even though most of the progress was due to consumers' specific characteristics.

In 2007, Chang and Lyons analyzed the effectiveness of the program 'All My Money', developed by University of Illinois in 1997. The program was designed to teach low-income consumers financial skills using modules of 60 minutes each. The authors adopted a retrospective test to collect evaluation data from the program participants. Specifically, consumers were asked to think back and indicate (on a 4-point Likert scale) how their level of financial ability had changed as result of the participation in the program. Between 1998 and 2002, 602 evaluations were collected. Responses were assessed by an OLS regression. Significant enhancements were observed for those who reported lower initial ability, with more modules completed.

In 2010, Monticone investigated the determinants of financial literacy using the 2006 wave of the survey conducted by the Bank of Italy on household income and wealth. The 2006 wave of the survey covered 19,551 individuals and 7,768 households. About half of the sample (3,992 family units) was given 6 multiple choices on financial literacy, 3 of which were repeated in the 2008 survey. To identify the main determinants of knowledge, Monticone constructed a dependent discrete variable obtained from the number of correct answers to the 6 financial quizzes. A generalized method of moments (GMM) was performed to estimate the relationship between financial wealth and literacy. Empirical results indicated that wealth had a positive but small effect on the degree of financial knowledge. Furthermore, greater education was associated with greater financial literacy, suggesting that general education might decrease the cost of acquiring additional capability.

In 2011, Cappelletti, Guazzarotti and Tommasino measured the strength of annuity demand. They used the 2008 survey of the Bank of Italy on household income and wealth. The 2008 wave included questions on the preference for annuities, which were completed by 7,124 household heads. Specifically, questions detected the availability to transform a regular life-long stream of payments at retirement into a lump sum. To clarify the determinants of preferences, responses were investigated performing an ordered probit model. To better assess the role of financial literacy, Cappelletti, Guazzarotti and Tommasino included as regressors two quizzes on financial knowledge contained in the survey. The results of the analysis highlighted the importance of wealth, formal education and (to a lesser extent) financial literacy in shaping annuity demand.

A comparison of the studies reveals a set of common features. As for the methods of analysis, most applications have recourse to regression models that have to interpret the financial capability determinants. As for the limits, the articles present the same weaknesses as the first research field, and they are compounded by the numerousness and geographic distribution of the samples being examined, not infrequently more circumscribed, with a regression equation capacity to explain on average no more than 20-22% of the phenomenon being analyzed.

DATA AND METHODOLOGY

The main objective of the presented empirical analysis is testing the hypothesis that financial experience, gained with the daily use of different products and services, has a relevant effect on the acquisition of financial literacy. A multivariate regression analysis is performed with a view to identifying the determinants of financial literacy, following the prevalent methodology, applied in Lyons, Rachlis, Scherpf (2007), Guiso, Jappelli (2008), and Monticone (2010).

The data set is composed by the responses collected by the Bank of Italy through the Survey on Household Income and Wealth in 2008. The interviews were conducted between January and September 2009. Questions dealt with the structure and socio-demographic profile of households, their income, wealth, financial assets, the use of payment instruments and housing. The survey covered 19,551 individuals, including 13,268 income-earners. In addition to the standard questionnaire, about half of the sample (7,977 household heads) was given an extra module of 9 multiple choices on financial literacy. The quizzes were designed to determine the ability to read an account statement, calculate changes in purchasing power due to inflation, evaluate the difference between several types of mortgage loans, assess the knowledge of the main characteristics of supplementary pension schemes and understand the riskiness of different investments (e.g. bonds vs shares). The dependent variable of our regression model, *Fin_Lit*, is a simple measure of financial literacy, obtained from the number of correct answers to the 9 Bank of Italy quizzes. Formally, this requires two conceptual steps to be made. First, we assign a point in case of correct answer for each quiz (0 otherwise) and use the total obtained score to measure the respondents' financial literacy. Thus our measure is a discrete quantitative variable that assumes the values {0, 1, …, 9}. The second step is to consider it as a continuous variable, that is possible because both it is a score, and its levels are sufficiently dense.

The choice of the OLS model to fit the data is motivated principally by its robustness and the ease of the interpretation of its output. As regressors, in conformity with Beal, Delpachtra (2003), and Worthington (2004), we include four groups of explanatory variables. The first group of variables comprises several proxies for characteristics exposing respondents to financial literacy, including the followings (every time we define a set of dummy variables, the first one is omitted in the model to avoid multicollinearity problems):

- **Age**. Some previous studies (e.g. Monticone, 2010) showed that the relationship between age and financial literacy is concave (the number of correct answers increases up to middle age and then declines). In order to test this relationship and avoid multicollinearity problems deriving from including in the regression both age and its square, the model incorporates the squared difference between the age of each respondent and the sample median (*Age*);
- **Gender.** A dummy variable, named *Gender*, takes the value of 1 for males and 0 for females;
- **Residence.** The corresponding dummy variables are *North*, *Centre* and *South/Islands*, following the classification defined by the National Institute of Statistics (ISTAT); in addition to this, we introduce a measure of the town size (which takes the following values: 1= up to 20,000 inhabitants; 2= 20,000-40,000 inhabitants; 3= 40,000-500,000 inhabitants and 4= more than 500,000 inhabitants);
- **Marital status**. Respondents were divided in people married or living together (*Couple*), single (*Single*), separated/divorced (*Sep_Div*) or widow (*Widow*);
- **Occupation.** Several categories were defined together with the relative dummy variables: *Workman* for blue collars, *Clerk_Teach* for employees and teachers of primary and secondary schools, *Off_Man*, for officials and managers (including university professors); *Prof_Entr* for professionals and entrepreneurs, *Self_employed* for people working independently, *Unemployed* for people in search of a stable occupation, *Retired* for retired workers, *Pensioner* for people perceiving disability, survivor's pensions or other old-age welfare benefits, and a residual category, named *Other_unemployed*, for other not employed people (e.g. students). In addition, we also include some dummy variables to consider the sector of activity following the

Bank of Italy classification (*No_sector* for people without occupation, *Agri* for agriculture, hunting, forestry, fishing, fish-farming and related services; *Factories* for mining, food products, beverages and tobacco, textiles, clothing, leather products, wood products, paper, chemicals, metal products, other manufactures, production and distribution of electricity, gas and water; *Buil* for building and construction; *Trade* for wholesale and retail trade, repair of motor vehicles and motorcycles, lodging and catering services; *Trans* for transport, warehousing and transport support services,e.g. post and postal services, information and communication services; *Fin* for finance and insurance; *Services* for real-estate and rental services, travel agencies, IT services, other services; *Dom* for domestic services for households, production of goods and services by households for own consumption; *Public* for general government, defense, education, health, compulsory social contributions and social welfare; *Org* for extraterritorial organizations and entities and *Leisure* for art, sport, entertainment and leisure activities). In order to catch more information on past and present occupation, we also include a series of dummy variables related to the job experience accumulated in the whole life of the respondent (*No_exp*, for people having no experience; *Payroll* for people having experience only as a payroll employee; *Self* for people having experience only as a self-employed worker and *Empl_Self* for people having both types of experience). Finally, we incorporate a variable counting the number of years passed from the beginning of the first job experience (*Work_years*).

- **Household features.** First of all, we define a variable counting the number of household members (*Household_size*) and income earners (*Income_earners*). We also account for the mean age of household components without any perceived income (*Age_no_inc*), in order to catch the (possibly) different effect of the presence of children or elderly people. In addition, we include a set of binary variables considering the ownership and the use of computer, Internet and remote banking (these dummy variables are not mutually exclusive, so they are all included in the regression model): *PC_use,* taking the value of 1 for people using a computer (and 0 otherwise), *PC_home* for people having a computer at home, *Web* for people using the Internet, *E-buyer* for people purchasing over the Internet and *E-bank* for people using remote banking services.

The second group of variables regards income, consumption and household wealth; the underlying assumption is that individuals with more resources have a greater incentive to learn about finance in view of the higher costs of a poor management (Bernehim, 1998). In addition to these, we include some variables that describes the behavior of the respondents with respect to money management. We include the following variables:

- **Household income and wealth.** First of all, we account for the total value of the household wealth (*Wealth*) and available income (*Income*). With reference to the former, the study succeeded in considering also the weight of real assets over total wealth, that is of particular interest for Italian households with respect to other European countries. We also include a set of dummy variables relative to the tenure of the principal residence (*Own_home* for houses owned by the household, without any mortgages or debt; *Debt_home* for houses owned by the household with a mortgage or other types of debt; *Rent_home* for houses rented, sublet or occupied under redemption and *Use_home* for houses occupied in usufruct or free of charge). With reference to the income, two variables account for the weight of income deriving from financial and real assets over the total household income (respectively, *Fin_Income* and *Real_income*). Given that the conduct of people may depend more on the perceived wealth than from the effective one, we also include the answers given to the following question (*Econ_condition*): Is your household's income sufficient to see you through to the end of the month? Scores are attributed as follows: 1= with great difficulty; 2=with difficulty; 3= with some difficulty; 4= fairly easily; 5= easily; 6= very easily. A final indicator of the household wealth is also the percentage of income devoted to satisfy primary needs, in particular food (*Foodex_Income*). Given that most variables are related to the whole household while

for financial literacy we analyze answers from single respondents, we also include the percentage of total available income for the respondent over the total for the household (*%Head_Income*). To measure the eventual impact of the presence of more than one worker in the household we also calculate the weight of other components labor income, both as payroll employees (*Other_payroll*) and self employed workers (*Other_selfempl*) over the total household income.

- **Money management.** In order to consider the main attitudinal aspects of respondents with respect to the management of money, we include the saving rate (*Savings*) and some other variables indicating the level of risk aversion and liquidity propensity. With reference to the former (*Risk*), we incorporate answers to the following question: In managing your financial investments, would you say you have a preference for investments that offer? The following codification is adopted (1= very high returns, high risk; 2= good return, fair degree of protection; 3= fair return, good degree of protection; 4= low returns, no risk). To measure the liquidity propensity, we include different variables: the monthly amount of cash expenses (*Cash*), the liquidity stock maintained by the household (*Liq*) and answers to the following question: Imagine you are 65 years old and receive a total pension income of 1,000 euros a month (adjusted for inflation). For which amount would you be willing to give up half that pension? The following codification is adopted: 1=none; 2=for 60,000 euros; 3=for 80,000 euros; 4=for 100,000 euros.

The third group of variables relates to formal education, in order to give additional information with respect to the socio-demographic and economic profile of the respondents, including the following regressors:

- **Educational level**. The corresponding variable, *Edu*, is equal to the years of schooling (calculated on the basis of the highest educational title obtained, from elementary school to university degrees); in addition to this, we include some variables to account for the educational level of other household components, because we believe that people living together can influence each other with their culture and knowledge. A dummy, *Higher_Edu_d*, takes the value of 1 if there is at least one household component with a higher educational level than the respondent and 0 otherwise; *Higher_Edu%* measures the number of higher educated components over total components in the household.

Finally, the fourth group of variables reflects the experience resulting from the active participation in the capital market through the holding of financial assets and the use of specific products:

- **Financial assets holding and experience**. With reference to the whole household, we include a simple count of financial assets relative to both the end of 2008 (*FinAss_hold*) and the entire lifetime of respondents (*FinAss_exp*). These variables can take values between 0 (for people without any type of financial assets) and 6 (for people holding or having experience of all the considered types of financial assets). The classification considered is the following: certificates of deposits, repos and post office savings certificates; domestic government securities, bonds and cooperative loans; mutual funds and managed savings; shares; foreign securities (Bank of Italy, 2010). In addition, we also include *Ins_hold* as the number of type of insurance policies hold. The variable can range from 0 to 4. The classification considered is the following: life insurance products; supplementary pensions; health insurance – accident and illness; other household insurance, excluding compulsory motor vehicle insurance (Bank of Italy, 2010). The model incorporates also variables related to the number of checking accounts hold by the household (*N_accounts*), the number of different banks with whom the household has a relationship (*N_banks*), the number of debit cards (*N_debit_cards*), credit cards (*N_credit_cards*) and prepaid cards (*N_prepaid_cards*) owned. Financial experience is also measured by the variable named *N_financial_services*, calculated as a count of services actually used at the main financial intermediary by respondents (Devlin, 2002). The reference is a list defined on the basis of the Bank of Italy survey (payment of utility bills; payment of rent, condominium charges, etc; payment of credit card; mortgage payments; crediting of salary; custody and settlement of securities;

trading of securities; insurance policies; consumer credit; personal loans; individual portfolio management; interactive online services and online information services). By definition, the main financial intermediary is the operator which is mainly used by the household.

The Bank of Italy survey offers a huge amount of information on the respondents: the regressors included in the final model were selected on the strength of a stepwise procedure, with a view to improving the fit of the model and, at the same time, cause the latter to make sparing use of variables and, therefore be more easily interpreted.

Consistently with the aim of the paper, we pay particular attention to the last group of variables, expecting to find a positive and significant relationship between the experience gained with the daily use of financial products/services and the attained level of financial literacy. The idea that people learn financial skills through the daily use of financial products and services, with also trials and errors, has been already suggested by various studies (e.g. Beal and Delpachitra, 2003) but, at our knowledge, there are only very few empirical analyses specifically focusing on this issue. Peng *et al.* (2007) analyze financial literacy among randomly-selected alumni of a large mid-western university also accounting for the impact of financial experience. First they define variables accounting for childhood experiences, represented by parents' saving habits, holding of a bank account before 18 and stock or bond ownership before 16. Second they include variables considering current practices: stock or bond ownership, business ownership, and home ownership. Finally, they specify a regression model to explain financial literacy, progressively introducing variables regarding education, financial experience, income and inheritance and demographic characteristics. They find that having a bank account before the age of 18 and currently ownership of bonds or stocks have a positive impact on financial literacy. Anyway the impact of financial experience is not exactly isolated from that of other regressors, because the relative set of indicators is included as the second of four groups of variables. This paper aims to advance the existing literature assessing the impact of financial experience on financial literacy in a more accurate way. At this aim, the above defined groups of variables are progressively introduced in the regression model, following this order: demographic characteristics together with income, education and financial experience. The improvement that results from the inclusion of each group of regressors with respect to the model accounting only for the socio-demographic and economic profile of the respondents is measured by the Bonferroni index, that is the relative increment of the R-squared measure of goodness of fit.

RESULTS

First of all, we can observe some descriptive statistics of our measure of financial literacy, that is the number of correct answers to the 9 Bank of Italy quizzes on financial knowledge.

Table 1 – Number of correct answers to financial literacy questions

Fin_Lit	Freq.	%
0	829	10.39%
1	704	8.83%
2	845	10.59%
3	1,065	13.35%
4	1,240	15.54%
5	1,194	14.97%
6	894	11.21%
7	699	8.76%
8	406	5.09%
9	101	1.27%
Total	**7,977**	**1**

Source: our elaboration on Bank of Italy data (2010)

It is possible to note that a considerable portion of respondents (more than 10%) is not able to provide any correct answer. At the same time an insignificant part of the sample

(about 1.3%) shows a very high performance, responding correctly to all questions. Italian households' knowledge of financial matters seems to be still quite low, even though some improvements have been registered since the previous edition of the Bank of Italy survey. However results are not perfectly comparable, because only 3 questions are the same in both editions of the survey. For these questions, it is possible to observe an increase in the percentage of correct responses, '*probably reflecting both the rising level of educational attainment of the population and the greater attention that households pay to these matters in times of economic crisis'* (Bank of Italy, 2010). In order to understand what determines different levels of financial literacy among people, we perform a multivariate regression model, progressively introducing different sets of possible explanatory variables. First, results are shown for the basic model including only regressors relative to the socio demographic and economic profile of the respondents (see Table 2).

Table 2 – Model 1: financial literacy explained by socio-demographic and economic variables

	Coef.	Std. Err.	T	P-value
constant	3.0672660	0.134430	22.82	0.000
Age	-0.0006335	0.000084	-7.53	0.000
Gender	0.1669640	0.051780	3.22	0.001
Centre	0.4305255	0.055258	7.79	0.000
Sep_Div	0.2527645	0.088446	2.86	0.004
Widow	-0.7358196	0.067336	-10.93	0.000
Clerk_Teach	0.6844996	0.069130	9.90	0.000
Off_Man	0.9502885	0.124470	7.63	0.000
Fin	1.0569540	0.138049	7.66	0.000
Empl_Self	0.7384776	0.067342	10.97	0.000
PC_home	1.1075520	0.050975	21.73	0.000
Econ_condition	0.3553913	0.018948	18.76	0.000
Risk	-0.2790757	0.031081	-8.98	0.000
N. obervations	7,977			
R-squared	0.2950			
Adj R-squared	0.2939			

Source: our elaboration on Bank of Italy data (2010)

The negative coefficient for *Age* is consistent with the hypothesis of a U-shaped relationship between age and financial literacy. Given that *Age* was defined as the squared difference with respect to the sample median, that is equal to 58 years, the negative sign reveals that elderly people have a lower performance with respect to middle aged persons, in line with the findings of previous studies (e.g. Monticone, 2010). The positive coefficient for *Gender* indicates a higher level of financial literacy for men with respect to women, as in most existing analyses (e.g. Chen and Volpe, 1998; Beal and Delpachitra, 2003; Worthington 2004; Monticone, 2010). With respect to the residence area, people living in the centre of Italy show a better score than others (the dummy omitted to avoid multicollinearity problems was *North*). In terms of marital status, we find that separated and divorced persons perform better than people married or living together, while widows have a lower financial literacy score. These findings are similar to Monticone (2010) even though in her study the positive coefficient for separated and divorced respondents was not statistically significant at the 90% confidence level.

Examining occupational variables, the resulting coefficients for included variables are in favor of an advantage for white collars, teachers, officials and managers, with respect to the omitted category (workmen). This is in line with our expectations and with previous literature. Worthington (2004, p. 11) suggests that '*white collar occupations are associated with higher levels of financial literacy, with some occupations having more reliance on skills included within financial literacy, say, mathematical skills. Positive coefficients are hypothesized for white collar occupations, especially those involving business management or ownership; negative coefficients for blue collar occupations, primarily those in semi-skilled*

and unskilled trades'. In terms of sectors of activity, the only evidence is the higher performance of people working in the financial services industry, that is a quite obvious result. Finally, our findings show that respondents with job experiences both as payroll employees and as self employed are more financially literate that people without any job experience. The positive impact of work experience on financial literacy was often found in previous studies (e.g. Chen and Volpe, 1998) and can be explained by the ability in the management of one's budget that people part of the workforce generally develop.

The positive coefficient for *PC_home* indicates a positive relationship between technological literacy and financial literacy, as suggested in Servon and Kaestner (2008).

In terms of household income and wealth, the stepwise procedure selected the variable *Econ_condition* instead of more detailed variables. It seems that this indicator is able to catch the effect of economic wellbeing and also the impact of respondents subjective perceptions. The positive sign of the relative coefficient shows that people with less economic difficulties reach a higher level of financial literacy as in most previous studies (e.g. Beal and Delpachitra, 2003).

The negative sign for *Risk* reveals that people more risk adverse have a lower level of financial literacy. This result is consistent with Beal and Delpachitra (2003, p. 9) outlining that people with a higher risk aversion '*are likely to have less financial experience, knowledge and confidence and a high score in this factor will tend to depress the financial skills and knowledge score*'.

The basic model with the inclusion of regressors describing the socio demographic and economic profile of respondents has a quite good fit, with a R-squared index of 29.5% and all the included variables statistically significant at the 99% confidence level. As a second step, we add the variables relative to the educational level of the respondents. Results are shown in Table 3.

Table 3 –Model 2: financial literacy explained by socio-demographic, economic variables and education

	Coef.	Std. Err.	T	P-value
constant	2.0720160	0.14183830	14.61	0.000
Age	-0.0006715	0.00008330	-8.06	0.000
Gender	0.1889182	0.05044770	3.74	0.000
Centre	0.4074534	0.05382780	7.57	0.000
Sep_Div	0.1524648	0.08652900	1.76	0.078
Widow	-0.4322387	0.06724060	-6.43	0.000
Clerk_Teach	0.3362369	0.06948360	4.84	0.000
Off_Man	0.4897230	0.12341080	3.97	0.000
Fin	0.8042896	0.13497370	5.96	0.000
Empl_Self	0.6463276	0.06574180	9.83	0.000
PC_home	0.7579005	0.05494370	13.79	0.000
Econ_condition	0.2597693	0.01900940	13.67	0.000
Risk	-0.2256136	0.03037350	-7.43	0.000
Edu	0.1389319	0.00681480	20.39	0.000
Higher_Edu_d	0.1497111	0.05469100	2.74	0.006
N. obervations	7,977			
R-squared	0.3316			
Adj R-squared	0.3305			

Source: our elaboration on Bank of Italy data (2010)

As we can see, the sign and the statistical significance of regressors remain absolutely stable with respect to Model 1. Regarding new regressors, the variable counting years of schooling (*Edu*), as expected, assumes a positive coefficients. We also find evidence of a "family effect", because the presence of a person with a higher educational level than the respondent has a positive impact on financial literacy. This is consistent with Monticone (2010) and also with Mandell and Klein (2007) finding a better performance for high school students having a college graduate parent.

The Bonferroni index is equal to 0.0519, meaning that the introduction of educational variables increase the fit of the model of about 5.2%. With respect to Model 1, the only relevant change is that the T statistic for the dummy variable relative to separated and divorced people (*Sep_Div*) is strongly reduced and its p-value is no more less than 0.05. Dropping this variable, the fit of the model (in terms of R-squared) is equal to 33.14% instead of 33.16%, so we decide to keep parsimonious and eliminate the dummy.

As a final step, we introduce the group of variables describing financial experience. Results are shown in Table 4.

Table 4 –Model 3: financial literacy explained by socio-demographic, economic variables, education and financial experience

	Coef.	Std. Err.	T	P-value
_cons	1.87279	0.13374	14.00	0.000
Age	-0.00040	0.00008	-5.12	0.000
Gender	0.10791	0.04637	2.33	0.020
Centre	0.41633	0.05087	8.18	0.000
Widow	-0.48411	0.06232	-7.77	0.000
Clerk_Teach	0.29266	0.06569	4.46	0.000
Off_Man	0.25335	0.11684	2.17	0.030
Fin	0.38620	0.12797	3.02	0.003
Empl_Self	0.43183	0.06245	6.91	0.000
PC_home	0.38961	0.05358	7.27	0.000
Econ_condition	0.05705	0.01899	3.00	0.003
Risk	-0.16664	0.02870	-5.81	0.000
Edu	0.09511	0.00660	14.41	0.000
Higher_Edu_d	0.11191	0.05202	2.15	0.031
FinAss_exp	0.34075	0.02344	14.54	0.000
Ins_hold	0.23835	0.03232	7.37	0.000
N_debit_cards	0.30193	0.03144	9.60	0.000
N_financial_services	2.30776	0.24132	9.56	0.000
N. obervations	7,977			
R-squared	0.4081			
Adj R-squared	0.4068			

Source: our elaboration on Bank of Italy data (2010)

As we can see, the sign and the statistical significance of regressors remain stable with respect to Model 2. In addition, several variables measuring financial experience assume a positive and highly significant coefficient. First, there is a positive relationship between the level of financial literacy and the count of financial assets categories of which the respondent has had experience in his/her life (*FinAss_exp*). It is not surprising that people with experience in deposits and savings, bonds, mutual funds, shares, etc. are more frequently able to correctly answer to the Bank of Italy quizzes, including questions about difference in risk between several forms of investments. A positive impact is also found for the ownership of insurance policies other than the compulsory motor insurance, *Ins_hold***.** Holding an insurance product, especially a life contract with a long term savings investment content, may have a positive impact on the respondent's awareness about the role of inflation. In addition to this, several insurance policies have also the function of supplying a second pillar to the public social security scheme, giving knowledge about supplementary pensions that are the central subject in 4 of 9 of the Bank of Italy quizzes. The positive coefficients for *N_debit_cards* reveals a positive effect on financial literacy for people having practice with payment instruments. It is also worth highlighting that people holding a debit card generally have a banking or a postal checking account and so a continuous relationship with a financial intermediary. Finally, as suggested by Devlin (2002), there is also a positive relationship between financial literacy and the number of financial services used at the main financial intermediary by the respondent (*N_financial_services*).

The Bonferroni index is equal to 0.1147, meaning that the introduction of financial

experience variables increase the fit of the model of about 11.5%. This provide a strong evidence of the crucial role of financial experience in explaining financial literacy, also with respect to a model already accounting for the educational level of respondents.

In terms of goodness of fit of the final model, results point to a quite high R-Squared index value (about 41%) with respect to the findings of preceding studies based on large samples and using an OLS regression, e.g. 15.64% in Tennyson and Nguyen (2001) and 25.8% in Peng *et al.* (2007). In addition to this, all coefficients are highly significant at the least at the 95% confidence level.

CONCLUSIONS

The main objective of the presented empirical analysis was to test the hypothesis that financial experience, gained with the daily use of different products and services, has a relevant effect on the acquisition of financial capabilities.

The data set was composed by the responses collected by the Bank of Italy through the Survey on Household Income and Wealth in 2008. The interviews were conducted between January and September 2009. Questions dealt with the structure of households, their income, wealth, financial assets, the use of payment instruments, and housing. The survey covered 19,551 individuals, including 13,268 income-earners. In addition to the standard questionnaire, about half of the sample (7,977 household heads) was given an extra module of 9 multiple choice tests on financial literacy. The quizzes were designed to determine the ability to read an account statement, calculate changes in purchasing power, evaluate the difference in the riskiness between different types of mortgage loan, and to assess knowledge of the main characteristics of supplementary pension schemes.

To identify the main determinants of the attained level of financial literacy, we defined a dependent variable obtained from the number of correct answers to the 9 Bank of Italy quizzes. A statistical analysis was performed using an OLS regression model. In conformity with the prevalent literature, we involved four groups of explanatory variables. The first group comprised a few proxies for characteristics exposing respondents to financial literacy, including in particular such variables as gender, age, household structure, area of residence, and access to labor. The second group of variables regarded income, consumption and household investments; the underlying assumption was that individuals with more resources have a greater incentive to learn about finances in view of the higher costs of a poor management. The third group of variables related to formal education, while the fourth reflected the experience resulting from the active participation in the capital market through the holding of financial assets and the use of specific products.

Consistently with the aim of the paper, we paid particular attention to the last group of variables, expecting to find a positive and significant relationship between the financial experience and the attained level of financial literacy.

The idea that people learn financial skills through the daily use of financial products and services, with also trials and errors, has been already suggested by various studies, but, at our knowledge, there are only very few empirical analyses specifically focusing on this issue. Anyway the impact of financial experience is not exactly isolated from that of other regressors. This paper wished to mitigate this gap assessing the impact of financial experience on financial literacy in a more accurate way. At this aim, the above defined groups of variables were progressively introduced in the regression model, following this order: demographic characteristics together with income, education and financial experience. The contribution of each group of regressors was measured with the Bonferroni index.

The study indicated a higher level of financial literacy for men, white collars, teachers, officials and managers, as in most existing analyses. Furthermore, our findings showed that respondents with job experiences both as payroll employees and as self employed were more financially literate that people without any job experience. In terms of sectors of activity, the only signal was the higher performance of people working in the financial services industry, that is a quite obvious result. In line with the findings of previous studies, there was evidence of an inverse *U*-shaped age profile of financial literacy, meaning middle-

aged adults report higher scores than both their younger and older counterparts. In terms of marital status, we found that widows have a lower financial literacy score. These findings are similar to Monticone (2010). In terms of household income and wealth, people with less economic difficulties reached a higher level of financial literacy as in most previous studies. Years of schooling, as expected, was positively correlated with capabilities. We also found evidence of a "family effect", because the presence of a person with a higher educational level than the respondent has a positive impact on financial literacy. This is consistent with Monticone (2010) and also with Mandell and Klein (2007) finding a better performance for high school students having a college graduate parent. As for the financial experience, there was a positive relationship between the level of financial literacy and the count of financial assets categories of which the respondent has had experience in his/her life. A positive correlation was also found regarding the ownership of insurance policies and the number of financial services used at the main financial intermediary by the respondents.

The Bonferroni index provided a strong evidence of the crucial role of financial experience in explaining financial literacy, also with respect to a model already accounting for the educational level of respondents. In terms of goodness of fit of the model, results pointed to a quite high R-Squared index value (about 41%) with respect to the findings of preceding studies based on large samples and using an OLS regression. In addition to this, all our coefficients were highly significant at least at the 95% confidence level.

The main limitation of the analysis is given by the number of financial quizzes contained in the survey. The battery is not as rich as in some other investigations (i.e. FSA, 2006). Quizzes also cover a wide range of financial topics but often capture knowledge and numerical ability rather than motivations and confidence to plan effectively for financial needs, which can influences willingness to acquire financial literacy (Mandell and Klein, 2007). Further investigations should be devoted in order to assess this issue. To this aim, it may be useful to submit questions asking respondents to choose between several investment or financing alternatives, simulating effective decisions taken in the everyday life. Finally, the financial literacy quizzes were included in the Bank of Italy survey only for the latest two editions, in 2006 and 2008, with some relevant differences. As a consequence, we do not dispose of a longitudinal panel data to assess the direction of causality between financial experience and literacy.

This research is important because offers policymakers guidance in the adoption of effective tools to protect the consumers implementing literacy. The significant impact of financial experience on responsible decisions promotes incentives on the use of financial instruments or wealth accumulation, rather than on educational programs.

REFERENCES

ANZ (2008). *ANZ Survey of Adult Financial Literacy in Australia*, Melbourne, Australia.

Bank of Italy (2010). "Survey on Household Income and Wealth 2008", Supplements to the Statistical Bulletin No. 8, Rome, Italy, 10 February.

Beal, Diana J. and Saraht B. Delpachtra (2003). "Financial Literacy Among Australian University Students", *Economic Papers*, Volume 22, Number 1, 65-78.

Bernheim, B. Douglas (1998). "Financial Illiteracy, Education, and Retirement Saving", Mitchell, Olivia S. and Sylvester J. Schieber (eds.), *Living with Defined Contribution Pensions*, University of Pennsylvania, Philadelphia, USA, 38-68.

Cappelletti, Giuseppe, Guazzarotti, Giovanni, and Pietro Tommasino (2011). "What Determines Annuity Demand at Retirement", Working paper No. 805, Bank of Italy, Rome, Italy, April.

Chang, Yunhee, and Angela C. Lyons (2007). "Are Financial Education Programs Meeting the Needs of Financially Disadvantaged Consumers?", Working paper No. 07-02, Networks Financial Institute, Indiana State University, Indiana, USA.

Chen, Haiyang, and Ronald P. Volpe (1998). "An Analysis of Personal Financial Literacy Among College Students", *Financial Services Review*, Volume 7, Number 2, 107-128.

Devlin, James Francis (2002). "An Analysis of Choice Criteria in the Home Loans Market", *International Journal of Bank Marketing*, Volume 20, Number 5, 212-226.

Elliehausen, Gregory, Lundquist, E. Christopher, and Michael E. Staten (2007). "The Impact of Credit Counseling on Subsequent Borrow Behavior", *The Journal of Consumer Affairs*, Volume 41, Number 1, 1-28.

FSA (2006), *Levels of Financial Capability in the UK: Results of a Baseline Survey*, London, UK, March.

Guiso, Luigi, and Tullio Jappelli (2008). "Financial Literacy and Portfolio Diversification", EUI working Number. 08/31, European University Institute, Florence, Italy.

Hilgert, Marianne A., Jeanne M. Hogarth, and Sondra Beverly (2003). "Household Financial Management: The Connection between Knowledge and Behavior", Federal Reserve Bulletin Number. 89, Richmond, Virginia, USA, June.

Hirard, Abdughani, and Peter M. Zorn (2001). "A Little Knowledge Is a Good Thing: Empirical Evidence of the Effectiveness of Pre-Purchase Homeownership Counseling", Working paper No. 01-04, Joint Center for Housing Studies, Harvard University, Cambridge, Massachusetts, February.

Lusardi, Annamaria (2008). "Financial Literacy: An Essential Tool for Informed Consumer Choice?", Working paper No. UCC08-11, Joint Center for Housing Studies, Harvard University, Cambridge, Massachusetts, USA, June.

Lusardi, Annamarina, and Olivia S. Mitchell (2007). "Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education", *Business Economics*, Volume 42, Number 1, 35-44.

Lyons, Angela C., Mitchell Rachlis, and Erik Sherpf (2007). "What's in a Score? Differences in Consumers' Credit Knowledge Using OLS and Quantile Regressions", *Journal of Consumer Affairs*, Volume 41, Number 2, 223-249.

Mandell, Lewis (2008). *The Financial Literacy of Young American Adults*, Washington, USA, April.

Mandell, Lewis, and Linda Schmid Klein (2007). "Motivation and Financial Literacy", *Financial Services Review*, Volume 16, Number 2, 105-116.

Martin, Matthew (2007). "Literature Review on the Effectiveness of Financial Education", Working paper No. 07-3, Federal Reserve Bank of Richmond, Richmond, Virginia, USA, June.

Monticone, Chiara (2010). "How Much Does Wealth Matter in the Acquisition of Financial Literacy?", *Journal of Consumer Affairs*, Volume 44, Number 2, 403-422.

Noctor, Michael, Sheila Stoney, and Robert Stradling (1992). *Financial Literacy: A Discussion of Concepts and Competences of Financial Literacy and Opportunities for its Introduction into Young People's Learning*, National Foundation for Education Research, Slough, Berkshire, UK.

Peng, Tzu-Chin Martina, Bartholomae, Suzanne, Fox, Jonathan J. and Garrett Cravener (2007). "The Impact of Personal Finance Education Delivered in High School and College Courses", *Journal of Family and Economic Issues*, Volume 28, Number 2, 265-284.

Remund, David L. (2010), "Financial Literacy Explicated: The Case for a Clearer Definition in an Increasingly Complex Economy", *Journal of Consumer Affairs*, Volume 44, Number 2, 276-295.

Servon, Lisa J. and Robert Kaestner (2008),"Consumer Financial Literacy and the Impact of Online Banking on the Financial Behavior of Lower-Income Bank Customers"**,** *Journal of Consumer Affairs,* Volume 42, Number 2, 271-305.

Tennyson Sharon and Chau Nguyen (2001), "State Curriculum Mandates and Student Knowledge of Personal Finance", *Journal of Consumer Affairs*, Volume 35, Number. 2, 241-262.

Worthington, Andrew C. (2004), "The Distribution of Financial Literacy in Australia", Discussion paper No. 185 in Economics, Finance and International Competitiveness, Queensland University of Technology, Brisbane, QLD, Australia.