

CEIS Tor Vergata

RESEARCH PAPER SERIES

Vol. 9, Issue 10, No. 210 – September 2011

Financial education and investment attitudes in high schools: evidence from a randomized experiment

Leonardo Becchetti, Stefano Caiazza and Decio Coviello

**Financial education and investment attitudes in high schools:
evidence from a randomized experiment.¹**

Leonardo Becchetti, University of Rome Tor Vergata

Stefano Caiazza, University of Rome Tor Vergata

Decio Coviello, HEC Montreal and University of Rome Tor Vergata

Abstract

We experimentally study the effect of financial education on investment attitudes in a large sample of high school students in Italy. Students in the treated classes were taught a course in finance and interviewed before and after the study, while controls were only interviewed. Our principal result is that the difference-in-difference estimates of the effect of the course are not statistically significant. However, the course in finance reduced the virtual demand for cash, and increased the level of financial literacy and the propensity to read (and the capacity to understand) economic articles in both treated and control classes compared with pre-treatment baseline levels. A breakdown of the cognitive process, which is statistically significant for the classes treated, suggests that error and ignorance reduction was sizable, and that the progress in financial literacy was stronger in subgroups which exhibited lower *ex-ante* knowledge levels.

Keywords: financial education, financial literacy, demand for money balances, randomized experiment.

¹ We wish to thank Gianpaolo Barbetta, Stefano Cima, Chiara Monticone, Mario Padula and all participants at the XIXth Tor Vergata Financial Conference for useful comments and suggestions. Managerial support from Marco Bracaglia and the Osservatorio sul Credito, and financial support from Unicredit, Fondazione Cariplo, Fondazione Carige and JP Morgan are gratefully acknowledged.

1. Introduction

Financial education is becoming an increasingly investigated dimension among the determinants of human capital formation and development, especially in the wake of the global financial crisis. This is because amid the turbulent financial environment of globally integrated economies, in which individuals are increasingly required to take financial decisions, the lack of a financial education may produce a number of negative effects on individual and aggregate wellbeing. From an individual point of view, it may lead people to be over-indebted and to fall into debt traps, with serious consequences not only on their productivity and financial conditions, but also on their health (Keese and Schmitz, 2010), thereby increasing the number of borrower bankruptcies at aggregate level, and imposing a high burden on government assistance.² More generally, financial ignorance increases the information asymmetry between the investor and the financial advisor, thereby worsening the impact of potential conflicts of interest of the latter. Both factors have the effect of exacerbating the economic and social consequences of financial shocks and crises. These considerations emphasise the importance of research in financial education, which performs the important role of documenting a novel, original contribution of human capital to individual wellbeing, following the well-known contributions in the literature relating to its impact on individual earnings (returns to schooling),³ crime (Wolfe and Haveman, 2002), health (Lleras-Muney, 2005 and Cutler and Lleras-Muney, 2008) and social capital (see, among others, Gibson, 2001; Milligan et al., 2003 and Dee, 2003).

According to the OECD, *“financial education is the process by which financial consumers/investors improve their understanding of financial products and concepts and, through*

2 To provide an example on this point, Lusardi and Mitchell (2008) underline that baby boomers in the U.S. are approaching retirement with very low levels of financial wealth, thereby creating a potential factor which is likely to increase individual bankruptcies and the cost of social assistance in the future.

3 For a survey and results on returns to schooling in various countries see, among others, Psacharopoulos and Patrinos (2002) and Card (1999).

information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being” (OECD, 2005). Financial education may therefore be conceived as involving two main steps (both of which will be considered in our empirical analysis): the first, related to *financial literacy*, in which individuals learn concepts and understand the way financial systems and products function; and the second, one related to *financial empowerment*, in which what they have learned helps them to improve their decision-making processes.

Given that a fundamental part of our knowledge is developed at school, it is no wonder that recommendations by international institutions and financial education programs consider it crucial to begin cultivating financial literacy in the school years, even though most financial decisions are taken in adulthood.⁴ Financial education at a young age is also important because an increasing number of young people are becoming involved with debt and financial management issues with

4 According to the OECD “*Financial education should start at school, for people to be educated as early as possible*” (OECD, 2006). The importance of financial education has also been noted by the European Commission in the *White Paper on Financial Service Policy* in the period between 2005 and 2007, and the *Green Paper on Retail Financial Service in the Single Market* in 2007. The importance of financial education in the U.S. has been emphasized, among others, by the 2006 review “Taking Ownership of the Future”. In the U.K., after verifying the poor performances in primary and secondary schools, the Financial Services Authority (FSA) launched a national plan (*the National Strategy for Financial Capability*), while other projects (*Citizens Advice Frontline Training, On Your Own 2 Feet, Money Doctors*) focus on students between 11 and 19 years old and adults. In 2006, the *Consumer Financial Education? Body (CFEB)* was created with the goal of promoting financial education. In France, the “*Federation Bancaire Francaise*” has organized courses of financial education in French schools, and in 2006 the *Institut pour l’Education Financière du Public* was created to coordinate state and private initiatives on financial education. In Germany, the “*SchülerBanking*” project provides financial education to scholars in collaboration with the *Jugend und Bildung association*, which includes financial experts, members of labour and industrial unions and representatives of the Ministry of Education. Recently, a joint project has been instituted between the *Bundesbank* and the Ministry of Finance to create a network of institutions which will support financial lectures in schools. In Spain, the “*Educación y asesoramiento financiero*” project, a private initiative with economic support from the *Ministerio de Educación, Política Social y Deporte*, provides financial education to families in order to help them to solve their financial problems.

the accumulation of credit card debts, or because they are required to repay student loans at the end of their university studies (Lusardi, Mitchell and Curto 2009).

The burgeoning interest in financial education since the financial crisis makes understanding whether *ad-hoc* courses can significantly improve financial education in schools an urgent matter. Starting from a wider perspective, even though the field is relatively new, there have been several contributions which have looked at levels of financial literacy and education among adults (see, among others, Lusardi and Mitchell, 2009; Lusardi, 2004; and Clancy et al., 2001) but very few papers which have attempted to evaluate the impact of financial education on the young. Among these, Boyce and Danes (1998) show that a minority of students who took part in the High School Financial Planning Program started to save or increased their savings, Mandell (2008) documents that Chicago students in ten classes slightly improved their financial literacy after the course, while Mandell (2005) finds no evidence of an increase in knowledge (but a higher propensity to save) in 17-19-year-old students who were taught financial education in high schools. Only a very few papers in this literature go beyond descriptive evidence. Among these, econometric findings from an *ex-post* survey show that adults who participated in a financial education course at a young age have slightly higher saving rates (Bernheim et al., 1997), while a pseudo-randomized, natural field experiment documents that 13-19 year old students exhibit higher saving rates and modify their budgeting choices based on the information received during the course (Carlin and Robinson, 2010).

The goal of our research is to make an original contribution to this literature by implementing a randomized experiment (to our knowledge the first in this field) measuring the causal impact on financial literacy and virtual portfolio investment of a sixteen-hour course in finance held for a large sample of students in thirty-six Italian classes. The effect was evaluated with a questionnaire which was administered before and after the standardized course.

Our approach is original in the literature, especially if we consider impact evaluations of financial education and the narrower subfield of impact studies of financial education in schools. The

distinctive feature of the paper is that (as typically occurs in randomized experiments) the construction of the treatment and control samples was devised *ex-ante* (i.e. before the treatment), and not derived *ex-post*, thereby controlling for all possible confounding factors and limiting the problems of endogeneity which typically affect those impact studies in which treatment occurs before empirical analysis, which are designed for and usually targeted at less-educated students. A typical example of endogeneity is well described by Jappelli and Padula (2010). With a simple two-period model in which financial education is a form of investment in human capital, the two authors show that lower inter-temporal discount rates generate both higher investment in financial education and higher savings, thereby creating a spurious positive correlation between the last two variables. In our paper, we show that the difference-in-difference estimations of the impact of the course are not statistically significant. However, the course in finance reduces virtual demand for cash, and increases the level of financial literacy and the propensity to read (and the capacity to understand) economic articles in both treated and control classes compared to pre-treatment baseline levels. In the paper, we also try to shed light on the ‘black box’ of cognitive processes by looking at transitions among the three states (ignorance, error and correctness) measured in our treatment. We also look at gender, motivation (the desire to go to university) and school performance splits, and find evidence of “learning convergence”, since the effect of the course is stronger in subgroups with lower *ex-ante* financial literacy. The findings from our empirical analysis are intended to provide insights for policy advice as to the most effective use of resources invested in financial education, even though our short-run measurements of the effects of financial education would suggest prudence, given that other authors have shown that measures of intended behavior are likely to dramatically overstate the actual effects of financial education (Choi *et al.*, 2004).

The paper is divided into six sections (introduction and conclusions included). In the second section, we outline our experimental design. In the third and fourth sections, we describe the data and illustrate the descriptive results. In the fifth section, we present findings from the econometric model. In the sixth section, we draw our conclusions.

2. The experimental design and the information available

The sample was composed of 944 students in 36 classes enrolled in the final year before graduation from high school. The school curricula were classical studies (*liceo classico*) and vocational training (*istituto professionale*⁵), and the schools were located between Rome and Milan. For the purpose of randomization, we divided the classes into two groups (see Table 1). In the first group (treatment with course, TC), we devised a 16-hour course⁶ on finance and ran a survey before and four months after the course. The course lasted approximately three months. In the second group (treatment without course, TWC), we ran only two surveys (before and after) at the same time intervals, and no course was taught. Each pair of treated and control classes belonged to a different school. In our analysis, we are aware of the fact that both the treated and control groups were exposed to the survey twice within a limited amount of time. Both treated and control groups might, therefore, have learned how to answer the specific questions of the test, thereby obtaining higher scores without showing higher levels of financial literacy (Figure 1). In this sense, as Figure 1 suggests, the TC and TWC approaches can also be regarded as two different treatments (with and without course), and compared with the absence of any intervention, on the reasonable assumption that within a third framework of this kind, no progress is achieved by school students in financial education given the short time interval.

The course was taught by different teachers in different classes. However, so that it could be standardized across all the classes, the teachers used the same materials. The course consisted of: i) a set of slides; ii) a short guide for the teacher which illustrated the guidelines to be followed in

⁵ *The Liceo Classico* has historically been considered the most prestigious type of high school in Italy. Its curriculum is mainly in the humanities (Latin, Greek, Italian, and philosophy), but also includes mathematics, physics, chemistry, and biology. The *Istituto Professionale* is a technical school in which the curriculum includes accounting and basic economic principles together with Italian, mathematics, and principles of law.

⁶ The details of the structure of the course are omitted for reasons of space, but are available upon request.

their lessons; and iii) a more detailed guide to the available materials specifically designed for the students.⁷ The teachers were carefully trained in the rules of the experiment. The questionnaires handed out before and after the treatment were identical, and were answered by the students in the presence of the teachers.

The survey comprised: i) 27 multiple choice questions on financial literacy (each with four possible answers: a correct answer, two wrong answers and a “don’t know” (DK) option); ii) four questions on financial skills (comprehension of simple financial graphs and simple and compounded interest calculations); iii) questions intended to measure the students’ levels of trust of institutions including banks and financial intermediaries; iv) a question on a virtual portfolio investment (in cash, stocks, and private and government bonds) of an inherited sum of 100,000 euros which the students were told had to be used in four years to buy a flat; v) a question on the consumption/saving choice regarding the monthly allowance that the students received from their parents (if any); vi) socio-demographic characteristics, including questions on parental education and jobs, and relationships of the students and their families with banks and finance (i.e. whether the students had a current account, or their experience with online purchases, household mortgages, and loans).

We also measured the students’ scholastic ability by looking at their final grades in middle school, and at their previous high school year final grade in mathematics and Italian.⁸ Finally, we asked them whether they planned to go to university and, in the case of an affirmative response, whether they intended to choose Economics.⁹

3. Descriptive statistics

⁷ The remaining heterogeneity due to the influence of class-specific financial education teachers or school teachers (and/or the impact of the socioeconomic environment in which the school is located) will be controlled for in the econometric analysis with class dummies, or by clustering standard errors at class level according to the various specifications estimated (see section 5 for details).

⁸ These grades are on a scale of 0-10, with 6 being the pass level.

⁹ The questionnaire is in the Appendices.

Table 1 reports the composition of the sample by treatment and control classes, the latter being present only in Rome. Table 2 reports the summary statistics. Fifty percent of the students turn out to be males, 53 percent declare they want to attend university, and around 18 percent intend to study economics. The fact that the minimum grade in mathematics is below sufficiency level is consistent with the fact that 21 percent had been given a “*debito*” (a grade below pass) in this subject. Around one-third of student households borrow from a bank or have a mortgage. The mother or father has a university degree or higher in only 9 and 7 percent of cases, respectively.

Pre-treatment baseline characteristics (available upon request) also document that students already take several financial decisions: 30 percent of them have a current account, 32 percent have used a credit card at least once, and 38 percent have made online purchases. Opinions on banks are divided: 49 percent have enough confidence in banks, only 10 percent a high degree of confidence, 6 percent none at all, and the rest only a small amount.

Finally, in Table 3 we check whether randomization was successful. We report covariate balance differences in means and test statistics by treatment status before the students were exposed to the treatment. For all the observable characteristics, we find that the null hypothesis of no significant difference between treatment and control sample is not rejected.

4. Nonparametric Tests of the Effects of the Course

In what follows we describe present findings from our non econometric tests related to the impact of the treatment on financial literacy (4.1), virtual investment and readership of economic journals (4.2).

4.1 Financial literacy

The students’ level of financial ability is reasonable, even though based on very simple questions: the simple (compounded) interest calculation is correct in 82 (76) percent of cases. By contrast, pre-treatment financial literacy is in some cases extremely low. Only 20 (30) percent of the students

correctly answer questions on the meaning of deposit interest rates and government bonds (of the European Central Bank), and only 30 percent acknowledge the existence of a positive risk-return relationship in financial assets. The correct meaning of inflation is understood by only 57 percent. Around one-quarter of the students believe that inflation is “*the change in the quantity of goods and services domestically produced*”, while a share between one-fifth and one-quarter confuses government deficit with government debt, and government bonds with public investments, and believes that the Bank of Italy is in charge of fiscal policy. In general, students tend to be more familiar with concepts related to those aspects of financial markets with which they are in contact (current accounts, credit cards etc.) than with those related to macroeconomics or economic and financial institutions.

When looking at factors discriminating between *ex-ante* levels of financial literacy, we find that the latter is higher for students attending classical rather than vocational high schools. This is a paradox, since economics is taught at vocational schools but not at classical schools (see footnote 5). This paradox is generally explained by the different family backgrounds of students attending *liceo classico*, since a larger proportion of them belong to high-income classes.¹⁰ Mathematics and language grades are, as expected, positively correlated with the number of correct answers *ex-ante*, consistently with the cross-sectional country evidence provided by Jappelli (2009) on the positive relationship between financial literacy and mathematical ability measured with the Pisa-OECD grading system.

A preliminary idea of progress in financial literacy at a descriptive level is provided by the histograms showing the distribution of the number of correct answers per individual before and after the treatment, presented in Figures 2A-2C for the overall Rome-Milan sample and for the Rome and Milan subsamples. The two main findings are that *ex-ante* financial literacy is higher in

¹⁰ The puzzle remains, however, since the effect persists when we control for income and parental education in the econometric estimates discussed in section 5 (see Table 10.1). Hence the *Liceo Classico* effect must be related to a teaching quality factor, or to socioeconomic factors which are not captured by parental job and education variables.

Milan than in Rome (in terms of mean, median and mode), while progress in financial literacy is greater in Rome.

To test whether financial literacy improves significantly after the course we define as A_{tijk} the three possible answer modalities ($A=R$ (right), $A=W$ (wrong) and $A=DK$ (don't know)) that an individual i belonging to school class j ($j=1, \dots, 39$) may give to the k ($k=1, \dots, 27$) multiple choice questions in the survey, with $t=0$ and $t=1$ being respectively the pre- and post-treatment periods. We also define an *index of progress in financial literacy* (henceforth also "*PFL index*") based on ΔA_{ijk} values, understood as the difference in the answers by the i -th individual (belonging to the j -th class) to the same question k from period 0 to period 1. The attribution of values to changes of state among error, ignorance and correctness is arbitrary. Our choice (the robustness of which is checked)¹¹ is to rate: i) +1 a passage from a wrong or DK answer to a correct answer after the treatment; ii) 0 a non-right (wrong or DK) response before and after the treatment and iii) -1 the passage from a right answer to a wrong or DK answer after the treatment. More formally, this implies that

$$\Delta A_{ijk} = 1 \mid A_{1ijk} = R \text{ and } A_{0jk} = W \text{ or } DK$$

$$\Delta A_{ijk} = 0 \mid A_{1ijk} = W \text{ or } DK \text{ and } A_{0jk} = W \text{ or } DK$$

$$\Delta A_{ijk} = 0 \mid A_{1ijk} = R \text{ and } A_{0jk} = R$$

$$\Delta A_{ijk} = -1 \mid A_{1ijk} = W \text{ or } DK \text{ and } A_{0jk} = R$$

Finally, we define as ΔA_{k}^{ALL} , ΔA_{k}^{TC} and ΔA_{k}^{TWC} the average values of ΔA_{ijk} for the k -th financial literacy question related to the overall (ALL), treatment with course (TC) and treatment without course (TWC) samples respectively.

The generalized null hypothesis that we test for the overall sample and the TC and TWC subsamples is

¹¹ Opinions on the comparative value of wrong and DK answers are mixed. According to some, DK answers acknowledge ignorance, and are therefore better than giving wrong answers on the presumption that they are right. In order to see whether our findings were affected by small perturbations of the indicator, we devised a robustness check in which we set to missing transitions from right to right answers. The results were substantially unchanged, and are available upon request.

$$H_0: \Delta A^{\text{ALL}}_k, \Delta A^{\text{TC}}_k, \Delta A^{\text{TWC}}_k = 0.$$

Table 4 synthesises our results on parametric (t-test) and non-parametric (Wilcoxon rank sum) tests for the null hypothesis on each of the 27 questions for the overall sample, the treatment with course and the treatment without course samples.

If we consider the overall sample, we find that the index of progress in financial literacy is significant 25¹² and 19¹³ times for the TC and TWC classes. The breakdown between Rome and Milan shows that progress is much greater (in fact, twice as great!) in Rome than in Milan.¹⁴ This is partly justified by the fact that the *ex-ante* number of correct answers was higher in Milan. Non-parametric results are slightly more severe for TWC classes, since they document progress on only 15 questions.

One somewhat surprising result is that financial literacy also progresses in control classes (TWC) and not just in treated classes (TC). This may be due to several factors. First, questionnaire learning cannot be ruled out. Second, there may have been spillovers among students from different classes. Third, spillovers may have been generated by the same teachers in neighbouring classes which competed with each other and wanted to perform well to avoid stigma. A fourth possibility is that spillovers were generated by the fact that the teachers of economics in the TWC classes and in the neighbouring TC classes may have been the same.

To test whether progress is also significant at class level, we calculate class average values for the index of progress in financial literacy for each of the 27 questions, and then average these values

12 The two questions where we do not register progress in the treatment group are those on the exchange rate and the role of the Bank of Italy. More specifically, in the case of exchange rates the majority of students choose “*the price you pay to buy foreign goods*” instead of “*the price paid to exchange domestic with foreign currency*”, while in the case of the Bank of Italy, they prefer the answer “*the Bank of Italy decides the monetary policy in Europe*”, to “*the Bank of Italy is in charge of banking supervision in Italy*”.

13 The mistakes are on CONSOB (the Stock Exchange Regulatory Authority), banking foundations, the Bank of Italy, current accounts, mortgages, ATMs, risks, and exchange rates.

14 As a robustness check we built the index by considering as missing values situations in which the response was right both before and after the treatment. The results were substantially unchanged, and are available upon request.

within each class. More formally, we calculate $\sum_i \Delta A_{jk}$ and test the following null hypothesis: $H_0: \sum_j \sum_i \Delta A_{jk} = 0$. The number of observations available for this test is given by the product of the number of multiple choice questions on financial literacy times the number of classes ($n \cdot k$ or $27 \cdot 39$). The results from this test show that the null is always rejected. The average value of the PFL index is 18.89 in Rome and 8.81 in Milan, and is slightly larger in the treatment than in the control sample (Table 5).

By calculating the index for relevant subgroups, we can identify characteristics which increased the impact of our treatment on students. What emerges from this analysis (see Table 6) is a sort of “financial learning convergence” whereby “watering is more effective where the land is more arid”, and subgroups with lower *ex-ante* numbers of correct answers progress more.¹⁵ More specifically, females learn significantly more than males, and students in the lower half of the distribution of mathematics, Italian and final middle school grades perform better than those in the upper half. Finally, progress is more significant for those who do not intend to attend university or study economics (and report *ex-ante* a lower number of correct answers).

To analyze further what happens inside the ‘black box’ of progress in financial literacy, we create a (pre- post-treatment) transition matrix for each of the 27 questions, and compute average values of all cells across the same 27 questions. In this way, we can calculate persistence and reduction in the three states of correctness, ignorance (DK) and error, and transition from one state to another. The results are illustrated in Tables 7a-7b, and document that “persistence in correctness” (*ex-ante* and *ex-post* right answers) accounts for around 85 percent of *ex-ante* correct answers. Error reduction (transition from wrong to right out of total *ex-ante* wrong questions) is around 52 percent, while

15 The result obviously depends in part (but not completely) on the higher potential increase in correct answers for groups with lower *ex-ante* financial literacy.

ignorance reduction (transition from DK to right out of total *ex-ante* DK questions) is around 57 percent.¹⁶ All transition averages across the 27 questions are significantly different from zero.

4.2. Virtual investment

From an economics point of view, one crucial issue is whether and how knowledge of financial concepts and instruments translates into behavioral changes (investment planning, portfolio allocation etc.), at this age at least virtually. One of the directions from which we can investigate this is whether our treatment affects the virtual portfolio choices of the participants. To do so we use the following question in our survey,

You inherit 100,000 uros with which you plan to buy a flat in four years. How do you invest the money?

The respondents were required to answer by providing investment shares in current accounts, government bonds, corporate bonds, and stocks. Descriptive evidence on average responses to the questions shows that after the course, the share invested in cash decreased from around 65 to 60 percent, with the 5 percent points being redistributed over the other three assets (around two percent more on government bonds, and one percent more on stocks and shares) (see Figure 3).

Parametric and non-parametric tests document that the reduction in the demand for money is significant in the treatment with course, while in the treatment without course it is not (Table 8).

This last finding marks an important difference between progress in financial literacy and the results on virtual investment choices: the former also occurs in the treatment without a course, while this is not the case for the latter. The course in financial education therefore affects the propensity to hold cash, but in this case there are no externalities in the neighbouring TWC classes.

¹⁶ The idea that ignorance (DK answer) may be a better status than error seems to be confirmed by the fact that the transition to correctness is higher (and persistence in the same state is lower) in the first than in the second case, even though more than 10 percent of ignorance moves to error. Consider, however, that the difference between average error reduction and average ignorance reduction across the 27 questions is not statistically significant.

As we well know, the optimal share of a portfolio to be invested in different assets remains a subjective issue, because it should be the outcome of a maximization process depending on the degree of risk aversion of the individuals, and on expectations of returns and the variance-covariance matrix of assets in the investors' portfolios. What we can observe, however, is that the *ex-post* average share of money held in the current account remains high (around 60 percent), and the overall profile of the investor cannot be regarded as particularly risky (around 15 percent in government bonds and 10 percent in stocks). Furthermore, if we inspect the distribution of the share held in cash before and after the course in TC classes, we find that the share of extremely prudent individuals (share of cash above 80 percent) falls by 4 percentage points, while the share of very aggressive individuals (share of cash below 20 percent) does not rise in the same way (from 12.33 to 13.06 percent), and that the share of those who invest less than 2 percent in cash falls from 5 to 3.8 percent. *The fall in the demand for money balances produced by the course is therefore obtained by reducing extreme prudence, and in spite of a reduction in extremely aggressive investment attitudes.*¹⁷

Finally, we look at the impact of the course on financial literacy on the reading of economic and financial articles in newspapers and magazines (Table 9). The question on the perceived improvement in understanding economic and financial articles was the following: “*Do you read economic articles in newspapers?*” The four possible answers were: i) *no*; ii) *yes, but I do not understand anything*; iii) *yes, but I understand only some of them*; or iv) *yes, and I understand them fully*.

¹⁷ We also tested the effect of the course on the share of students who saved money out of funds received monthly from their parents. The increase in the share of those who saved was one percent. Unfortunately, we do not have information on the share saved. Consider, however, that, differently from the virtual investment question, in the case of their monthly allowance, students received only a very small amount of money, which was explicitly intended to satisfy their expenditure needs, and therefore they may have reasonably believed that savings attitudes must be delegated to parents. Furthermore, it is possible that in several cases parents also saved money for their children over and above their monthly allowance.

We find that the share of students who read news of this kind increased significantly after the course both in the treatment and control groups (around 34 and 21 percent respectively), and that the share of students who read and understood (choice iii) or iv)) increased by around 24 percent in both groups.

5. Econometric model and results

To further investigate the causal impact of the course in finance , we specify an empirical model in this section which allows a reduction in the sampling variability left after the randomization. We include both students' observable characteristics and class fixed effects in the model. The empirical model also allows us to evaluate the impact of concurring factors and, more specifically, we can disentangle the Milan effect from the TWC class effect (remember that in the tests on the index of progress in financial literacy, we documented that the Milan classes had lower increases in performance (see Table 5), and therefore TWC classes may have performed well not only due to externalities but also because of the Rome effect).

In order to check if the treatment is significant, net of the impact of a series of standard sociodemographic controls and variables measuring motivations (intention to go to university and to study economics) and skills (mathematics, Italian and middle school grades), we estimated the following model:

$$Totright_i = \alpha_0 + \alpha_1 TreatTCpost_i + \sum_l \alpha_l X_{li} + \varepsilon_i \quad [1a]$$

where the dependent variable $Totright_i = \sum_k A(R)_{ijk}$ (where $A(R)_{ijk}$ stands for $A_{ijk}=R$), that is, the total number of right answers given by the i -th individual and $TreatTCpost_i$ is a dummy variable which takes the value of one under the following two conditions: i) post-treatment period; and ii) the individual is part of the treatment group. In this estimation, and in order to evaluate the effect of the TC treatment separately, *ex-post* observations of students in TWC classes were excluded from the sample.

A second test was run to check whether the treatment without a course was significant. In this case, we estimated the following specification:

$$\text{Totright}_i = \alpha_0 + \alpha_1 \text{TreatWCpost}_i + \sum_1 \alpha_i X_{i1} + \varepsilon_i \quad [1b]$$

where TreatWCpost_i is a dummy variable which takes the value of one under the following two conditions: i) post-treatment period; and ii) the individual is part of the control group. Following the same approach, and in order to evaluate the effect of the TWC treatment separately, *ex-post* observations of students in TC classes were ruled out of the sample.

Tables 10.1 and 10.2 report the results from several specifications testing the effect of the treatment with and without a course. The selected specifications vary according to the use of a restricted and enlarged set of controls (omission/inclusion of parental job and education dummies) and the introduction or non-introduction of class fixed effects. When class fixed effects are absent, standard errors are clustered at class level. Class fixed effects are intended to capture all class-specific influences which affect all students belonging to that class equally. These effects may include several unmeasured factors, such as i) the specific ability of the financial education teacher teaching the course in that class; ii) the ability of the class teacher who is present for the course and who is one of the students' regular teachers; iii) the class atmosphere created by the students; and iv) common local sociodemographic factors which are typical of the area in which the school is located.

Our econometric findings show that the effect of the treatment is positive and significant, and robust in the various specifications. In terms of economic significance, the course on financial literacy accounts for around four more correct answers. Among the controls, we observe the positive and significant effect of the final grade in middle school, the desire to go to university and the affiliation with a *liceo classico* high school (almost two more correct answers). The desire to study economics is significant only if we do not control for class fixed effects. Parental variables do not seem to matter much, with the exception of the mothers' employment. Male gender and mathematics and Italian grades become positively significant once we control for class fixed effects. Consider that, since we have a heterogeneous mix of classes – from technical and humanities schools – and due to the many class-specific factors mentioned above, class fixed effects are expected to be relevant, as

indeed they are, since goodness of fit is 15 percent higher when we control for them. Consider, too, that when we estimate model [1b], we have the same significant findings as in model [1a] (Table 10.3). These results show that progress in financial literacy in TWC classes is robust when controlling for concurring factors and fixed class effects.

However, when we run a regression that pools together and compares TC and TWC classes before and after the treatment, we find that the difference-in-difference coefficient (the dummy variable representing TC classes after the treatment) is not statistically different from zero.

In order to see whether the course has heterogeneous effects within certain specific subgroups, we interact our *TreatTCpost* variable with dummies for foreigners, male gender, students with above average mathematics and Italian grades, and students who want to attend university or, more specifically, study economics, each of them in a separate specification (Table 10.2). Three interacted dummies are significant: the course is slightly less effective for males and for students who want to attend university and study economics, confirming the convergence learning phenomenon already observed in parametric and non-parametric tests in Table 6.

As a robustness check of these findings, we estimate the different specifications, ruling out the worst-performing classes (we can evaluate their performance by looking at class fixed effects), looking only at the Rome and Milan subsamples, considering a balanced sample in the case of Rome which includes only TC classes in schools where we also have TWC classes. In all cases, the effect of the course remains positive and significant, with a magnitude varying in the 4-7 range.¹⁸ In a robustness check, we look at the effect of the treatment on all deciles of the distribution of the dependent variable with quantile regressions. The effects move monotonically from 3.9 to around 4.9 going from the 10th to the 90th percentile. These findings again show that the impact of the course on financial literacy is stronger on those respondents who have lower levels of financial literacy *ex-ante*. The results are omitted for reasons of space, and are available upon request.

¹⁸ The results are omitted for reasons of space, and are available upon request.

A different econometric approach adopted for a final robustness check considers as the dependent variable the index of progress in financial literacy for each of the 27 multiple choice questions, while controls are the same as in [1a], and observations are clustered at an individual level, since in this case we have multiple (27) observations for each student. More specifically we have

$$\Delta A_{ik} = \alpha_0 + \sum_j \alpha_j X_{ij} + \varepsilon_{ik} \quad [2].$$

With this specification, the null of the absence of progress in financial literacy is rejected if the intercept is not significantly different from zero. Our findings on the reshaped sample show that this is never the case in any of the considered estimates (with or without class fixed effects, in the treatment with a course and in the treatment without a course, with restricted or extended sets of controls), with the exception of TWC classes with the extended set of controls and fixed effects (see Table 11).

5.1 Econometric findings on the virtual investment

Two other important findings from the econometric estimates are the self-perceived improvement in understanding economic news, and the reduced propensity to hold money balances. These findings are illustrated in Tables 12 and 13.

In Table 12 we estimate the following model:

$$\text{Investincash}_i = \alpha_0 + \alpha_1 \text{Treatpost}_i + \sum_j \alpha_j X_{ij} + \varepsilon_i \quad [3]$$

where the dependent variable is the share of the virtual inherited sum which is invested in cash according to the question described in section 4.1, and among the regressors we include the dummy taking value one for TC observations in the post-course period and zero otherwise. Observations from TWC classes are excluded from the sample in the second period, as when estimating equation [1a]. The results displayed in Table 12 show that the treatment dummy is always negative and significant, with a magnitude ranging from a minimum of 3.7 percentage points to a maximum of over 5.7 points when we control for class fixed effects in the estimates with the extended set of

controls which include parental job and education. Among other controls, we also document a remarkable gender effect (males invest 6 percent less in cash).

In order to test more directly whether the treatment makes the difference, we test whether the treatment dummy is significant on the probability of investing less than 20 percent in cash net of the impact of standard controls. We perform the regression in the before-course and after-course samples respectively. The treatment dummy (*treatment*) is not significant before the course, but it is after (Table 12.4).

We want to check further that the reduced propensity to keep money balance does not generate excessively risky attitudes. We therefore consider as a dependent variable with a 0/1 dummy taking value of one if the amount of money held in cash is above 80 percent (an extremely prudent attitude which may be regarded as non-optimizing under reasonable parameters of risk aversion and considering the 4-year investment horizon) and zero otherwise. We find in this case that the course is not significant in any of the four different specifications (Table 12.2). These findings confirm that, beyond the effect on the mean investment in cash, we have a significant and strong reduction in extremely prudent attitudes without any increase in extremely risky investment strategies

Finally, we look at the question on reading and understanding economic articles in newspapers (see end of section 4). In this regard, we run a logit estimation:

$$\text{Readeconomics}_i = \alpha_0 + \alpha_1 \text{Treatpost}_i + \sum_l \alpha_l X_{li} + \varepsilon_i \quad [4]$$

in which the dependent variable takes the value of one if the student reads economic articles in newspapers and zero otherwise, and the controls are the same as in [1]. Our findings show that the course significantly affects readership by increasing the probability of reading economic articles in newspapers by 20 percent. The result is robust in the four different specifications, with and without the extended set of controls and class fixed effects. Readership is also affected positively by a “*debito*” in Mathematics, good Italian grades, having a mother with at least a university degree, and negatively by having a father who is a civil servant (Table 13).

Since the second answer to this question is responded to positively by those who read but do not understand economic articles at all, we create another variable which takes value of one if individuals give positive answers only to point iii) or iv); that is, a dummy for those who read and understand economic articles (at least in part). Again, we find that the course increases the share of those who read and understand economic articles by around 16-17 percent (Table 14).

6. Conclusions

Financial education is a partially unexplored but increasingly investigated dimension of the determinants of human capital formation and development. It is becoming more and more important since the global financial crisis and, more generally, in a turbulent financial environment in which individuals are ever more frequently asked to take financial decisions which crucially affect their present and future wealth.

As we emphasize in our introduction, financial institutions stress the importance of starting to teach introductory notions of financial education in school. This paper has provided an original contribution to the analysis of the impact of financial education in this period by means of a randomized experiment .

Our findings document that a 16-hour course of financial education significantly affects students' financial literacy, their propensity to read (and capacity to understand) economic articles in newspapers, and their virtual investment attitudes. On the first point, we find significant improvements when we consider both individual student and class average observations. We also document that the effect is significant not only in TC but also in TWC classes; that is, we also register significant progress in financial literacy in classes in which students fill in the two (*ex-ante* and *ex-post*) questionnaires within the same time interval but do not attend the course. However, we find that the difference-in-difference estimates of the effects of the course are not statistically different from zero. Pinning down the determinants of this phenomenon falls outside the immediate scope of this paper. However, our candidate explanations are learning through the test and

communication externalities generated by students or teachers working in both classes, or competition among classes in the same school.

Finally, from our analysis of the learning process of different subgroups of students, we find a greater level of progress in terms of financial literacy within those categories which have *ex-ante* poorer notions of financial literacy (females, students with poorer mathematics and Italian grades, and students who do not intend to attend university or study economics). This implies that, as far as financial literacy is concerned, courses in financial education are more effective where the *ex-ante* background of notions is poorer.

While progress in financial literacy also occurs with the repetition of questionnaires without the course, the effect on the change in virtual investment attitudes is confined to TC classes. This finding indicates that changes in investment attitudes may not be obtained from emulation, questionnaire learning effects or via externalities, but only from the course. More specifically, we find that after the course, students reduce the share of money held in cash in a virtual investment of 100,000 uros over a 4-year horizon by around 4 percent. Given that it may be not clear whether or not this is a desirable result, depending on individual risk aversion and the financial and economic scenario postulated by the investor, we look at the effect of the course on the tails of the distribution of the amount invested in cash. In this respect, we find that the result is highly asymmetric. The course reduces extremely risky attitudes (less than 20 percent in cash) without significantly increasing extremely prudent attitudes (more than 80 percent in cash).

Our findings pose additional relevant research questions relative to the eventual decay or persistence of the observed effects. Is progress in financial literacy permanent, or does it fade over time? Will the reduced propensity to hold money balances in virtual portfolio choices be confirmed by actual portfolio choices made by these students in the future? Are the virtual responses obtained after the finance course proxies for actual responses and modification of financial decisions? We

hope that our findings may represent a reference for further studies in this area which will extend results in the above-mentioned directions in the future.

References

- Banca d'Italia (2010), *"I bilanci delle famiglie italiane nell'anno 2008"*, Febbraio 2010
- Bayer P. J., Bernheim B. D., Scholz J. K. (1996), *"The Effects of Financial Education in the Workplace: Evidence from a Survey of Employers"*, *Working Papers* 5655, National Bureau of Economic Research (NBER), 1996
- Bernheim B. D., Garrett D. M., Maki D. M. (1997), *"Education and Saving: The Long-Term Effects of High School Financial Curriculum Mandates"*, *Working Papers* 6085, National Bureau of Economic Research (NBER), 1997
- Boucher R. (2010), *"Improving financial education efficiency"*, discorso del Segretario Generale dell'OECD al Symposium Internazionale sulla Financial Literacy, Roma, Giugno 2010
- Boyce L., Danes S. (1998), *"Evaluation of the NEFE high school financial planning program. Engelwood"*, National Endowment for Financial Education (NEFE), 1998
- Card, D. (1999). "The Causal Effect of Education on Earnings" in O. Ashenfelter and D. Card (eds.), *Handbook of Labour Economics*, Vol. 3, chapter 30, North Holland, pp. 1801-1863.
- Carlin, Robinson (2010), *"What Does Financial Literacy Training Teach Us?"*, *NBER Working Paper No. w16271*, Agosto 2010
- Chen H. e Volpe R. P. (1998), *"An Analysis of Personal Financial Literacy Among College Students"*, 1998
- Choi, Laibson, Madrian, Metrick (2004), *"Saving For Retirement on the Path of Least Resistance"*, Behavioral Public Finance: Toward a New Agenda. Ed McCaffrey and Joel Slemrod, eds. New York: Russell Sage Foundation 304-51. http://faculty.som.yale.edu/jameschoi/plr_bpf.pdf
- Clancy, Grinstein-Weiss, Schreiner, 2001, *Financial Education and Savings Outcomes In Individual Development Accounts* "
- Cutler, David, and Adriana Lleras-Muney. (2008). "Education and Health: Evaluating Theories and Evidence." In: The Effects of Social and Economic Policy on Health, Editors J. House, R. Schoeni, G. Kaplan, and H. Pollack, forthcoming, Russell Sage Press.
- Dee Thomas S. (2003) Are there civic returns to education? NBER paper 9588
- Gibson John (2001) Unobservable family effects and the apparent external benefits of education *Economics of Education Review*, 20, 225-233

- Gnan E., Silgoner M. A. e Weber B. (2007), *“Economic and Financial Education: Concepts, Goals and Measurement”*, 2007
- Howard S. Bloom (2006), *“The Core Analytics of Randomized Experiments for Social Research”*, 2006
- Ibrahim D., Harun R. e Isa Z. M. (2009) *“A Study on Financial Literacy of Malaysian Degree Students”*, Dicembre 2009
- Jappelli, Tullio (2009), *“Economic literacy: An international comparison”*, CSEF Working Paper n. 238.
- Jappelli T. Padula M., (2010), *Investment in Financial Literacy and Savings Decisions*, CSEF Working Paper No. 272, January 2011.
- Lleras-Muney, Adriana. 2005. "The Relationship Between Education and Adult Mortality in the U.S." *Review of Economic Studies* 72(1): 189-221.
- Lusardi A., 2004, *Saving and the Effectiveness of Financial Education*, The Pension Research Council WP2003-14
- Lusardi A. (2008), *“Household saving behavior: the role of literacy, information and financial education programs”*, NBER Working Paper N. 13824, 2008
- Lusardi A. e Mitchell O.S. (2007), *“Baby Boomer retirement security: the roles of Planning, financial literacy, and housing wealth”*, *Journal of Monetary Economics*, 54, 2007, pp. 205-224
- Lusardi A. e Mitchell O. S. (2008), *“Planning and Financial Literacy: How Do Women Fare?”*, *American Economic Review*, American Economic Association, vol. 98(2), pages 413-17
- Annamaria Lusardi A., Mitchell, O. S., Curto V., **2010** *Financial Literacy among the Young*. *Journal of Consumer Affairs*, 2010; 44 (2): 358
- Mandell L. (2005), *“The Financial Literacy of Young African-American Adults”*, Aprile 2005
- Mandell L. (2006), *“Financial Literacy: Improving Education Results of the 2006 National JumpStart Survey Washington”*, Jumpstart Coalition, 2006
- Mandell L. (2008), *“High School Financial Literacy”*, in *“Overcoming the Savings Slump. How to Increase the Effectiveness of Financial Education and Savings Programs”* di Lusardi A., University of Chicago, 2008
- Matthias Keese_ Hendrik Schmitzy Broke, ill, and obese: The causal effect of household debts on health, paper presented at the GSOEP 2010 Conference.
- Milligan Kevin, Enrico Moretti and Philip Oreopoulos (2003) *Does education improve citizenship? Evidence from the US and the UK*, NBER working paper 9584 OECD (2009), *“The OECD project on Financial Education”*, 2009

OECD, "Recommendation on Principles and Good Practices for Financial Education and Awareness", 2005.

Psacharopoulos, G., and H. Patrinos (2002). *Returns to investment in education: A further update*, World Bank

Policy Research Working Paper N.º 2881, forthcoming in *Education Economics*

Subbarao D. (2010), "*Financial education – worthy and worthwhile*", International Workshop sulla Financial Literacy, Marzo 2010

Surowiecki J. (2010), "*Financial illiteracy*", *New Yorker*, 1.07.2010

The European House Ambrosetti and Consorzio PattiChiari (2007), "*L'educazione finanziaria in Italia: lo stato dell'arte e possibili linee d'azione*", Novembre 2007

The European House Ambrosetti and Consorzio PattiChiari (2010), "*L'istruzione finanziaria in Italia*", Maggio 2010

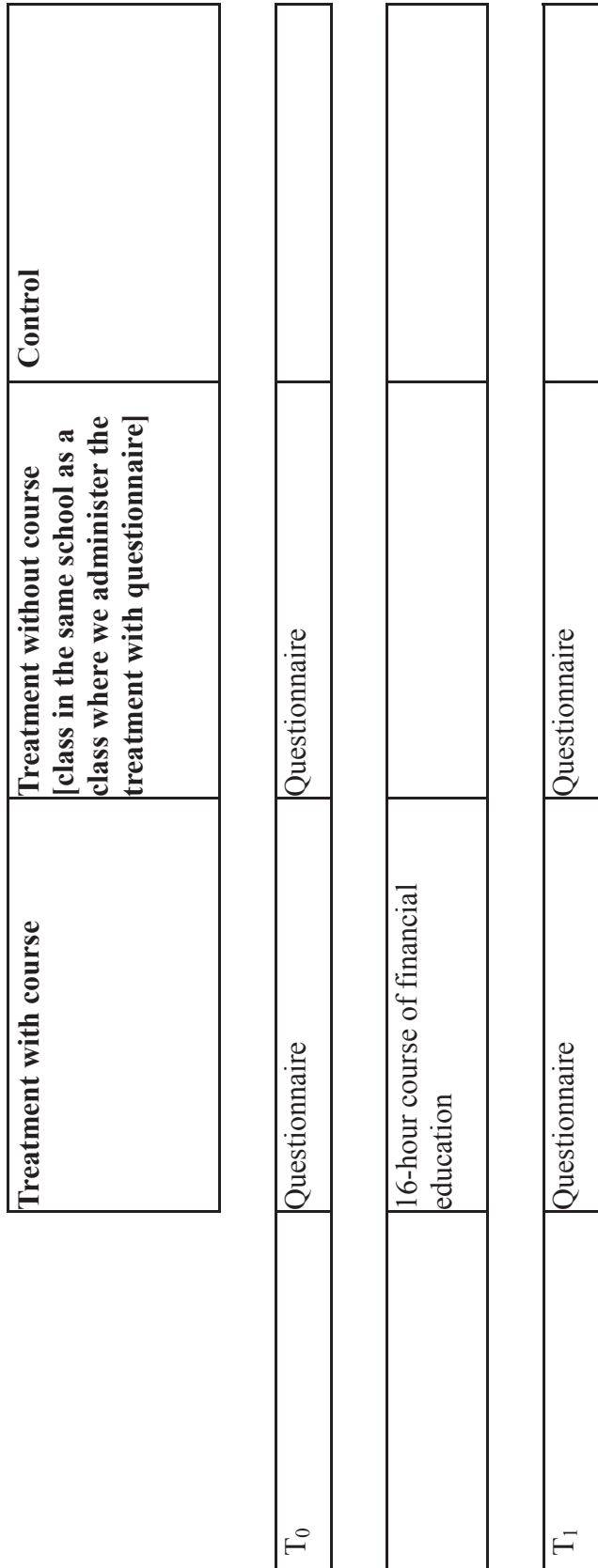
Wolfe Barbara L, and Robert H. Haveman. 2002. "Social and Non-market Benefits from Education in an Advanced Economy", in: Yolanda K.Kodrzyki, ed., *Education in the 21st Century: Meeting the Challenges of a Changing World* (Conference Series 47, Federal Reserve Bank of Boston) pp.97-131.

Source: OECD Policy Brief, "The importance of financial education", 2006

Table 1 The sample

	Rome	Milan	Raw total
Treatment group	17	8	25
Control group	11		
Column total	28		36

Figure 1. The experiment design



H₀ $\Delta Y(T_1 - T_0) \neq 0$

$\Delta Y(T_1 - T_0) \neq 0$
(if externalities, competition with
neighbouring class, questionnaire
effects apply)

$\Delta Y(T_1 - T_0) = 0$
by assumption, due to the
short time interval

Table 2. Descriptive statistics of the main variables of interest (before the treatment)

Variable	Obs	Mean	Std.	Min	Max
TotRight	1063	15.053	4.014	0	26
FatherClerk	1063	0.182	0.386	0	1
FatherWorker	1063	0.177	0.382	0	1
FatherPublicSector	1063	0.068	0.252	0	1
MotherHousewife	1063	0.302	0.459	0	1
MotherClerk	1063	0.202	0.402	0	1
FatherDegree	1063	0.073	0.261	0	1
MotherDegree	1063	0.089	0.285	0	1
Mortgage	888	0.339	0.473	0	1
Loan	775	0.317	0.466	0	1
MathGrade	891	6.59	1.111	3	10
ItalianGrade	901	6.648	0.862	2	10
IntermediateGrade	882	7.880	1.266	5	10
Male	1026	0.501	0.500	0	1
MathDebt	824	0.214	0.410	0	1
Volunteering	995	0.076	0.266	0	1
Humanities	1063	0.034	0.18\	0	1
WouldBeUniversity	985	0.534	0.499	0	1
WouldBeEconomics	1063	0.180	0.385	0	1

Variable legend: see Appendix.

Table 3 Tests for random assignment

	TWC classes	TC classes	Ho: no significant difference (P-value)
MathGrade	6.496	6.616	0.2727
ItalianGrade	6.598	6.657	0.4881
IntermediateGrade	7.917	7.881	0.7766
Male	0.484	0.504	0.6416
Foreigner	0.048	0.056	0.8052
Volunteering	0.015	0.042	0.2984
Humanities	0.044	0.037	0.781
WouldBeUniversity	0.58	0.524	0.1972
WouldBeEconomics	0.145	0.187	0.2016
FatherDegree	0.109	0.067	0.057
MotherDegree	0.097	0.088	0.6989
FatherClerk	0.176	0.184	0.8094
FatherWorker	0.194	0.174	0.5386
FatherPublicSector	0.073	0.068	0.8204
MotherHousewife	0.309	0.301	0.834
MotherClerk	0.212	0.201	0.7461

TC classes (treatment with course classes); TWC classes (treatment without course classes).

Variable legend: see Appendix.

Figure 2a. Total number of correct answers in the 27 multiple choice questions on financial literacy - All sample

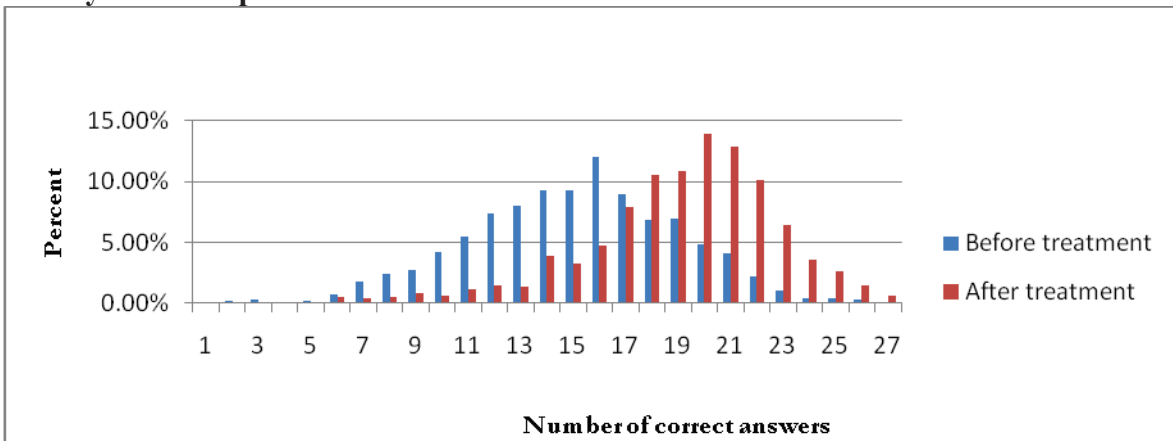


Figure 2b. Total number of correct answers in the 27 multiple choice questions on financial literacy - TC classes

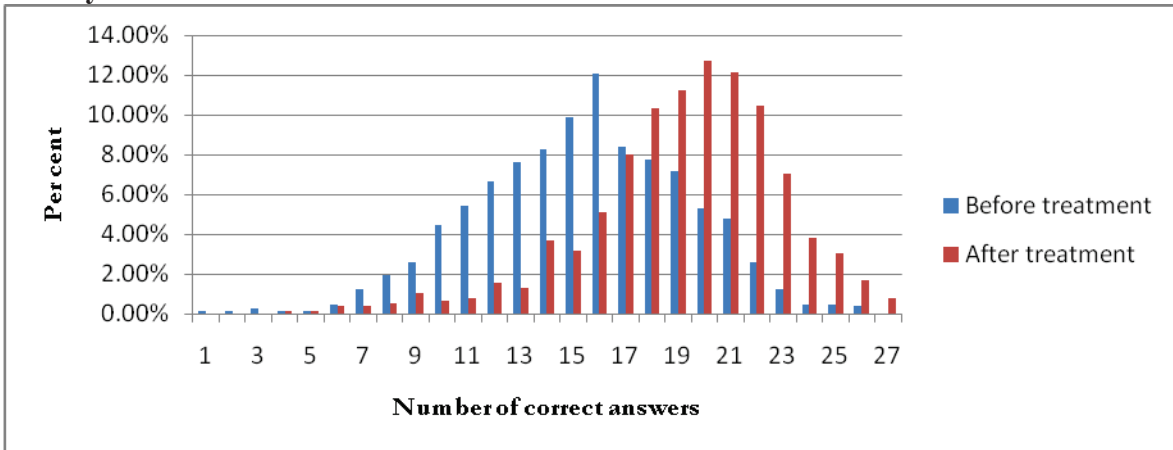


Figure 2c. Total number of correct answers in the 27 multiple choice questions on financial literacy - TWC classes

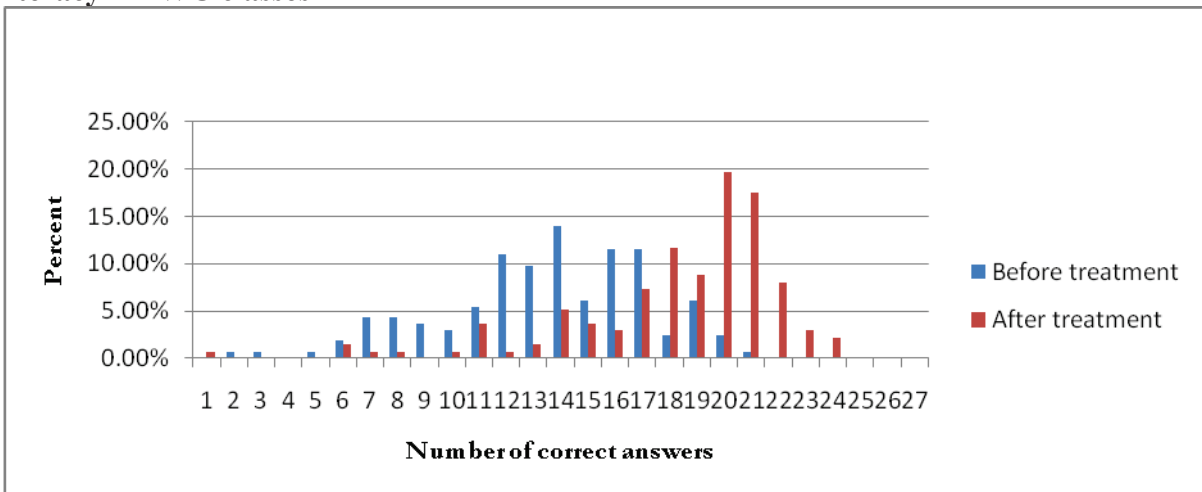


Table 4. Progress in financial literacy (parametric and non parametric tests on the 27 multiple choice questions)

Dependent variable: Index of Progress in Financial Literacy (PFL index) in which we rate: i) +1 a passage from a wrong or DK answer to a right answer after the treatment; ii) 0 a non-right (wrong or DK) response before and after the treatment; and iii) -1 a passage from a right answer to a wrong or DK answer after the treatment

	Ho: IPFL=0			Ho: IPFL=0			Difference in the impact between TC and TWC classes
	[parametric test t-stat with p-value in parentheses]			[non-parametric rank test-stat and p-value in parentheses]			
	All sample	TC classes	TWC classes	All sample	TC classes	TWC classes	
Current account	2.815 (0.005)	2.785 (0.006)	0.687 (0.493)	-2.904 (0.004)	-2.290 (0.022)	-1.710 (0.087)	0.478 (0.633)
Mortgage	1.889 (0.059)	1.924 (0.055)	0.301 (0.764)	-1.123 (0.261)	-0.619 (0.536)	-1.014 (0.311)	0.540 (0.589)
ATM	2.275 (0.023)	2.438 (0.015)	1.837 (0.042)	-2.445 (0.015)	-2.003 (0.045)	-1.465 (0.143)	1.030 (0.303)
Credit Card	15.570 (0.000)	13.847 (0.000)	7.152 (0.000)	-12.637 (0.000)	-10.845 (0.000)	-6.540 (0.000)	-1.131 (0.258)
Deposit Rate	13.701 (0.000)	11.320 (0.000)	8.689 (0.000)	-11.456 (0.000)	-9.335 (0.000)	-7.434 (0.000)	-2.915 (0.004)
Treasury Bills	16.171 (0.000)	13.754 (0.000)	9.081 (0.000)	-14.056 (0.000)	-12.143 (0.000)	-7.187 (0.000)	-1.553 (0.121)
Corporate Bonds	15.4795 (0.000)	13.900 (0.000)	6.709 (0.000)	-14.593 (0.000)	-13.065 (0.000)	-6.383 (0.000)	-1.287 (0.198)
Risk-Return	16.271 (0.000)	14.498 (0.000)	7.415 (0.000)	-14.722 (0.000)	-12.891 (0.000)	-7.061 (0.000)	-1.141 (0.254)
Shares	7.516 (0.000)	6.135 (0.000)	4.633 (0.000)	-5.856 (0.000)	-4.440 (0.000)	-4.148 (0.000)	-1.444 (0.149)
Share value	2.911 (0.004)	2.843 (0.005)	0.904 (0.368)	-2.819 (0.005)	-2.635 (0.008)	-0.970 (0.332)	0.057 (0.954)
Stock Exchange	7.776 (0.000)	7.537 (0.000)	2.374 (0.019)	-6.975 (0.000)	-6.433 (0.000)	-2.625 (0.009)	0.448 (0.655)
Risk	2.682 (0.007)	2.585 (0.010)	0.816 (0.416)	-2.805 (0.005)	-2.441 (0.015)	-1.291 (0.197)	0.239 (0.811)
Rating Companies	23.486 (0.000)	20.960 (0.000)	10.672 (0.000)	-19.853 (0.000)	-17.467 (0.000)	-9.696 (0.000)	-1.041 (0.298)
Deposit Insurance	8.496 (0.000)	6.103 (0.000)	7.659 (0.000)	-7.258 (0.000)	-4.970 (0.000)	-6.815 (0.000)	-3.794 (0.000)
Investment Risk	12.388 (0.000)	10.292 (0.000)	7.365 (0.000)	-10.312 (0.000)	-8.549 (0.000)	-6.014 (0.000)	-2.665 (0.008)
Inflation	9.938 (0.000)	8.603 (0.000)	5.011 (0.000)	-8.323 (0.000)	-6.983 (0.000)	-4.515 (0.000)	-2.046 (0.041)
Money	7.657 (0.000)	6.725 (0.000)	3.698 (0.000)	-6.194 (0.000)	-5.423 (0.000)	-2.880 (0.004)	-0.743 (0.458)
ECB	15.883 (0.000)	12.879 (0.000)	10.679 (0.000)	-13.383 (0.000)	-11.033 (0.000)	-8.028 (0.000)	-3.460 (0.001)
Monetary Policy	8.829 (0.000)	7.406 (0.000)	5.018 (0.000)	-8.144 (0.000)	-6.882 (0.000)	-4.464 (0.000)	-1.811 (0.070)
Exchange Rate	-11.256 (0.000)	-8.793 (0.000)	-8.071 (0.000)	9.441 (0.000)	7.173 (0.000)	7.468 (0.000)	4.785 (0.000)
Public Deficit	5.018 (0.000)	5.074 (0.000)	0.446 (0.656)	-4.875 (0.000)	-4.713 (0.000)	-1.057 (0.291)	2.001 (0.045)
Public Debt	4.363 (0.000)	3.921 (0.000)	2.090 (0.039)	-2.709 (0.007)	-2.614 (0.009)	-0.800 (0.424)	0.456 (0.648)
Bank of Italy	-2.336 (0.020)	-1.693 (0.091)	-2.363 (0.020)	1.192 (0.233)	0.895 (0.371)	1.121 (0.262)	0.836 (0.403)

CONSOB	9.322 (0.000)	9.395 (0.000)	1.615 (0.109)	-8.336 (0.000)	-8.621 (0.000)	-0.738 (0.460)	2.874 (0.004)
FED	8.987 (0.000)	8.846 (0.000)	1.985 (0.049)	-7.722 (0.000)	-7.704 (0.000)	-1.563 (0.118)	2.692 (0.007)
Foundations	3.857 (0.000)	4.542 (0.000)	-1.823 (0.071)	-3.646 (0.000)	-4.298 (0.000)	0.871 (0.384)	3.198 (0.001)
Microfinance	7.949 (0.000)	7.382 (0.000)	2.918 (0.004)	-6.613 (0.000)	-6.500 (0.000)	-1.154 (0.249)	1.750 (0.080)

^BNon-parametric rank test (H_0 : IPFL (TC classes) - IPFL (TWC classes) = 0)

Table 5 Parametric tests on class averages of the index of progress in financial literacy

Test type	Average difference (percent)	p-value
Tests on Distributions		
[One-sample t-test]		
<i>a) Overall sample</i>	17.093	(0.000)
<i>b) Rome</i>	18.467	(0.000)
<i>c) Milan</i>	11.766	(0.000)
<i>d) TC classes</i>	16.687	(0.000)
<i>e) TWC classes</i>	18.269	(0.000)
<i>f) Rome – TC classes</i>	18.572	(0.000)
<i>g) Rome – TWC classes</i>	18.260	(0.000)

TC classes (treatment with course classes); TWC classes (treatment without course classes);

The value we calculated for the Index of Progress in Financial Literacy is $\sum_i \Delta A_{ijk}$ where A_{ijk} is the three possible answer modalities (A=R (right), A=W(wrong) and A=DK(don't know)) that an individual i belonging to school class j ($j=1, \dots, 39$) may give to the k ($k=1, \dots, 27$) multiple choice questions in the survey, with $t=0$ and $t=1$ being respectively the pre- and post-treatment periods. The IPFL index is built in the following way: i) $\Delta A_{ijk} = 1 | A_{1ijk}=R$ and $A_{0jk}=W$ or DK; ii) $\Delta A_{ijk} = 0 | A_{1ijk}=W$ or DK and $A_{0jk}=W$ or DK; iii) $\Delta A_{ijk} = 0 | A_{1ijk}=R$ and $A_{0jk}=R$; iv) $\Delta A_{ijk} = -1 | A_{1ijk}=W$ or DK and $A_{0jk}=R$. The null hypothesis we test for the relevant subgroup is $H_0: \sum_j \sum_i \Delta A_{jk} = 0$

Table 6. Relative performance for selected subgroups in the index of financial literacy

Variable	Tests on Distributions (One-sample t-test)		Non-parametric tests (Wilcoxon Rank sum Mann-Whitney test)		
	Average	Average difference	p-value	z- stat	p-value
Gender					
<i>Males</i>	0.131		(0.000)		
<i>Females</i>	0.166		(0.000)		
<i>Males vs Females</i>		0.035	(0.000)	5.093	(0.000)
Last year final Mathematics grade					
≤ 6	0.152		(0.000)		
> 6	0.148		(0.000)		
<i>Low vs high grade</i>		0.004	(0.504)	0.841	(0.4)
Last year final Italian grade					
≤ 6	0.158		(0.000)		
> 6	0.143		(0.000)		
<i>Low vs high grade</i>		0.015	(0.035)	2.189	(0.029)
Final middle school grade					
≤ 6	0.169		(0.000)		
> 6	0.142		(0.000)		
<i>Low vs high grade</i>		0.027	(0.001)	3.554	(0.000)
Want to attend university					
<i>Yes</i>	0.140		(0.000)		
<i>No</i>	0.167		(0.000)		
<i>Yes vs No</i>		0.027	(0.000)	4.034	(0.000)
Want to study Economics					
<i>Yes</i>	0.130		(0.000)		
<i>No</i>	0.154		(0.000)		
<i>Yes vs No</i>		0.024	(0.008)	2.952	(0.003)

The value we calculated for the Index of Progress in Financial Literacy is $\sum_i \Delta A_{ijk}$ where A_{ijk} is the three possible answer modalities (A=R (right), A=W(wrong) and A=DK(don't know)) that an individual i belonging to school class j ($j=1, \dots, 39$) may give to the k ($k=1, \dots, 27$) multiple choice questions in the survey, with $t=0$ and $t=1$ being respectively the pre- and post- treatment periods. The IPFL index is built in the following way: i) $\Delta A_{ijk} = 1 | A_{1ijk}=R$ and $A_{0jk}=W$ or DK; ii) $\Delta A_{ijk} = 0 | A_{1ijk}=W$ or DK and $A_{0jk}=W$ or DK; iii) $\Delta A_{ijk} = 0 | A_{1ijk}=R$ and $A_{0jk}=R$; iv) $\Delta A_{ijk} = -1 | A_{1ijk}=W$ or DK and $A_{0jk}=R$. The null hypothesis we test for the relevant subgroup is $H_0: \sum_j \sum_i \Delta A_{jk} = 0$

Table 7a Transition matrix of changes in financial literacy

	Right	Wrong	Don't Know
Right	Correctness Persistence	Correctness Reduction	Loss of Knowledge
Wrong	Error Reduction	Error Persistence	Error to Ignorance
Don't Know	Ignorance Reduction	Ignorance to Error	Ignorance Persistence

Table 7b Transition matrix of changes in financial literacy

	Overall sample	TWC classes	TC classes
Right to Right/Total right <i>ex-ante</i>	84.01	86.18	82.72
Right to Wrong/Total right <i>ex-ante</i>	14.03	11.32	15.67
Right to DK/Total right <i>ex-ante</i>	1.96	2.49	1.63
Wrong to Right/Total wrong <i>ex-ante</i>	50.37	47.87	51.8
Wrong to Wrong/Total wrong <i>ex-ante</i>	47.72	49.52	46.57
Wrong to Don't Know/Total wrong <i>ex-ante</i>	1.9	2.64	1.63
DK to Right/Total DK <i>ex-ante</i>	55.33	54.33	54.82
Don't Know to Wrong/Total DK <i>ex-ante</i>	12.43	11.61	16.61
DK to DK/Total DK <i>ex-ante</i>	32.24	34.33	29.93

Percentage values of the transition matrix for each of the 27 multiple choice questions averaged for individuals and relevant group (overall sample, TWC classes, TC classes). All values are significantly different from zero at 1 percent.

Figure 3 Share invested in cash, government and corporate bonds and stocks before and after the treatment in TC classes

Shares of money held in current accounts or invested in government bonds, corporate bonds and shares before and after the course in financial education when individuals interviewed answer the following question: *You inherit 100,000 euros with which you plan to buy a flat in 4 years. How do you invest the money? (Please indicate shares invested in the four available options: current account, government bonds, corporate bonds and shares)*

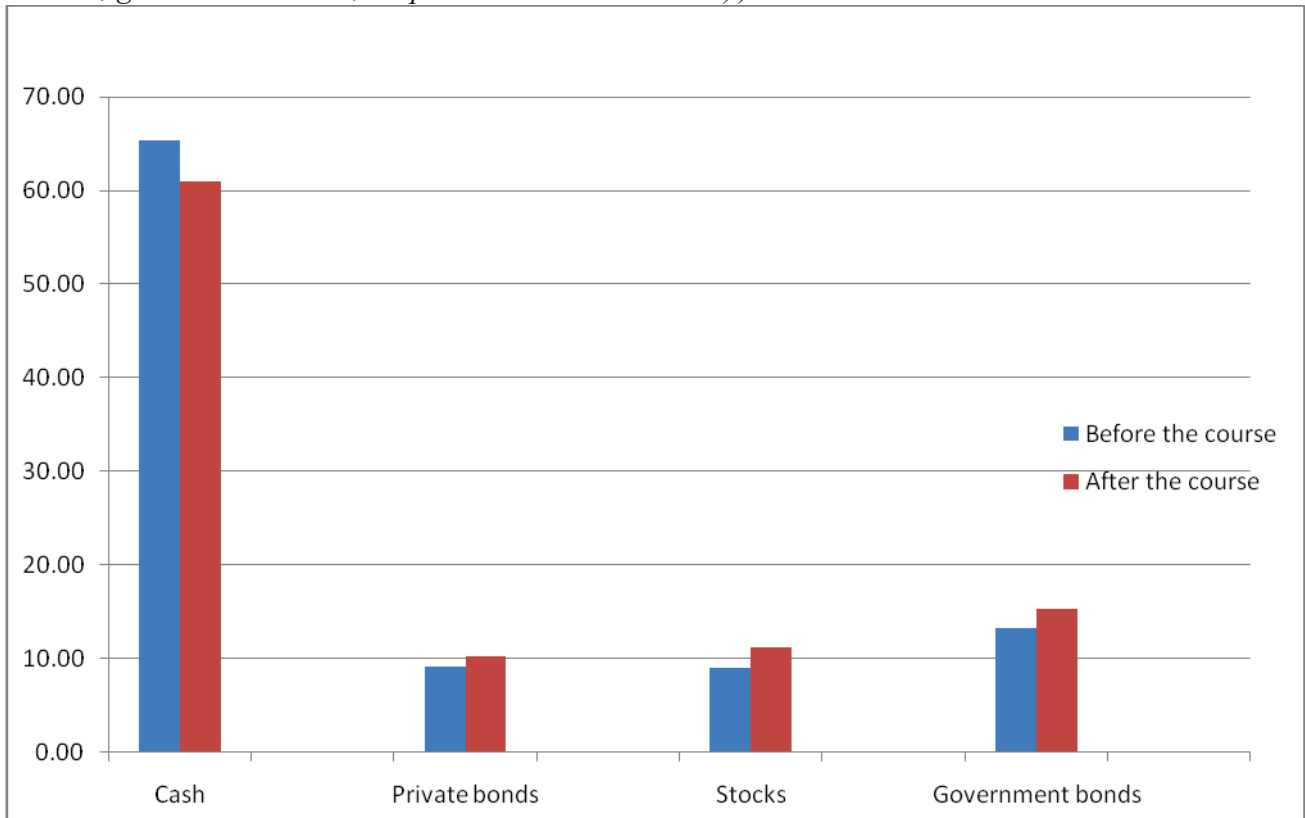


Table 8. Effect of the treatment on the propensity to invest in cash – Rome Milan database – parametric tests

Test type	Parametric test		Non parametric rank sum test	
	[t-test]			
		p-value		p-value
<i>All sample</i>	-4.506	(0.000)	2.890	(0.004)
<i>Treatment group</i>	-4.935	(0.000)	2.866	(0.004)
<i>Control group</i>	-1.041	(0.509)	0.550	(0.582)

Shares of money held in current account when individuals interviewed answer the following question: *You inherit 100,000 euros with which you plan to buy a flat in 4 years. How do you invest the money ? (Please indicate shares invested in the four available options: current account, government bonds, corporate bonds and shares)*

Table 9 - Parametric and non parametric test on the readership of economic and financial articles in journals

Test Type	Average difference (from t_1 to t_0)	z- stat	p-value
Tests on Distributions	(One-sample t-test)		
Change in readership			
<i>a) Overall sample</i>	0.165		[0.000]
<i>b) TWC classes</i>	0.256		[0.000]
<i>c) TC classes</i>	0.209		[0.000]
TC vs TWC	0.046		[0.337]
Non parametric tests (Wilcoxon Rank-sum Mann-Whitney test)			
Change in readership			
<i>a) Overall sample</i>		-6.782	[0.000]
<i>b) TWC classes</i>		-5.06	[0.000]
<i>c) TC classes</i>		-8.057	[0.000]
Tests on Distributions	(One-sample t-test)		
Change in readership and understanding			
<i>a) Overall sample</i>	0.130		(0.000)
<i>b) TWC classes</i>	0.226		(0.000)
<i>c) TC classes</i>	0.165		(0.000)
TC vs TWC	-0.061		(0.191)
Non-parametric tests (Wilcoxon Rank-Sum Mann-Whitney Test)			
Change in readership and understanding			
<i>a) Overall sample</i>		-5.220	(0.000)
<i>b) TWC classes</i>		-4.237	(0.000)
<i>c) TC classes</i>		-6.385	(0.000)

Change in readership: dummy which takes value of one if respondents chose item ii), iii) or iv) and zero otherwise for the question which follows: "Do you read economic articles in newspapers?" The four possible answers are: i) no; ii) yes, but I do not understand anything; iii) yes, but I understand only some of them or iv) yes, and I understand them fully] **Change in readership and understanding:** dummy which takes value of one if respondents chose item iii) or iv).

Table 10.1 The determinants of financial literacy – treatment with course

	(1)	(2)	(3)	(4)
MathGrade	0.171 (0.154)	0.145 (0.160)	0.276** (0.112)	0.249** (0.112)
ItalianGrade	0.208 (0.169)	0.238 (0.168)	0.294** (0.139)	0.320** (0.140)
IntermediateGrade	0.518*** (0.136)	0.506*** (0.127)	0.297*** (0.094)	0.303*** (0.095)
Male	0.007 (0.360)	0.096 (0.355)	0.540** (0.217)	0.650*** (0.221)
MathDebt	0.357 (0.348)	0.31 (0.344)	0.244 (0.278)	0.237 (0.278)
Volunteering	-0.078 (0.487)	-0.034 (0.520)	-0.506 (0.367)	-0.442 (0.368)
Humanities	1.861*** (0.560)	1.886*** (0.577)		
WouldBeUniversity	0.702** (0.316)	0.862** (0.326)	1.011*** (0.243)	1.138*** (0.244)
WouldBeEconomics	0.774** (0.337)	0.814** (0.315)	0.048 (0.289)	0.109 (0.290)
TreatTCPPost	4.066*** (0.518)	4.071*** (0.510)	3.773*** (0.208)	3.792*** (0.208)
Milan	0.479 (0.636)	0.456 (0.599)		
FatherClerk		0.514 (0.355)		0.025 (0.262)
FatherWorker		0.51 (0.414)		0.592** (0.277)
FatherPublicSector		0.473 (0.407)		0.4 (0.393)
MotherHousewife		-0.243 (0.288)		-0.243 (0.245)
MotherClerk		0.811** (0.344)		0.525** (0.267)
FatherDegree		-0.655 (0.543)		-0.757* (0.398)
MotherDegree		-0.734 (0.482)		-0.395 (0.376)
BrothSistUniversity		0.0001 (0.001)		0.0001 (0.001)
HouseholdSize		0.06 (0.161)		0.011 (0.130)
ClassFixedEffects	NO	NO	YES	YES
Constant	7.683*** (1.413)	7.240*** (1.475)	10.226*** (1.166)	9.948*** (1.245)
Observations	1176	1172	1176	1172
R-squared	0.3	0.318	0.441	0.452

Robust standard errors in parentheses

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

Table 10.2 The determinants of financial literacy – treatment without course

	(1)	(2)	(3)	(4)
MathGrade	0.336* (0.182)	0.353* (0.190)	0.391*** (0.128)	0.394*** (0.128)
ItalianGrade	0.246 (0.165)	0.229 (0.149)	0.265 (0.162)	0.265 (0.163)
IntermediateGrade	0.422** (0.156)	0.407** (0.163)	0.257** (0.113)	0.250** (0.115)
Male	0.294 (0.385)	0.254 (0.364)	0.586** (0.266)	0.590** (0.270)
MathDebt	0.481 (0.461)	0.455 (0.458)	0.305 (0.332)	0.279 (0.333)
Volunteering	-0.507 (0.654)	-0.559 (0.644)	-1.017** (0.473)	-1.031** (0.477)
Humanities	2.323*** (0.627)	2.421*** (0.600)		
WouldBeUniversity	0.723* (0.400)	0.760* (0.416)	1.073*** (0.292)	1.116*** (0.295)
WouldBeEconomics	1.143** (0.420)	1.163*** (0.413)	0.38 (0.364)	0.42 (0.365)
TreatTWCPost	3.676*** (0.960)	3.685*** (0.945)	4.789*** (0.442)	4.825*** (0.442)
FatherClerk		0.331 (0.356)		0.195 (0.322)
FatherWorker		-0.085 (0.499)		0.22 (0.341)
FatherPublicSector		0.882 (0.537)		1.114** (0.463)
MotherHousewife		-0.382 (0.299)		-0.289 (0.295)
MotherClerk		0.840* (0.425)		0.459 (0.329)
FatherDegree		0.196 (0.464)		0.213 (0.487)
MotherDegree		-0.494 (0.537)		-0.31 (0.448)
BrothSistUniversity		0.0001 (0.001)		0.0001 (0.001)
HouseholdSize		-0.052 (0.220)		-0.042 (0.159)
ClassFixedEffects	NO	NO	YES	YES
Constant	6.450*** (1.487)	6.579*** (1.432)	10.056*** (1.445)	9.991*** (1.532)
Observations	750	748	750	748
R-squared	0.219	0.236	0.418	0.427

Robust standard errors in parentheses

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

Table 10.3 Differential impact of the course on different groups of students

	(1)	(2)	(3)	(5)	(6)	(7)
TreatPost	4.301*** (0.291)	3.738*** (0.272)	3.817*** (0.268)	3.806*** (0.212)	4.366*** (0.291)	4.076*** (0.232)
Treat*Male	-0.979** (0.392)					
Treat*top50%ItalianGrade		0.109 (0.352)				
Treat*top50%MathGrade			-0.051 (0.342)			
Treat*HighSchool				-0.39 (1.133)		
Treat*FutureUnivStudents					-1.096*** (0.391)	
Treat*FutureStudentsOfEconomics						-1.310*** (0.483)
ClassFixedEffects	YES	YES	YES	YES	YES	YES
Constant	4.889** (1.967)	5.203** (2.033)	4.997** (2.001)	5.044** (1.971)	4.937** (1.965)	5.068** (1.965)
Observations	1172	1172	1172	1172	1172	1172
R-squared	0.455	0.452	0.452	0.452	0.455	0.455

Standard errors in parentheses *** p<0.01, ** p<0.05, *p<0.1

Table 11. Progress in financial literacy synthesis of econometric findings from the reshaped sample

TWC classes						
	Not included	Not included	Not included	Included	Included	Included
Parental job and education	Not included	Not included	Not included	Included	Included	Included
Class fixed effects	No	No	No	No	No	No
Constant	0.405*** (0.059)	0.439*** (0.066)	0.298** (0.131)	0.414*** (0.082)	0.511*** (0.094)	0.243 (0.149)
Observations	12657	8289	4342	9181	6103	3078
R-squared	0.004	0.005	0.009	0.01	0.013	0.023
TC classes						
	All sample	Treatment	Control	All sample	Treatment	Control
Parental job and education	Not included	Not included	Not included	Included	Included	Included
Class fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.266*** (0.048)	0.502*** (0.069)	0.406*** (0.102)	0.336*** (0.072)	0.588*** (0.183)	0.443*** (0.125)
Observations	12631	8289	4342	9181	6103	3078
R-squared	0.04	0.032	0.05	0.04	0.033	0.057

Table 12.1 The determinants of virtual demand for money

	(1)	(2)	(3)	(4)
MathGrade	0.478 (1.260)	0.41 (1.252)	1.018 (1.089)	0.846 (1.091)
ItalianGrade	-1.753 (1.426)	-1.429 (1.466)	-1.79 (1.361)	-1.303 (1.369)
IntermediateGrade	1.703* (0.919)	1.412 (0.920)	1.255 (0.896)	0.862 (0.901)
Male	-5.008* (2.685)	-4.732* (2.760)	-6.233*** (2.093)	-6.102*** (2.136)
MathDebt	1.647 (2.333)	1.145 (2.359)	2.093 (2.700)	1.727 (2.703)
Volunteering	-5.699 (4.482)	-5.614 (4.143)	-7.014** (3.430)	-6.871** (3.435)
Humanities	-1.293 (3.213)	-1.59 (3.347)		
WouldBeUniversity	-4.684 (2.995)	-4.21 (2.931)	-3.903* (2.351)	-3.435 (2.359)
WouldBeEconomics	-2.388 (3.718)	-2.196 (3.687)	-1.735 (2.680)	-1.452 (2.689)
TreatPost	-3.916** (1.667)	-3.697** (1.663)	-4.710** (1.968)	-4.621** (1.962)
Milan	-1.001 (2.401)	-0.358 (2.558)		
FatherClerk		4.983 (2.992)		5.649** (2.507)
FatherWorker		0.995 (3.566)		2.271 (2.651)
FatherPublicSector		2.834 (5.147)		4.959 (3.697)
MotherHousewife		-1.327 (3.398)		-4.111* (2.338)
MotherClerk		-0.268 (3.013)		-2.873 (2.537)
FatherDegree		-7.977** (3.093)		-5.985 (3.723)
MotherDegree		0.099 (4.865)		-3.696 (3.484)
BrothSistUniversity		-0.009 (0.005)		-0.004 (0.005)
HouseholdSize		1.483 (2.038)		1.726 (1.240)
ClassFixedEffects	NO	NO	YES	YES
Constant	65.075*** (10.631)	60.722*** (12.385)	66.629*** (11.436)	63.260*** (12.068)
Observations	973	969	973	969
R-squared	0.029	0.044	0.117	0.134

Robust standard errors in parentheses

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

Dependent variable: share of the money held in current account indicated when answering the following question: *You inherit 100,000 euros with which you plan to buy a flat in 4 years. How do you invest the money?* (Shares of the money held in current account or invested in government bonds, corporate bonds and shares before and after the course in financial education)

Table 12.1 The determinants of virtual demand for money– share in cash below 20 ‘percent

Dependent variable: (0/1) dummy taking value of one if the share of the money held in current account indicated when answering to the following question: *You inherit 100,000 euros with which you plan to buy a flat in 4 years. How do you invest the money ?* (Shares of the money held in current account or invested in government bond, corporate bonds and shares before and after the course of financial education) – is below 20 percent

VARIABLES	After the course (all sample)		Before the course (all sample)	
	(1)	(2)	(3)	(4)
MathGrade	-0.003 (0.010)	0.002 (0.014)	0.001 (0.010)	0.006 (0.009)
ItalianGrade	0.011 (0.011)	0.005 (0.012)	0.016 (0.011)	0.015 (0.010)
IntermediateGrade	-0.009 (0.006)	-0.014* (0.008)	-0.019** (0.008)	-0.019** (0.008)
Male	0.067*** (0.019)	0.078*** (0.026)	0.043** (0.019)	0.037 (0.023)
MathDebt	-0.036* (0.020)	-0.008 (0.019)	-0.039** (0.018)	-0.022 (0.021)
Volunteering	0.099** (0.043)	0.055 (0.049)	0.029 (0.027)	0.041 (0.037)
Humanities	-0.038 (0.026)		-0.008 (0.029)	
WouldBeUniversity	0.020 (0.027)	-0.011 (0.043)	0.019 (0.021)	0.002 (0.025)
WouldBeEconomics	-0.004 (0.021)	0.015 (0.031)	-0.002 (0.020)	0.011 (0.027)
Milan	0.031 (0.025)		0.037* (0.021)	
Treatment	-0.077** (0.035)	-0.081** (0.032)	-0.050 (0.035)	-0.050 (0.032)
Foreigner		0.095 (0.059)		0.050 (0.044)
Observations	642	422	651	467

Robust standard errors in parentheses

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

Table 12.2 The determinants of virtual demand for money – share in cash above 80 ‘percent

Dependent variable: (0/1) dummy taking value of one if the share of the money held in current account indicated when answering the following question: *You inherit 100,000 euros with which you plan to buy a flat in 4 years. How do you invest the money?* (Shares of the money held in current account or invested in government bond, corporate bonds and shares before and after the course of financial education) is above 80 percent

VARIABLES	(1)	(2)	(3)	(4)
MathGrade	0.014 (0.021)	0.022 (0.027)	0.013 (0.018)	0.008 (0.020)
ItalianGrade	-0.040* (0.021)	-0.046* (0.025)	-0.036 (0.026)	-0.027 (0.029)
IntermediateGrade	-0.018 (0.019)	-0.011 (0.018)	-0.009 (0.016)	-0.028 (0.019)
Male	-0.090** (0.044)	-0.043 (0.058)	-0.044 (0.059)	-0.026 (0.078)
MathDebt	0.025 (0.022)	0.026 (0.037)	0.012 (0.009)	0.012* (0.007)
Volunteering	-0.051 (0.069)	-0.022 (0.098)	0.055 (0.084)	0.071 (0.106)
Humanities	-0.152** (0.069)		-0.280*** (0.096)	
WouldBeUniversity	-0.077 (0.049)	-0.036 (0.063)	-0.071 (0.066)	-0.026 (0.080)
WouldBeEconomics	-0.058 (0.070)	-0.195*** (0.065)	-0.092 (0.064)	-0.115 (0.075)
Milan	-0.120** (0.048)		-0.189** (0.076)	
Treatment	-0.060 (0.061)	-0.065 (0.065)	-0.036 (0.116)	-0.028 (0.121)
Foreigner		0.002 (0.080)		0.009 (0.064)
Observations	642	422	651	467

Robust standard errors in parentheses

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

Table 13. The determinants of the decision to read economic and financial articles on newspapers

	(1)	(2)	(3)	(4)
MathGrade	0.011 (0.023)	0.015 (0.025)	0.011 (0.018)	0.016 (0.018)
ItalianGrade	0.066*** (0.025)	0.061*** (0.023)	0.066*** (0.023)	0.061*** (0.023)
IntermediateGrade	-0.016 (0.015)	-0.015 (0.015)	-0.031** (0.015)	-0.030* (0.015)
Male	0.025 (0.039)	0.015 (0.040)	-0.017 (0.035)	-0.024 (0.036)
MathDebt	0.086** (0.037)	0.092** (0.040)	0.108** (0.043)	0.116*** (0.043)
Volunteering	-0.001 (0.073)	-0.012 (0.071)	-0.035 (0.059)	-0.052 (0.059)
Humanities	0.017 (0.039)	0.03 (0.040)		
WouldBeUniversity	0.049 (0.037)	0.033 (0.038)	0.056 (0.039)	0.038 (0.039)
WouldBeEconomics	0.074 (0.060)	0.071 (0.056)	0.107** (0.045)	0.104** (0.046)
TreatPost	0.208*** (0.040)	0.213*** (0.041)	0.209*** (0.032)	0.214*** (0.032)
Milan	-0.136** (0.067)	-0.141** (0.065)		
FatherClerk		-0.048 (0.038)		-0.079* (0.042)
FatherWorker		-0.072 (0.055)		-0.068 (0.045)
FatherPublicSector		-0.224*** (0.066)		-0.237*** (0.058)
MotherHousewife		0.044 (0.044)		0.024 (0.039)
MotherClerk		-0.07 (0.052)		-0.103** (0.043)
FatherDegree		0.004 (0.066)		0.015 (0.066)
MotherDegree		0.137** (0.062)		0.127** (0.058)
ClassFixedEffects	NO	NO	YES	YES
Observations	1158	1158	1153	1153

Robust standard errors in parentheses

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

Probit estimate: coefficient measures the effect of a unit change in the regressors on the probability of reading economic articles in newspapers

Table 14. The determinants of the decision to read (and ability to understand) economic and financial articles on newspapers

	(1)	(2)	(3)	(4)
MathGrade	0.006 (0.021)	0.009 (0.022)	0.002 (0.018)	0.006 (0.018)
ItalianGrade	0.072*** (0.024)	0.067*** (0.023)	0.079*** (0.022)	0.073*** (0.023)
IntermediateGrade	-0.012 (0.016)	-0.011 (0.016)	-0.033** (0.015)	-0.032** (0.015)
Male	0.028 (0.039)	0.02 (0.039)	-0.015 (0.035)	-0.019 (0.036)
MathDebt	0.081** (0.036)	0.085** (0.037)	0.100** (0.044)	0.106** (0.044)
Volunteering	0.017 (0.074)	0.011 (0.070)	-0.023 (0.059)	-0.034 (0.059)
Humanities	0.076* (0.041)	0.080* (0.043)		
WouldBeUniversity	0.06 (0.037)	0.046 (0.038)	0.070* (0.039)	0.054 (0.039)
WouldBeEconomics	0.065 (0.061)	0.061 (0.058)	0.090** (0.046)	0.088* (0.047)
TreatPost	0.166*** (0.036)	0.170*** (0.036)	0.163*** (0.033)	0.169*** (0.033)
Milan	-0.091 (0.067)	-0.09 (0.065)		
FatherClerk		-0.029 (0.042)		-0.065 (0.042)
FatherWorker		-0.073 (0.060)		-0.063 (0.045)
FatherPublicSector		-0.198*** (0.061)		-0.204*** (0.057)
MotherHousewife		0.076* (0.045)		0.058 (0.039)
MotherClerk		-0.076 (0.058)		-0.112*** (0.042)
FatherDegree		-0.022 (0.070)		-0.019 (0.066)
MotherDegree		0.152** (0.061)		0.140** (0.059)
ClassFixedEffects	NO	NO	YES	YES
Observations	1158	1158	1153	1153

Robust standard errors in parentheses

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

Appendix

Tab. A1 Variables definitions

Variable	
TotRight	Total number of correct answers
FatherClerk	Dummy taking value of one if the father is an employee in the private sector
FatherWorker	Dummy taking value of one if the father is a manual worker
FatherPublicSector	Dummy taking value of one if the father is an employee in the public sector
MotherHousewife	Dummy taking value of one if the mother is a housewife
MotherClerk	Dummy taking value of one if the mother is an employee
FatherDegree	Dummy taking value of one if the father has a university degree
MotherDegree	Dummy taking value of one if the mother has a university degree
Foreign	Dummy taking value of one if the student does not have Italian citizenship
BrothSistUniversity	Number of brothers or sisters attending University
HouseholdSize	Number of people living in the household
Mortgage	Dummy taking value of one if the student's family has a mortgage
Loan	Dummy taking value of one if the student's family is a borrower
MathGrade	Final grade in mathematics in the previous school year
ItalianGrade	Final grade in Italian in the previous school year
IntermediateGrade	Final grade at middle school
Male	Dummy taking value of one if the student is male.
MathDebt	Dummy taking value of one if the student had "debito" ("insufficient" grade) in mathematics in the previous year
Volunteering	Dummy taking value of one if the student takes part in volunteering activities
Humanities	Dummy taking value of one if the student is at <i>liceo classico</i> * high school
WouldBeUniversity	Dummy taking value of one if the student intends to go to University
WouldBeEconomics	Dummy taking value of one if the student intends to study economics at university
TotRightPost	Total number of correct answers after the treatment
Milan	Dummy taking value of one if the student attends school in Milan

Table 12. The determinants of virtual demand for money

	(1)	(2)	(3)	(4)
MathGrade	0.004 (0.021)	0.015 (0.030)	-0.008 (0.021)	0.006 (0.030)
ItalianGrade	-0.029 (0.020)	-0.036 (0.028)	-0.025 (0.021)	-0.031 (0.029)
IntermediateGrade	-0.011 (0.013)	-0.014 (0.023)	-0.005 (0.015)	-0.006 (0.028)
Male	-0.061 (0.047)	0.008 (0.071)	-0.143*** (0.042)	-0.107 (0.079)
MathDebt	-0.038 (0.046)	-0.04 (0.074)	-0.035 (0.050)	-0.053 (0.081)
Volunteering	-0.001 (0.072)	-0.034 (0.100)	0.027 (0.074)	-0.009 (0.102)
Humanities	-0.188*** (0.071)	-0.179 (0.115)		
WouldBeUniversity	-0.086 (0.053)	-0.044 (0.071)	-0.105* (0.054)	-0.04 (0.075)
WouldBeEconomics	-0.079 (0.055)	-0.213*** (0.049)	-0.1 (0.063)	-0.313*** (0.057)
TreatPost	-0.118*** (0.032)	-0.165*** (0.045)	-0.108*** (0.036)	-0.160** (0.063)
Milan	-0.151*** (0.050)			
FatherClerk		0.087 (0.077)		0.185* (0.095)
FatherWorker		0.159*** (0.058)		0.169*** (0.065)
FatherPublicSector		-0.077 (0.090)		-0.113 (0.085)
MotherHousewife		0.038 (0.069)		0.004 (0.065)
MotherClerk		0.144* (0.077)		0.127 (0.083)
FatherDegree		-0.027 (0.107)		-0.121 (0.124)
MotherDegree		0.026 (0.106)		0.055 (0.116)
BrothSistUniversity		0.001 (0.001)		0.0001** (0.00001)
HouseholdSize		0.04 (0.032)		0.05 (0.038)
Mortgage		-0.055 (0.060)		0.022 (0.066)
Loan		0.017 (0.059)		0.028 (0.071)
ClassFixedEffects	NO	NO	YES	YES
Observations	1176	546	1146	527

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Dependent variable: (0/1) dummy taking value of one if the share of the money held in current account indicated when answering the following question: *You inherit 100,000 euros with which you plan to buy a flat in 4 years. How do you invest the money?* (Shares of the money held in current account or invested in government bonds, corporate bonds and shares before and after the course of financial education) is above 80 percent

Table 12. The determinants of virtual demand for money

	(1)	(2)	(3)	(4)
voto_mat	-0.004 (0.010)	-0.013 (0.011)	-0.004 (0.011)	-0.02 (0.013)
voto_ita	0.012* (0.007)	0.008 (0.011)	0.011 (0.007)	-0.001 (0.013)
voto_medie	-0.015** (0.007)	-0.005 (0.006)	-0.019*** (0.007)	-0.003 (0.009)
sesso	0.060*** (0.018)	0.033* (0.020)	0.072*** (0.022)	0.035 (0.028)
debiti_matematica	-0.036** (0.014)	-0.021 (0.018)	-0.047*** (0.017)	-0.025 (0.018)
volontariato	0.054* (0.033)	-0.023 (0.027)	0.060* (0.032)	-0.005 (0.055)
classico	-0.023 (0.014)	-0.018 (0.016)		
universit	0.031 (0.022)	0.014 (0.027)	0.042 (0.029)	0.018 (0.032)
futuroiscrittoeconomia	-0.01 (0.019)	0.014 (0.031)	-0.003 (0.026)	0.068 (0.065)
straniero	0.082* (0.048)		0.113** (0.051)	
trattamentopost	0.009 (0.010)	0.005 (0.009)	0.019 (0.013)	0.027** (0.013)
milano	0.036* (0.019)			
padreimpiegato		-0.042** (0.017)		-0.040** (0.017)
padreoperaio		-0.014 (0.019)		-0.03 (0.020)
padredipubblico		-0.013 (0.021)		-0.008 (0.029)
madrecasalinga		-0.012 (0.016)		-0.009 (0.022)
madreimpiegata		-0.006 (0.020)		-0.011 (0.022)
pl Laureaplust		-0.024 (0.017)		-0.028 (0.019)
mlaureaplust		0.0001 (0.022)		0.009 (0.031)
cittadinanzaleo2		-0.159** (0.074)		-0.342*** (0.118)
fratelli_universit		0.0001 (0.001)		0.0001 (0.0001)
num_familiari		0.0001 (0.008)		-0.002 (0.013)
mutuo_famiglia		-0.004 (0.025)		0.002 (0.038)
prestiti_famiglia		-0.049*** (0.016)		-0.071*** (0.015)
class fixed effects	NO	NO	YES	YES
Observations	1240	588	935	388

Robust standard errors in parentheses

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

Dependent variable: (0/1) dummy taking value of one if the share of the money held in current account indicated when answering the following question: *You inherit 100,000 euros with which you plan to buy a flat in 4 years. How do you invest the money?* (Shares of the money held in current account or invested in government bonds, corporate bonds and shares before and after the course of financial education) is below 20 percent

Appendix 2

1. Contents of the teaching modules

There are six teaching modules which when taken all together form the cycle of lectures. The following topics are addressed by each module:

1. Basic Concepts of Economics
2. Economic Operators: Households, Companies and Banks
3. Debt, Indebtedness, and Financing
4. Monetary Policy and the Monetary Institutions
5. Financial Markets
6. Finance and Ethics

1. Basic Concepts of Economics

This teaching unit deals with economic definitions. It introduces the basic concepts of microeconomics, macroeconomics, and political economy. It then presents concepts concerning macroeconomic magnitudes, such as: gross domestic product and its composition, aggregate demand, growth rates of the economy, inflation and its effects, employment and unemployment, money and its functions, interest rates, and the links of these magnitudes with everyday life and the financial market.

2. Economic Operators: Households, Companies and Banks

This teaching unit considers concepts relative to flows among economic operators (households, firms and banks) and the social functions performed by these three actors, with the focus on the role, activities, and functions of banks. Explanations are given of the concepts underlying financial intermediation, the traditional functions of banks, and forms of deposits, savings and loans, as well as management of the risks attendant on traditional banking activities.

3. Debt, Indebtedness, and Financing

This teaching unit considers concepts concerning firms and households, with the focus on consumption, saving, indebtedness, and financing. It then discusses the motives for the postponement of consumption to the future (saving) and those for the anticipation of future consumption (indebtedness), and how financial resources are procured, with particular regard to risks. This unit considers both private operators and the public operator *par excellence*, the State. The unit finishes with a treatment of the links between national debt and the single currency.

4. Monetary Policy and the Monetary Institutions

This teaching unit deals with the most important monetary institutions, such the European Central Bank and the American Federal Reserve, and their monetary policies. It begins with the concepts of the value of money and interest rates, and continues with the mechanisms which transmit decisions by the monetary authorities to the financial markets. The focus then shifts to the main objectives of the central banks, the European Central Bank in particular, whose principal operating bodies are described. The second part considers the American Central Bank, the Federal Reserve, and concludes with a comparison between the two systems.

5. Financial Markets

This teaching unit examines the financial markets. It begins by explaining the decision-making process of operators in conditions of uncertainty. It continues with a treatment of the financial markets, with particular regard to securities, bonds, stocks, and derivatives. It describes the institutions that operate in the financial markets and then considers types of instruments and transactions in the financial markets. The unit closes with a treatment of the risks of investment in the financial markets.

6. Finance and Ethics

This teaching unit presents all the intermediaries which operate in the banking and financial system, with particular regard to the social and environmental effects of their actions. It starts with the traditional bank foundations, describing their nature and activities. Then analysed are examples of socially responsible financing, such as microcredit institutes, ethically-oriented funds, and other financial institutions created for mainly social purposes.